

*Merger Shocks and the Origin of the Large X-ray vs.
SZ Discrepancy in Abell 611*

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Senior Thesis Submitted in Partial Completion of the
Requirements of the
Bachelor of Arts Degree in Astronomy
University of Virginia

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May 2020

Abstract

We have proposed the first useful XMM observation of the CLASH cluster Abell 611. We have imaged the Sunyaev-Zel'dovich (SZ) effect using MUSTANG (9" res) and Bolocam (1' res). The high-resolution MUSTANG SZ image shows an excess south of the cluster center that is likely to be a merger shock. The MUSTANG+Bolocam image was used to derive the cluster pressure profile, which is 3x greater than that from the Chandra X-ray data. This is the largest discrepancy seen in any clusters we have observed. We have used the XMM observation to establish the nature of the southern SZ excess, and determined the dynamical state of the cluster. The origin of the SZ vs. X-ray discrepancy was found; this is important as a test of X-ray or SZ mass proxies for clusters in cosmological studies. The was accomplished by analyzing extended sources observed within the cluster and generating X-Ray images of the cluster with emphasis upon temperature and density distribution.

Introduction

Clusters of galaxies have long been vital probes of cosmology, giving early evidence of dark matter and of a low-density Universe. Their importance is partly due to their being simultaneously the biggest objects which are relaxed and bound, and the smallest objects which contain a fair sample of the composition of the Universe (e.g., baryons vs. dark matter) However, the use of clusters for cosmology generally requires that their total masses be determined. This is often done using mass proxies from X-ray or Sunyaev-Zel'dovich (SZ) data, which may depend on clusters being relaxed. Many clusters of galaxies appear to be forming at the present time through massive cluster mergers. Merger shocks driven into the intra-cluster gas are the primary heating mechanism in massive clusters. Chandra and XMM have provided beautiful X-ray

images and spectra of merger hydrodynamical effects, including “cold fronts” and merger shocks (Markevitch & Vikhlinin 2007). Unfortunately, these mergers can affect X-ray and SZ mass determinations. Recently, our high spatial resolution SZ observations have also detected merger shocks and other dynamical features in clusters (Mason et al. 2010; Korngut et al. 2011; Mroczkowski et al. 2012; Young et al. 2015). The SZ observations have the advantage that they map the integrated electron pressure through the cluster; the connection to the pressure means that SZ structures highlight violent dynamical effects in the ICM, such as shocks. We have mapped at high angular resolution all of the Cluster Lensing And Supernova survey with Hubble (CLASH; Postman et al. 2012) clusters visible with the Green Bank Telescope using the MUSTANG and MUSTANG1.5 instruments 9'' resolution, 90 GHz, Romero et al. 2015a,b). These observations have been combined with Bolocam data from the Caltech Submillimeter Observatory (CSO) which provides lower resolution but larger scale data. These combined observations have been used to determine the pressure profiles of the CLASH and other clusters, which have been compared to the profiles derived from X-ray observations (e.g., Cavagnolo et al. 2009). Since the SZ effect directly measures electron pressure, this comparison provides a strong test of hydrostatic equilibrium in clusters. In addition, the high-resolution MUSTANG observations directly show evidence for mergers by imaging shocks.

XMM-Newton Observations and Data Reduction

Abell 611 was observed on one occasion by the XMM-Newton X-ray observatory for the purpose of this paper. XMM has observed Abell 611 once, an 87-ks observation in 2019. Data was reduced and analyzed from the European Photon Imaging Cameras (EPIC) for the observation. Analysis was performed using the XMM Science Analysis System (SAS) and with the XMM Extended Source Analysis Software (ESAS). However, for ObsID 0781590201, the

EPIC-MOS1 CCDs 3 and 6 were inactive due to micrometeorite damage. Lastly, point sources were identified using the CHEESE task, and significant analysis was conducted to remove all non-cluster related point sources as well as any false sources. Furthermore, there were point sources added to the CHEESE file that were missed in the initial identification process.

Conclusion

Based on the progress conducted over the span of the academic school year, little significant results were found regarding the merger shocks and the origin of the large X-ray versus SZ discrepancy found in Abell 611. As of this publication date, only preliminary calculations and analysis has been performed to prepare the data for further studies. However, as of publications, said analysis is being conducted, however no conclusive results were able to be published.

References

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- Romero, C. E., Mason, B. S., Sayers, J., Young, A. H., Mroczkowski, T., Clarke, T. E., ... Golwala, S. (2015). Galaxy Cluster Pressure Profiles, As Determined By Sunyaev-Zeldovich Effect Observations With Mustang And Bolocam. I. Joint Analysis Technique. *The Astrophysical Journal*, 807(2), 121. doi: 10.1088/0004-637x/807/2/121

Young, A. H., Mroczkowski, T., Romero, C., Sayers, J., Balestra, I., Clarke, T. E., ... Umetsu, K. (2015). Measurements Of The Sunyaev–Zel'Dovich Effect In Macs J0647.7 7015 And Macs J1206.2–0847 At High Angular Resolution With Mustang. *The Astrophysical Journal*, 809(2), 185. doi: 10.1088/0004-637x/809/2/185

Appendix

Analysis Log

10/31/19

[htb3hg@xmm ~]\$ ssh -Y astr-XMM.astro.virginia.edu

htb3hg@astr-xmm.astro.virginia.edu's password:

Last login: Thu Oct 31 11:35:53 2019 from 172.25.42.46

[htb3hg@xmm ~]\$ cd/XMMShared/htb3hg/Data/A611

cd/XMMShared/htb3hg/Data/A611: Command not found.

[htb3hg@xmm ~]\$ ls

Desktop/ Music/ Templates/

Documents/ pfiles/ Videos/

Downloads/ Pictures/

media@ Public/

[htb3hg@xmm ~]\$ cd/XMMShared/htb3hg

cd/XMMShared/htb3hg: Command not found.

[htb3hg@xmm ~]\$ cd

[htb3hg@xmm ~]\$ ls

Desktop/ Music/ Templates/

Documents/ pfiles/ Videos/

Downloads/ Pictures/

media@ Public/

[htb3hg@xmm ~]\$ cd/xmmshared

cd/xmmshared: Command not found.

[htb3hg@xmm ~]\$ cd/XMMShared/htb3hg

cd/XMMShared/htb3hg: Command not found.

[htb3hg@xmm ~]\$ cd/XMMShared/htb3hg

cd/XMMShared/htb3hg: Command not found.

```
[htb3hg@xmm ~]$ cd /XMMShared/htb3hg
```

```
[htb3hg@xmm htb3hg]$ ls
```

Data/

```
[htb3hg@xmm htb3hg]$ cd /Data
```

/Data: No such file or directory.

```
[htb3hg@xmm htb3hg]$ cd Data
```

```
[htb3hg@xmm Data]$ ls
```

A611/

```
[htb3hg@xmm Data]$ cd A611
```

```
[htb3hg@xmm A611]$ ls
```

XMM/

```
[htb3hg@xmm A611]$ cd XMM
```

```
[htb3hg@xmm XMM]$ ls
```

0605000601/ 0781590301/ 0781590501/

0781590201/ 0781590401/ analysis.txt

11/11/19

```
[htb3hg@xmm ~]$ ssh -Y astr-XMM.astro.virginia.edu
```

htb3hg@astr-xmm.astro.virginia.edu's password:

Last login: Mon Nov 11 17:08:30 2019 from 172.25.207.41

```
[htb3hg@xmm ~]$ cd /XMMShared/htb3hg/Data/A611
```

```
[htb3hg@xmm A611]$ cd XMM
```

```
[htb3hg@xmm XMM]$ ls
```

0605000601/ 0781590201/ 0781590301/ 0781590401/ 0781590501/ analysis.txt

```
[htb3hg@xmm XMM]$ cd 07
```

0781590201/ 0781590301/ 0781590401/ 0781590501/

```
[htb3hg@xmm XMM]$ cd 0781590501
```

```
[htb3hg@xmm 0781590501]$ mkdir analysis
```

```
[htb3hg@xmm 0781590501]$ sasinit
```

```
sasversion:- Executing (routine): sasversion -w 1 -V 4
sasversion:- sasversion (sasversion-1.2) [xmmsas_20170719_1539-16.1.0] started: 2019-11-11T22:25:23.000
sasversion:- XMM-Newton SAS release and build information:
```

```
SAS release: xmmsas_20170719_1539-16.1.0
Compiled on: Fri Jul 28 01:07:14 CEST 2017
Compiled by: sasbuild@sasbld01n.net4.lan
Platform : RHEL6.8 64
```

SAS-related environment variables that are set:

```
SAS_DIR = /XMMShared/cls7i/Software/sas_16.1.0/xmmsas_20170719_1539
SAS_PATH = /XMMShared/cls7i/Software/sas_16.1.0/xmmsas_20170719_1539
SAS_CCFPATH = /XMMShared/conx/Software/ccf
```

```
sasversion:- sasversion (sasversion-1.2) [xmmsas_20170719_1539-16.1.0] ended: 2019-11-11T22:25:23.000
```

Do not forget to define SAS_CCFPATH, SAS_CCF and SAS_ODF

```
[htb3hg@xmm 0781590501]$ setenv SAS_CCF
/net/home/htb3hg/DATA/A611/XMM/0781590501/analysis/ccf.cif
```

```
CORRECT>setenv SAS_CCF /net/home/htb3hg/DATA/A611/XMM/0781590501/analysis/ccf.cif (y|n|e|a)? yes
```

```
[htb3hg@xmm 0781590501]$ setenv SAS_ODF /net/home/htb3hg/DATA/A611/XMM/0781590501/ODF
```

```
[htb3hg@xmm 0781590501]$ cifbuild withccfpath=no analysisdate=now category=MXXCCF \
calindexset=$SAS_CCF fullpath=yes
```

```
** cifbuild: error (ParamNotInRange), Parameter 'category';
```

```
value 'MXXCCF' is outside range 'SCISIMCCF|XMMCCF'
```

```
[htb3hg@xmm 0781590501]$ odfingest odfdir=$SAS_ODF outdir=$SAS_ODF
```

```
odfingest:- Executing (routine): odfingest odfdir=/net/home/htb3hg/DATA/A611/XMM/0781590501/ODF
withodfdir=no outdir=/net/home/htb3hg/DATA/A611/XMM/0781590501/ODF
summaryfile=0000_0000000000_SCX000SUM.SAS usecanonicalname=yes writepath=yes
findinstrumentmodes=yes usehousekeeping=yes oalcheck=no -w 1 -V 4
```

```
odfingest:- odfingest (odfingest-3.30) [xmmsas_20170719_1539-16.1.0] started: 2019-11-11T22:30:26.000
```

```
** odflingest: error (NoOdf), `/net/home/htb3hg/DATA/A611/XMM/0781590501/ODF' is neither the name of a directory nor the name of an ODF summary file
```

```
[htb3hg@xmm 0781590501]$ gedit /net/home/htb3hg/DATA/A611/XMM/0781590501/setup
```

```
epchain without offtime=true
```

```
epchain
```

```
pn-filter
```

```
emchain
```

```
mos-filter
```

12/1/19

```
[htb3hg@xmm ~]$ ssh -Y astr-XMM.astro.virginia.edu
```

```
htb3hg@astr-xmm.astro.virginia.edu's password:
```

```
Last login: Sun Dec 1 21:51:05 2019 from 172.25.252.89
```

```
[htb3hg@xmm ~]$ cd /net/home/HTB3HG/DATA/A611/XMM/0781590501/
```

```
/net/home/HTB3HG/DATA/A611/XMM/0781590501/: No such file or directory.
```

```
[htb3hg@xmm ~]$ cd /net/home/HTB3HG/DATA/A611/XMM
```

```
/net/home/HTB3HG/DATA/A611/XMM: No such file or directory.
```

```
[htb3hg@xmm ~]$ cd /XMMShared/htb3hg/Data/A611
```

```
[htb3hg@xmm A611]$ cd XMM/0781590501
```

```
[htb3hg@xmm 0781590501]$ mkdir analysis
```

```
mkdir: cannot create directory \u2018analysis\u2019: File exists
```

```
[htb3hg@xmm 0781590501]$ sasinit
```

```
sasversion:- Executing (routine): sasversion -w 1 -V 4
```

```
sasversion:- sasversion (sasversion-1.2) [xmmsas_20170719_1539-16.1.0] started: 2019-12-02T02:56:07.000
```

```
sasversion:- XMM-Newton SAS release and build information:
```

```
SAS release: xmmsas_20170719_1539-16.1.0
```

```
Compiled on: Fri Jul 28 01:07:14 CEST 2017
```

```
Compiled by: sasbuild@sasbld01n.net4.lan
```

```
Platform : RHEL6.8 64
```

SAS-related environment variables that are set:

```
SAS_DIR = /XMMShared/cls7i/Software/sas_16.1.0/xmmsas_20170719_1539  
SAS_PATH = /XMMShared/cls7i/Software/sas_16.1.0/xmmsas_20170719_1539  
SAS_CCFPATH = /XMMShared/conx/Software/ccf
```

```
sasversion:- sasversion (sasversion-1.2) [xmmsas_20170719_1539-16.1.0] ended: 2019-12-02T02:56:07.000
```

Do not forget to define SAS_CCFPATH, SAS_CCF and SAS_ODF

```
[htb3hg@xmm 0781590501]$ setenv SAS_CCF  
/XMMShared/HTB3HG/DATA/A611/XMM/0781590501/analysis/ccf.cif  
[htb3hg@xmm 0781590501]$ setenv SAS_ODF  
/XMMShared/HTB3HG/DATA/A611/XMM/0781590501/ODF  
[htb3hg@xmm 0781590501]$ cifbuild withccfpath=no analysisdate=now category=MXXCCF \  
calindexset=$SAS_CCF fullpath=yes  
** cifbuild: error (ParamNotInRange), Parameter 'category':  
value 'MXXCCF' is outside range 'SCISIMCCF|XMMCCF'  
[htb3hg@xmm 0781590501]$ cifbuild withccfpath=no analysisdate=now category=XMMCCF \  
calindexset=$SAS_CCF fullpath=yes  
** cifbuild: error (invalidOption), invalid option '  
calindexset=/XMMShared/HTB3HG/DATA/A611/XMM/0781590501/analysis/ccf.cif  
[htb3hg@xmm 0781590501]$ cifbuild withccfpath=no analysisdate=now category=XMMCCF \  
?  
cifbuild:- Executing (routine): cifbuild calindexset=ccf.cif withccfpath=no usecanonicalname=no ccopath=.  
recurse=no fileglob=*.ccf|*.CCF fullpath=no withobservationdate=no observationdate=now analysisdate=now  
category=XMMCCF ignorecategory=no masterindex=no withmasterindexset=no masterindexset=ccf.mif  
append=no -w 1 -V 4  
cifbuild:- cifbuild (cifbuild-4.8) [xmmsas_20170719_1539-16.1.0] started: 2019-12-02T03:01:00.000  
cifbuild:- Will ask the analysis date to the OAL.  
** cifbuild: error (NoOdf), `/XMMShared/HTB3HG/DATA/A611/XMM/0781590501/ODF' is neither the name of  
a directory nor the name of an ODF summary file  
[htb3hg@xmm 0781590501]$ cifbuild withccfpath=no analysisdate=now category=XMMCCF \  
calindexset=$SAS_CCF fullpath=yes  
** cifbuild: error (invalidOption), invalid option '  
calindexset=/XMMShared/HTB3HG/DATA/A611/XMM/0781590501/analysis/ccf.cif
```

```
[htb3hg@xmm 0781590501]$ odfingest odfdir=$SAS_ODF outdir=$SAS_ODF
odfingest:- Executing (routine): odfingest odfdir=/XMMShared/HTB3HG/DATA/A611/XMM/0781590501/ODF
withodfdir=no outdir=/XMMShared/HTB3HG/DATA/A611/XMM/0781590501/ODF
summaryfile=0000_0000000000_SCX000SUM.SAS usecanonicalname=yes writepath=yes
findinstrumentmodes=yes usehousekeeping=yes oalcheck=no -w 1 -V 4

odfingest:- odfingest (odfingest-3.30) [xmmsas_20170719_1539-16.1.0] started: 2019-12-02T03:04:58.000
** odfingest: error (NoOdf), '/XMMShared/HTB3HG/DATA/A611/XMM/0781590501/ODF' is neither the name of
a directory nor the name of an ODF summary file

[htb3hg@xmm 0781590501]$ setenv SAS_CCF
/XMMShared/HTB3HG/DATA/A611/XMM/0781590501/analysis/ccf.cif

[htb3hg@xmm 0781590501]$ setenv SAS_ODF
/XMMShared/HTB3HG/DATA/A611/XMM/0781590501/ODF

[htb3hg@xmm 0781590501]$ cifbuild withccfpath=no analysisdate=now category=XMMCCF \
? calindexset=$SAS_CCF fullpath=yes

cifbuild:- Executing (routine): cifbuild
calindexset=/XMMShared/HTB3HG/DATA/A611/XMM/0781590501/analysis/ccf.cif withccfpath=no
usecanonicalname=no ccfpath=. recurse=no fileglob=*.ccf*.CCF fullpath=yes withobservationdate=no
observationdate=now analysisdate=now category=XMMCCF ignorecategory=no masterindex=no
withmasterindexset=no masterindexset=ccf.mif append=no -w 1 -V 4

cifbuild:- cifbuild (cifbuild-4.8) [xmmsas_20170719_1539-16.1.0] started: 2019-12-02T03:07:25.000
cifbuild:- Will ask the analysis date to the OAL.

** cifbuild: error (NoOdf), '/XMMShared/HTB3HG/DATA/A611/XMM/0781590501/ODF' is neither the name of
a directory nor the name of an ODF summary file

[htb3hg@xmm 0781590501]$ ls
analysis/ odf/ pps/

[htb3hg@xmm 0781590501]$ setenv SAS_ODF /XMMShared/HTB3HG/DATA/A611/XMM/0781590501/odf
[htb3hg@xmm 0781590501]$ cifbuild withccfpath=no analysisdate=now category=XMMCCF
calindexset=$SAS_CCF fullpath=yes

cifbuild:- Executing (routine): cifbuild
calindexset=/XMMShared/HTB3HG/DATA/A611/XMM/0781590501/analysis/ccf.cif withccfpath=no
usecanonicalname=no ccfpath=. recurse=no fileglob=*.ccf*.CCF fullpath=yes withobservationdate=no
observationdate=now analysisdate=now category=XMMCCF ignorecategory=no masterindex=no
withmasterindexset=no masterindexset=ccf.mif append=no -w 1 -V 4

cifbuild:- cifbuild (cifbuild-4.8) [xmmsas_20170719_1539-16.1.0] started: 2019-12-02T03:09:04.000
cifbuild:- Will ask the analysis date to the OAL.

** cifbuild: error (NoOdf), '/XMMShared/HTB3HG/DATA/A611/XMM/0781590501/odf' is neither the name of a
directory nor the name of an ODF summary file

[htb3hg@xmm 0781590501]$ ls
```

```
analysis/ odf/ pps/  
[htb3hg@xmm 0781590501]$ cd analysis  
[htb3hg@xmm analysis]$ ls  
---- I closed the terminal because I realized my odf is lowercase, not upper case, so I opened a new terminal  
to try again from the beginning with this info in mind ----  
[htb3hg@xmm ~]$ ssh -Y astr-XMM.astro.virginia.edu  
htb3hg@astr-xmm.astro.virginia.edu's password:  
Last login: Sun Dec 1 21:53:33 2019 from 172.29.243.57  
[htb3hg@xmm ~]$ cd /XMMShared/htb3hg/Data/A611/XMM/0781590501  
[htb3hg@xmm 0781590501]$ ls  
analysis/ odf/ pps/  
[htb3hg@xmm 0781590501]$ sasinit
```

```
sasversion:- Executing (routine): sasversion -w 1 -V 4  
sasversion:- sasversion (sasversion-1.2) [xmmsas_20170719_1539-16.1.0] started: 2019-12-02T03:13:39.000  
sasversion:- XMM-Newton SAS release and build information:
```

```
SAS release: xmmsas_20170719_1539-16.1.0  
Compiled on: Fri Jul 28 01:07:14 CEST 2017  
Compiled by: sasbuild@sasbld01n.net4.lan  
Platform : RHEL6.8 64
```

SAS-related environment variables that are set:

```
SAS_DIR = /XMMShared/cls7i/Software/sas_16.1.0/xmmsas_20170719_1539  
SAS_PATH = /XMMShared/cls7i/Software/sas_16.1.0/xmmsas_20170719_1539  
SAS_CCFPATH = /XMMShared/conx/Software/ccf
```

```
sasversion:- sasversion (sasversion-1.2) [xmmsas_20170719_1539-16.1.0] ended: 2019-12-02T03:13:39.000
```

Do not forget to define SAS_CCFPATH, SAS_CCF and SAS_ODF

```
[htb3hg@xmm 0781590501]$ setenv SAS_CCF
/XMMShared/HTB3HG/DATA/A611/XMM/0781590501/analysis/ccf.cif

[htb3hg@xmm 0781590501]$ setenv SAS_ODF /XMMShared/HTB3HG/DATA/A611/XMM/0781590501/odf
[htb3hg@xmm 0781590501]$ cibuild withccfpath=no analysisdate=now category=XMMCCF \
calindexset=$SAS_CCF fullpath=yes

** cibuild: error (invalidOption), invalid option '
calindexset=/XMMShared/HTB3HG/DATA/A611/XMM/0781590501/analysis/ccf.cif

[htb3hg@xmm 0781590501]$ setenv SAS_odf /XMMShared/HTB3HG/DATA/A611/XMM/0781590501/odf
[htb3hg@xmm 0781590501]$ cibuild withccfpath=no analysisdate=now category=XMMCCF \
calindexset=$SAS_CCF fullpath=yes

** cibuild: error (invalidOption), invalid option '
calindexset=/XMMShared/HTB3HG/DATA/A611/XMM/0781590501/analysis/ccf.cif

[htb3hg@xmm 0781590501]$ odfingest odfdir=$SAS_ODF outdir=$SAS_ODF

odfingest:- Executing (routine): odfingest odfdir=/XMMShared/HTB3HG/DATA/A611/XMM/0781590501/odf
withodfdir=no outdir=/XMMShared/HTB3HG/DATA/A611/XMM/0781590501/odf
summaryfile=0000_0000000000_SCX000SUM.SAS usecanonicalname=yes writepath=yes
findinstrumentmodes=yes usehousekeeping=yes oalcheck=no -w 1 -V 4

odfingest:- odfingest (odfingest-3.30) [xmmsas_20170719_1539-16.1.0] started: 2019-12-02T03:21:45.000
** odfingest: error (NoOdf), '/XMMShared/HTB3HG/DATA/A611/XMM/0781590501/odf' is neither the name of a
directory nor the name of an ODF summary file

[htb3hg@xmm 0781590501]$ odfingest odfdir=$SAS_odf outdir=$SAS_odf

odfingest:- Executing (routine): odfingest odfdir=/XMMShared/HTB3HG/DATA/A611/XMM/0781590501/odf
withodfdir=no outdir=/XMMShared/HTB3HG/DATA/A611/XMM/0781590501/odf
summaryfile=0000_0000000000_SCX000SUM.SAS usecanonicalname=yes writepath=yes
findinstrumentmodes=yes usehousekeeping=yes oalcheck=no -w 1 -V 4

odfingest:- odfingest (odfingest-3.30) [xmmsas_20170719_1539-16.1.0] started: 2019-12-02T03:22:18.000
** odfingest: error (NoOdf), '/XMMShared/HTB3HG/DATA/A611/XMM/0781590501/odf' is neither the name of a
directory nor the name of an ODF summary file
```

12/2/19

```
[htb3hg@xmm ~]$ ssh -Y astr-XMM.astro.virginia.edu
```

htb3hg@astr-xmm.astro.virginia.edu's password:

Last login: Mon Dec 2 19:38:27 2019 from 172.29.243.57

```
[htb3hg@xmm ~]$ cd /XMMShared/htb3hg/Data/A611/XMM/0781590201/
```

```
[htb3hg@xmm 0781590201]$ mkdir analysis
```

```
[htb3hg@xmm 0781590201]$ ls
```

analysis/ ODF/ PPS/

```
[htb3hg@xmm 0781590201]$ sasinit
```

sasversion:- Executing (routine): sasversion -w 1 -V 4

sasversion:- sasversion (sasversion-1.2) [xmmsas_20170719_1539-16.1.0] started: 2019-12-03T00:49:43.000

sasversion:- XMM-Newton SAS release and build information:

SAS release: xmmsas_20170719_1539-16.1.0

Compiled on: Fri Jul 28 01:07:14 CEST 2017

Compiled by: sasbuild@sasbld01n.net4.lan

Platform : RHEL6.8 64

SAS-related environment variables that are set:

SAS_DIR = /XMMShared/cls7i/Software/sas_16.1.0/xmmsas_20170719_1539

SAS_PATH = /XMMShared/cls7i/Software/sas_16.1.0/xmmsas_20170719_1539

SAS_CCFPATH = /XMMShared/conx/Software/ccf

sasversion:- sasversion (sasversion-1.2) [xmmsas_20170719_1539-16.1.0] ended: 2019-12-03T00:49:43.000

Do not forget to define SAS_CCFPATH, SAS_CCF and SAS_ODF

```
[htb3hg@xmm 0781590201]$ setenv SAS_CCF  
/XMMShared/htb3hg/Data/A611/XMM/0781590201/analysis/ccf.cif
```

```
[htb3hg@xmm 0781590201]$ setenv_ODF /XMMShared/htb3hg/Data/A611/XMM/0781590201/ODF
```

setenv_ODF: Command not found.

```
[htb3hg@xmm 0781590201]$ setenv SAS_ODF /XMMShared/htb3hg/Data/A611/XMM/0781590201/ODF
```

```
[htb3hg@xmm 0781590201]$ cifbuild withccfpath=no analysisdate=now category=XMMCCF \  
calindexset=$SAS_CCF fullpath=yes
```

** cifbuild: error (invalidOption), invalid option '
calindexset=/XMMShared/htb3hg/Data/A611/XMM/0781590201/analysis/ccf.cif'

```
[htb3hg@xmm 0781590201]$ cifbuild withccfpath=no analysisdate=now category=XMMCCF \  
?
```

```
cifbuild:- Executing (routine): cifbuild calindexset=ccf.cif withccfpath=no usecanonicalname=no ccopath=
recurse=no fileglob=*.ccf|.CCF fullpath=no withobservationdate=no observationdate=now analysisdate=now
category=XMMCCF ignorecategory=no masterindex=no withmasterindexset=no masterindexset=ccf.mif
append=no -w 1 -V 4

cifbuild:- cifbuild (cifbuild-4.8) [xmmsas_20170719_1539-16.1.0] started: 2019-12-03T00:56:51.000
cifbuild:- Will ask the analysis date to the OAL.

cifbuild:- Using the ODF 3180_0781590201 found in /XMMShared/htb3hg/Data/A611/XMM/0781590201/ODF
cifbuild:- Observation date: 2017-04-19T23:45:49.000
cifbuild:- Analysis date: 2019-12-03T00:56:51.000

** cifbuild: warning (NoMatchingCcfConstituents), Could not find any CCF constituents matching the search
criteria:
```

```
Analysis date = 2019-12-03T00:56:51.000
Observation date = 2017-04-19T23:45:49.000
ccfpath =
Category = XMMCCF
File glob = *.ccf|.CCF
CCF search path = /XMMShared/conx/Software/ccf
cifbuild:- cifbuild (cifbuild-4.8) [xmmsas_20170719_1539-16.1.0] ended: 2019-12-03T00:56:51.000
[htb3hg@xmm 0781590201]$ cifbuild withccfpath=no analysisdate=now category=XMMCCF \
? calindexset=$SAS_CCF fullpath=yes

cifbuild:- Executing (routine): cifbuild
calindexset=/XMMShared/htb3hg/Data/A611/XMM/0781590201/analysis/ccf.cif withccfpath=no
usecanonicalname=no ccopath=. recurse=no fileglob=*.ccf|.CCF fullpath=yes withobservationdate=no
observationdate=now analysisdate=now category=XMMCCF ignorecategory=no masterindex=no
withmasterindexset=ccf.mif append=no -w 1 -V 4

cifbuild:- cifbuild (cifbuild-4.8) [xmmsas_20170719_1539-16.1.0] started: 2019-12-03T00:57:31.000
cifbuild:- Will ask the analysis date to the OAL.

cifbuild:- Using the ODF 3180_0781590201 found in /XMMShared/htb3hg/Data/A611/XMM/0781590201/ODF
cifbuild:- Observation date: 2017-04-19T23:45:49.000
cifbuild:- Analysis date: 2019-12-03T00:57:31.000

** cifbuild: warning (NoMatchingCcfConstituents), Could not find any CCF constituents matching the search
criteria:
```

```
Analysis date = 2019-12-03T00:57:31.000
```

```
Observation date = 2017-04-19T23:45:49.000
ccfpath      =
Category     = XMMCCF
File glob    = *.ccf|*.CCF
CCF search path = /XMMShared/conx/Software/ccf
cifbuild:- cifbuild (cifbuild-4.8) [xmmsas_20170719_1539-16.1.0] ended: 2019-12-03T00:57:31.000
```

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```
[htb3hg@xmm ~]$ ssh -Y astr-XMM.astro.virginia.edu
```

```
htb3hg@astr-xmm.astro.virginia.edu's password:
```

```
Permission denied, please try again.
```

```
htb3hg@astr-xmm.astro.virginia.edu's password:
```

```
Last failed login: Tue Dec 3 11:53:18 EST 2019 from 172.29.243.57 on ssh:notty
```

```
There was 1 failed login attempt since the last successful login.
```

```
Last login: Tue Dec 3 11:50:53 2019 from 172.25.201.32
```

```
[htb3hg@xmm ~]$ cd /XMMShared/htb3hg/Data/A611/XMM/0781590201/
```

```
[htb3hg@xmm 0781590201]$ ls
```

```
analysis/ ccf.cif ODF/ PPS/
```

```
[htb3hg@xmm 0781590201]$ cd analysis
```

```
[htb3hg@xmm analysis]$ ls
```

```
ccf.cif
```

```
[htb3hg@xmm analysis]$ cd ..
```

```
[htb3hg@xmm 0781590201]$ cd analysis
```

```
[htb3hg@xmm analysis]$ sasinit
```

```
sasversion:- Executing (routine): sasversion -w 1 -V 4
```

```
sasversion:- sasversion (sasversion-1.2) [xmmsas_20170719_1539-16.1.0] started: 2019-12-03T16:55:25.000
```

```
sasversion:- XMM-Newton SAS release and build information:
```

```
SAS release: xmmsas_20170719_1539-16.1.0
```

```
Compiled on: Fri Jul 28 01:07:14 CEST 2017
```

Compiled by: sasbuild@sasbld01n.net4.lan

Platform : RHEL6.8 64

SAS-related environment variables that are set:

SAS_DIR = /XMMShared/cls7i/Software/sas_16.1.0/xmmsas_20170719_1539

SAS_PATH = /XMMShared/cls7i/Software/sas_16.1.0/xmmsas_20170719_1539

SAS_CCFPATH = /XMMShared/conx/Software/ccf

sasversion:- sasversion (sasversion-1.2) [xmmsas_20170719_1539-16.1.0] ended: 2019-12-03T16:55:25.000

Do not forget to define SAS_CCFPATH, SAS_CCF and SAS_ODF

```
[htb3hg@xmm analysis]$ setenv SAS_CCF  
/XMMShared/htb3hg/Data/A611/XMM/0781590201/analysis/ccf.cif  
  
[htb3hg@xmm analysis]$ setenv SAS_ODF /XMMShared/htb3hg/Data/A611/XMM/0781590201/ODF  
  
[htb3hg@xmm analysis]$ cifbuild withccfpath=no analysisdate=now category=XMMCCF \  
calindexset=$SAS_CCF fullpath=yes  
  
** cifbuild: error (invalidOption), invalid option '  
calindexset=/XMMShared/htb3hg/Data/A611/XMM/0781590201/analysis/ccf.cif  
  
[htb3hg@xmm analysis]$ cd ..  
  
[htb3hg@xmm 0781590201]$ sasinit
```

sasversion:- Executing (routine): sasversion -w 1 -V 4

sasversion:- sasversion (sasversion-1.2) [xmmsas_20170719_1539-16.1.0] started: 2019-12-03T16:56:42.000

sasversion:- XMM-Newton SAS release and build information:

SAS release: xmmsas_20170719_1539-16.1.0

Compiled on: Fri Jul 28 01:07:14 CEST 2017

Compiled by: sasbuild@sasbld01n.net4.lan

Platform : RHEL6.8 64

SAS-related environment variables that are set:

```
SAS_DIR = /XMMShared/cls7i/Software/sas_16.1.0/xmmsas_20170719_1539  
SAS_PATH = /XMMShared/cls7i/Software/sas_16.1.0/xmmsas_20170719_1539  
SAS_CCFPATH = /XMMShared/conx/Software/ccf  
SAS_CCF = /XMMShared/htb3hg/Data/A611/XMM/0781590201/analysis/ccf.cif  
SAS_ODF = /XMMShared/htb3hg/Data/A611/XMM/0781590201/ODF
```

sasversion:- sasversion (sasversion-1.2) [xmmsas_20170719_1539-16.1.0] ended: 2019-12-03T16:56:42.000

Do not forget to define SAS_CCFPATH, SAS_CCF and SAS_ODF

```
[htb3hg@xmm 0781590201]$ setenv SAS_CCF  
/XMMShared/htb3hg/Data/A611/XMM/0781590201/analysis/ccf.cif  
[htb3hg@xmm 0781590201]$ setenv SAS_ODF /XMMShared/htb3hg/Data/A611/XMM/0781590201/ODF  
[htb3hg@xmm 0781590201]$ cifbuild withccfpath=no analysisdate=now category=XMMCCF \  
calindexset=$SAS_CCF fullpath=yes  
** cifbuild: error (invalidOption), invalid option '  
calindexset=/XMMShared/htb3hg/Data/A611/XMM/0781590201/analysis/ccf.cif
```

12/3/19

```
[htb3hg@xmm ~]$ ssh -Y astr-XMM.astro.virginia.edu  
htb3hg@astr-xmm.astro.virginia.edu's password:  
Last login: Tue Dec 3 14:31:28 2019 from 172.29.243.57  
[htb3hg@xmm ~]$ cd /XMMShared/htb3hg/Data/A611/XMM/0781590201/  
[htb3hg@xmm 0781590201]$ ls  
analysis/ ODF/ PPS/  
[htb3hg@xmm 0781590201]$ sasinit
```

sasversion:- Executing (routine): sasversion -w 1 -V 4

sasversion:- sasversion (sasversion-1.2) [xmmsas_20170719_1539-16.1.0] started: 2019-12-03T19:49:31.000

sasversion:- XMM-Newton SAS release and build information:

SAS release: xmmsas_20170719_1539-16.1.0
Compiled on: Fri Jul 28 01:07:14 CEST 2017
Compiled by: sasbuild@sasbld01n.net4.lan
Platform : RHEL6.8 64

SAS-related environment variables that are set:

```
SAS_DIR = /XMMShared/cls7i/Software/sas_16.1.0/xmmsas_20170719_1539
SAS_PATH = /XMMShared/cls7i/Software/sas_16.1.0/xmmsas_20170719_1539
SAS_CCFPATH = /XMMShared/cls7i/Software/ccf
```

sasversion:- sasversion (sasversion-1.2) [xmmsas_20170719_1539-16.1.0] ended: 2019-12-03T19:49:31.000

Do not forget to define SAS_CCFPATH, SAS_CCF and SAS_ODF

```
[htb3hg@xmm 0781590201]$ setenv
SAS_CCF/XMMShared/htb3hg/Data/A611/XMM/0781590201/analysis/ccf.cif
[htb3hg@xmm 0781590201]$ setenv SAS_ODF /XMMShared/htb3hg/Data/A611/XMM/0781590201/ODF
[htb3hg@xmm 0781590201]$ cifbuild withccfpath=no analysisdate=now category=XMMCCF \
calindexset=$SAS_CCF fullpath=yes
** cifbuild: error (invalidOption), invalid option '
calindexset=/XMMShared/htb3hg/Data/A611/XMM/0781590201/analysis/ccf.cif
[htb3hg@xmm 0781590201]$ cifbuild withccfpath=no analysisdate=now category=XMMCCF
calindexset=$SAS_CCF fullpath=yes
cifbuild:- Executing (routine): cifbuild
calindexset=/XMMShared/htb3hg/Data/A611/XMM/0781590201/analysis/ccf.cif withccfpath=no
usecanonicalname=no ccfpath=. recurse=no fileglob=*.ccf*.CCF fullpath=yes withobservationdate=no
observationdate=now analysisdate=now category=XMMCCF ignorecategory=no masterindex=no
withmasterindexset=no masterindexset=ccf.mif append=no -w 1 -V 4
cifbuild:- cifbuild (cifbuild-4.8) [xmmsas_20170719_1539-16.1.0] started: 2019-12-03T19:50:36.000
cifbuild:- Will ask the analysis date to the OAL.
cifbuild:- Using the ODF 3180_0781590201 found in /XMMShared/htb3hg/Data/A611/XMM/0781590201/ODF
cifbuild:- Observation date: 2017-04-19T23:45:49.000
cifbuild:- Analysis date: 2019-12-03T19:50:36.000
cifbuild:- cifbuild (cifbuild-4.8) [xmmsas_20170719_1539-16.1.0] ended: 2019-12-03T19:51:22.000
```

```
18.505u 1.293s 0:46.63 42.4%    0+0k 2002104+208io 0pf+0w

[htb3hg@xmm 0781590201]$ ls
analysis/ ODF/ PPS/
[htb3hg@xmm 0781590201]$ cd analysis
[htb3hg@xmm analysis]$ ls
ccf.cif
[htb3hg@xmm analysis]$ ls -l
total 108
-rw-r-----+ 1 htb3hg htb3hg 103680 Dec  3 14:51 ccf.cif
[htb3hg@xmm analysis]$ cd ..
[htb3hg@xmm 0781590201]$ odfinest odfdir=$SAS_ODF outdir=$SAS_ODF
```

```
setenv SAS_CCF /XMMShared/htb3hg/Data/A611/XMM/0781590201/analysis/ccf.cif
setenv SAS_ODF
/XMMShared/htb3hg/Data/A611/XMM/0781590201/ODF/3180_0781590201_SCX00000SUM.SAS
-   Above lines were put in setup file
```

```
29      15:02  source ./setup
30      15:02  cd analysis
31      15:02  echo $SAS_ODF
32      15:04  epchain withoutoftime=true
33      15:08  history
```

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```
[htb3hg@xmm ~]$ ssh -Y astr-XMM.astro.virginia.edu
```

htb3hg@astr-xmm.astro.virginia.edu's password:

Last login: Fri Feb 7 16:33:36 2020 from 128.143.1.145

```
[htb3hg@xmm ~]$ cd /XMMShared/htb3hg/Data/A611/XMM/0781590201/
```

```
[htb3hg@xmm 0781590201]$ ls
```

analysis/ ODF/ PPS/ setup

[htb3hg@xmm 0781590201]\$ sasinit

sasversion:- Executing (routine): sasversion -w 1 -V 4

sasversion:- sasversion (sasversion-1.2) [xmmsas_20170719_1539-16.1.0] started: 2020-02-07T21:52:42.000

sasversion:- XMM-Newton SAS release and build information:

SAS release: xmmsas_20170719_1539-16.1.0

Compiled on: Fri Jul 28 01:07:14 CEST 2017

Compiled by: sasbuild@sasbld01n.net4.lan

Platform : RHEL6.8 64

SAS-related environment variables that are set:

SAS_DIR = /XMMShared/cls7i/Software/sas_16.1.0/xmmsas_20170719_1539

SAS_PATH = /XMMShared/cls7i/Software/sas_16.1.0/xmmsas_20170719_1539

SAS_CCFPATH = /XMMShared/cls7i/Software/ccf

sasversion:- sasversion (sasversion-1.2) [xmmsas_20170719_1539-16.1.0] ended: 2020-02-07T21:52:42.000

Do not forget to define SAS_CCFPATH, SAS_CCF and SAS_ODF

[htb3hg@xmm 0781590201]\$ source ./setup

[htb3hg@xmm 0781590201]\$ cd analysis

[htb3hg@xmm analysis]\$ ls

ccf.cif

P0781590201OBX000ATTSR0000.FIT

P0781590201PNS003BPXHMK0001.FIT

P0781590201PNS003BPXHMK0002.FIT

P0781590201PNS003BPXHMK0003.FIT

P0781590201PNS003BPXHMK0004.FIT

P0781590201PNS003BPXHMK0005.FIT

P0781590201PNS003BPXHMK0006.FIT
P0781590201PNS003BPXHMK0007.FIT
P0781590201PNS003BPXHMK0008.FIT
P0781590201PNS003BPXHMK0009.FIT
P0781590201PNS003BPXHMK0010.FIT
P0781590201PNS003BPXHMK0011.FIT
P0781590201PNS003BPXHMK0012.FIT
P0781590201PNS003BPXMSK0001.FIT
P0781590201PNS003BPXMSK0002.FIT
P0781590201PNS003BPXMSK0003.FIT
P0781590201PNS003BPXMSK0004.FIT
P0781590201PNS003BPXMSK0005.FIT
P0781590201PNS003BPXMSK0006.FIT
P0781590201PNS003BPXMSK0007.FIT
P0781590201PNS003BPXMSK0008.FIT
P0781590201PNS003BPXMSK0009.FIT
P0781590201PNS003BPXMSK0010.FIT
P0781590201PNS003BPXMSK0011.FIT
P0781590201PNS003BPXMSK0012.FIT
P0781590201PNS003FBKGTI0000.FIT
P0781590201PNS003FBKSPC0000.FIT
P0781590201PNS003FBKTSR0000.FIT
P0781590201PNS003OOEVL0000.FIT

[htb3hg@xmm analysis]\$ cd..

cd..: Command not found.

[htb3hg@xmm analysis]\$ cd ..

[htb3hg@xmm 0781590201]\$ ls

analysis/ ODF/ PPS/ setup

[htb3hg@xmm 0781590201]\$ cd analysis

[htb3hg@xmm analysis]\$ ls

ccf.cif

P0781590201OBX000ATTSR0000.FIT

P0781590201PNS003BPXHMK0001.FIT

P0781590201PNS003BPXHMK0002.FIT

P0781590201PNS003BPXHMK0003.FIT

P0781590201PNS003BPXHMK0004.FIT

P0781590201PNS003BPXHMK0005.FIT

P0781590201PNS003BPXHMK0006.FIT

P0781590201PNS003BPXHMK0007.FIT

P0781590201PNS003BPXHMK0008.FIT

P0781590201PNS003BPXHMK0009.FIT

P0781590201PNS003BPXHMK0010.FIT

P0781590201PNS003BPXHMK0011.FIT

P0781590201PNS003BPXHMK0012.FIT

P0781590201PNS003BPXMSK0001.FIT

P0781590201PNS003BPXMSK0002.FIT

P0781590201PNS003BPXMSK0003.FIT

P0781590201PNS003BPXMSK0004.FIT

P0781590201PNS003BPXMSK0005.FIT

P0781590201PNS003BPXMSK0006.FIT

P0781590201PNS003BPXMSK0007.FIT

P0781590201PNS003BPXMSK0008.FIT

P0781590201PNS003BPXMSK0009.FIT

P0781590201PNS003BPXMSK0010.FIT

P0781590201PNS003BPXMSK0011.FIT

P0781590201PNS003BPXMSK0012.FIT

P0781590201PNS003FBKGTI0000.FIT

P0781590201PNS003FBKSPC0000.FIT

P0781590201PNS003FBKTSR0000.FIT

P0781590201PNS003OOEVLI0000.FIT

[htb3hg@xmm analysis]\$ epchain withoutoftime=true

--- Too Much to Copy ---

[htb3hg@xmm analysis]\$ epchain

--- Too Much to Copy ---

[htb3hg@xmm analysis]\$ pn-filter

--- Too Much to Copy ---

[htb3hg@xmm analysis]\$ emchain

--- Too Much to Copy ---

[htb3hg@xmm analysis]\$ mos-filter

1S001

Limit=1.0 CCD=2 Hardness=5.538 Uncertainty=0.964

Limit=1.0 CCD=3 Hardness=0.000 Uncertainty=0.000 ****

Limit=0.90 CCD=4 Hardness=2.731 Uncertainty=0.626

Limit=1.97 CCD=5 Hardness=5.158 Uncertainty=0.746

Limit=1.0 CCD=6 Hardness=0.000 Uncertainty=0.000 ****

Limit=1.0 CCD=7 Hardness=7.156 Uncertainty=1.351

2S002

Limit=1.0 CCD=2 Hardness=5.488 Uncertainty=0.910

Limit=1.0 CCD=3 Hardness=6.345 Uncertainty=1.268

Limit=1.0 CCD=4 Hardness=4.922 Uncertainty=0.756

Limit=1.70 CCD=5 Hardness=6.386 Uncertainty=1.035

Limit=1.0 CCD=6 Hardness=4.415 Uncertainty=0.764

Limit=1.0 CCD=7 Hardness=4.568 Uncertainty=0.760

**** CCD designated as being in an anomalous state, or for MOS1 CCD #6

after the CCD was lost to the micrometeorite hit.

If other CCDs are in use and if data for E<1 keV are to be used

mos_spectra should be run excluding this CCD

CCD possibly in an anomalous state (within 1 sigma of threshold)

The model QPB spectrum may be of questionable validity below ~1 keV,

the model above ~1 keV is valid. If data for E<1 keV are to be

used, examine the results closely. If necessary exclude this CCD

from further analysis (mos-spectra and mos_back).

13.388u 2.319s 0:16.71 93.8% 0+0k 48+257592io 0pf+0w

[htb3hg@xmm analysis]\$ qdp mos1S001-hist.qdp

To plot vs. Time (s), please enter

PGPLOT file/type: mos1S001-hist.ps/cps

PLT> quit

[htb3hg@xmm analysis]\$ gs mos1S001-hist.ps

GPL Ghostscript 9.25 (2018-09-13)

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This software comes with NO WARRANTY: see the file PUBLIC for details.

Loading NimbusRoman-Regular font from /usr/share/ghostscript/Resource/Font/NimbusRoman-Regular... 4341540
2875349 4035824 2722580 3 done.

Loading NimbusSans-Regular font from /usr/share/ghostscript/Resource/Font/NimbusSans-Regular... 4407652
3044566 4500424 3073375 3 done.

>>showpage, press <return> to continue<<

[htb3hg@xmm analysis]\$ cheese prefixm="1S003 2S002" prefixp=S003 scale=0.4 rate=0.2 \ dist=40.0 clobber=1
elow=400 ehigh=7200

mos prefix 1: 1S003

mos prefix 2: 2S002

pn prefix 1: S003

verb: 1

scale: 0.4

rate: 2e-15

rates: 1e-14

rateh: 1e-14

dist: 40

mlmin: 15

clobber: 1

Band 1: 400 7200

atthkgen atthkset=atthk.fits timestep=1

atthkgen:- Executing (routine): atthkgen atthkset=atthk.fits timestep=1 timebegin=0 timeend=0 withtimeranges=no
withpreqgti=no preqgtfile=pointings.fit -w 1 -V 4

atthkgen:- atthkgen (atthkgen-1.21) [xmmsas_20170719_1539-16.1.0] started: 2020-02-07T22:34:29.000

atthkgen:- 20 % completed of 1st run (AHF/OM)

atthkgen:- 40 % completed of 1st run (AHF/OM)

```
atthkgen:- 60 % completed of 1st run (AHF/OM)
atthkgen:- 80 % completed of 1st run (AHF/OM)
atthkgen:- 100 % completed of 1st run (AHF/OM)
atthkgen:- 20 % completed of 2nd run (PNT)
atthkgen:- 40 % completed of 2nd run (PNT)
atthkgen:- 60 % completed of 2nd run (PNT)
atthkgen:- 80 % completed of 2nd run (PNT)
atthkgen:- 100 % completed of 2nd run (PNT)
```

```
atthkgen:- atthkgen (atthkgen-1.21) [xmmsas_20170719_1539-16.1.0] ended: 2020-02-07T22:34:30.000
```

```
nn: 1
```

```
prefix: 1S003
```

```
evselect table=mos1S003-clean.fits:EVENTS withfilteredset=yes expression='(PATTERN<=12)&&(FLAG == 0)&&(PI in [400:7200])' filtertype=expression imagebinning='imageSize' imagedatatype='Int32' imageset=mos1S003-obj-im.fits squarepixels=yes ignorelegallimits=yes withxranges=yes withyranges=yes xcolumn='X' ximagesize=900 ximagemax=48400 ximagemin=3401 ycolumn='Y' yimagesize=900 yimagemax=48400 yimagemin=3401 updateexposure=yes filterexposure=yes verbosity=1
```

```
evselect:- Executing (routine): evselect table=mos1S003-clean.fits:EVENTS filteredset=filtered.fits withfilteredset=yes keepfilteroutput=yes flagcolumn=EVFLAG flagbit=-1 destruct=yes dssblock="" expression='(PATTERN<=12)&&(FLAG == 0)&&(PI in [400:7200])' filtertype=expression cleandss=no updateexposure=yes filterexposure=yes writedss=yes blockscopy="" attributecopy="" energycolumn=PHA zcolumn=WEIGHT zerrorcolumn=EWEIGHT withzerrorcolumn=no withzcolumn=no ignorelegallimits=yes imageset=mos1S003-obj-im.fits xcolumn=X ycolumn=Y ximagebinsize=1 yimagebinsize=1 squarepixels=yes ximagesize=900 yimagesize=900 imagebinning=imageSize ximagemin=3401 ximagemax=48400 withxranges=yes yimagemin=3401 yimagemax=48400 withyranges=yes imagedatatype=Int32 withimagedatatype=yes raiimagecenter=0 decimagecenter=0 withcelestialcenter=no withimageset=yes spectrumset=spectrum.fits spectralbinsize=5 specchannelmin=0 specchannelmax=11999 withspecranges=no withspectrumset=no rateset=rate.fits timecolumn=TIME timebinsize=1 timemin=0 timemax=1000 withtimeranges=no maketimecolumn=no makeratecolumn=no withrateset=no histogramset=histo.fits histogramcolumn=TIME histogrambinsize=1 histogrammin=0 histogrammax=1000 withhistoranges=no withhistogramset=no -w 1 -V 1
```

```
** evselect: error (copyDataSetFailed), It was not possible to copy the dataset with name 'mos1S003-clean.fits' to 'filtered.fits' because 'mos1S003-clean.fits' does not exist.
```

```
nn: 2
```

```
prefix: 2S002
```

```
evselect table=mos2S002-clean.fits:EVENTS withfilteredset=yes expression='(PATTERN<=12)&&(FLAG == 0)&&(PI in [400:7200])' filtertype=expression imagebinning='imageSize' imagedatatype='Int32' imageset=mos2S002-obj-im.fits squarepixels=yes ignorelegallimits=yes withxranges=yes withyranges=yes xcolumn='X' ximagesize=900 ximagemax=48400 ximagemin=3401 ycolumn='Y' yimagesize=900 yimagemax=48400 yimagemin=3401 updateexposure=yes filterexposure=yes verbosity=1
```

```

evselect:- Executing (routine): evselect table=mos2S002-clean.fits:EVENTS filteredset=filtered.fits
withfilteredset=yes keepfilteroutput=yes flagcolumn=EVFLAG flagbit=-1 destruct=yes dssblock=""
expression='(PATTERN<=12)&&(FLAG == 0)&&(PI in [400:7200])' filtertype=expression cleandss=no
updateexposure=yes filterexposure=yes writedss=yes blockstocopy=" attributestocopy=" energycolumn=PHA
zcolumn=WEIGHT zerrorcolumn=EWEIGHT withzerrorcolumn=no withzcolumn=no ignorelegallimits=yes
imageset=mos2S002-obj-im.fits xcolumn=X ycolumn=Y ximagebinsize=1 yimagebinsize=1 squarepixels=yes
ximagesize=900 yimagesize=900 imagebinning=imageSize ximagemin=3401 ximagemax=48400 withxranges=yes
yimagemin=3401 yimagemax=48400 withyranges=yes imagedatatype=Int32 withimagedatatype=yes
raimagecenter=0 decimagecenter=0 withcelestialcenter=no withimageset=yes spectrumset=spectrum.fits
spectralbinsize=5 specchannelmin=0 specchannelmax=11999 withspecranges=no withspectrumset=no
rateset=rate.fits timecolumn=TIME timebinsize=1 timemin=0 timemax=1000 withtimeranges=no
maketimecolumn=no makeratecolumn=no withrateset=no histogramset=histo.fits histogramcolumn=TIME
histogrambinsize=1 histogrammin=0 histogrammax=1000 withhistoranges=no withhistogramset=no -w 1 -V 1

```

nnp: 1

prefixp: S003

```

evselect table=pnS003-clean.fits:EVENTS withfilteredset=yes expression='(PATTERN<=12)&&(FLAG ==
0)&&(PI in [400:7200])&&(DETY in [-16510:14345])' filtertype=expression imagebinning='imageSize'
imagedatatype='Int32' imageset=pnS003-obj-im.fits squarepixels=yes ignorelegallimits=yes withxranges=yes
withyranges=yes xcolumn='X' ximagesize=900 ximagemax=48400 ximagemin=3401 ycolumn='Y' yimagesize=900
yimagemax=48400 yimagemin=3401 updateexposure=yes filterexposure=yes verbosity=1

```

```

evselect:- Executing (routine): evselect table=pnS003-clean.fits:EVENTS filteredset=filtered.fits withfilteredset=yes
keepfilteroutput=yes flagcolumn=EVFLAG flagbit=-1 destruct=yes dssblock=""
expression='(PATTERN<=12)&&(FLAG == 0)&&(PI in [400:7200])&&(DETY in [-16510:14345])'
filtertype=expression cleandss=no updateexposure=yes filterexposure=yes writedss=yes blockstocopy="
attributestocopy=" energycolumn=PHA zcolumn=WEIGHT zerrorcolumn=EWEIGHT withzerrorcolumn=no
withzcolumn=no ignorelegallimits=yes imageset=pnS003-obj-im.fits xcolumn=X ycolumn=Y ximagebinsize=1
yimagebinsize=1 squarepixels=yes ximagesize=900 yimagesize=900 imagebinning=imageSize ximagemin=3401
ximagemax=48400 withxranges=yes yimagemin=3401 yimagemax=48400 withyranges=yes imagedatatype=Int32
withimagedatatype=yes raimagecenter=0 decimagecenter=0 withcelestialcenter=no withimageset=yes
spectrumset=spectrum.fits spectralbinsize=5 specchannelmin=0 specchannelmax=11999 withspecranges=no
withspectrumset=no rateset=rate.fits timecolumn=TIME timebinsize=1 timemin=0 timemax=1000
withtimeranges=no maketimecolumn=no makeratecolumn=no withrateset=no histogramset=histo.fits
histogramcolumn=TIME histogrambinsize=1 histogrammin=0 histogrammax=1000 withhistoranges=no
withhistogramset=no -w 1 -V 1

```

Run edetect_chain

```

edetect_chain imagesets='mos1S003-obj-im.fits mos2S002-obj-im.fits pnS003-obj-im.fits' eventsets='mos1S003-
clean.fits mos2S002-clean.fits pnS003-clean.fits' attitudeset=atthk.fits pimin='400 400 400' pimax='7200 7200
7200' witheexpmap=yes likemin=10 ecf='1.2 1.2 3.2' eboxl_likemin=15 eboxm_likemin=15 ebox_withdetmask=yes
ebox_withexpimage=yes esp_scut=0.01 esp_withootset=yes esp_ooeventset='pnS003-clean-oot.fits'
esp_nsplinenodes=20 eml_ecut=15 eml_scut=15 eml_withtwostage=yes eml_withthreshold=yes eml_threshold=15
esen_mlmin=10 eml_list=emllist.fits

```

```
fkeypar3.1 : unable to open the FITS file  
fkeypar3.1 : Error Status Returned : 104  
fkeypar3.1 : could not open the named file
```

```
fkeypar3.1 : ***** FITSIO Error Stack Dump *****  
failed to find or open the following file: (ffopen)  
mos1S003-obj-im.fits+0  
fkeypar3.1 : unable to open the FITS file  
fkeypar3.1 : Error Status Returned : 104  
fkeypar3.1 : could not open the named file
```

```
fkeypar3.1 : ***** FITSIO Error Stack Dump *****  
failed to find or open the following file: (ffopen)  
mos1S003-clean.fits+0  
eexpmap:- Executing (routine): eexpmap imageset=pnS003-obj-im.fits attitudeset=atthk.fits eventset=pnS003-  
clean.fits expimageset=pnS003-obj-imexp.fits withdetcoords=no withvignetting=yes usefastpixelization=no  
usedlimap=no attrebin=4 pimin=400 pimax=7200 -w 1 -V 4  
eexpmap:- eexpmap (eexpmap-4.11.2) [xmmsas_20170719_1539-16.1.0] started: 2020-02-07T22:34:34.000  
eexpmap:- eexpmap (eexpmap-4.11.2) [xmmsas_20170719_1539-16.1.0] ended: 2020-02-07T22:34:39.000  
emask:- Executing (routine): emask expimageset=pnS003-obj-imexp.fits detmaskset=pnS003-obj-immask.fits  
threshold1=0.3 threshold2=0.5 regionset=region.fits withregionset=no -w 1 -V 4  
emask:- emask (emask-2.14) [xmmsas_20170719_1539-16.1.0] started: 2020-02-07T22:34:39.000  
emask:- emask (emask-2.14) [xmmsas_20170719_1539-16.1.0] ended: 2020-02-07T22:34:40.000  
eexpmap:- Executing (routine): eexpmap imageset=mos2S002-obj-im.fits attitudeset=atthk.fits eventset=mos2S002-  
clean.fits expimageset=mos2S002-obj-imexp.fits withdetcoords=no withvignetting=yes usefastpixelization=no  
usedlimap=no attrebin=4 pimin=400 pimax=7200 -w 1 -V 4  
eexpmap:- eexpmap (eexpmap-4.11.2) [xmmsas_20170719_1539-16.1.0] started: 2020-02-07T22:34:40.000  
eexpmap:- CCF constituents accessed by the calibration server:  
CifEntry{EMOS2, LINCOORD, 18, /XMMShared/cls7i/Software/ccf/EMOS2_LINCOORD_0018.CCF, 1998-01-  
01T00:00:00.000}  
CifEntry{EPN, LINCOORD, 9, /XMMShared/cls7i/Software/ccf/EPN_LINCOORD_0009.CCF, 1998-01-  
01T00:00:00.000}  
CifEntry{RGS2, LINCOORD, 8, /XMMShared/cls7i/Software/ccf/RGS2_LINCOORD_0008.CCF, 1998-01-  
01T00:00:00.000}
```

CifEntry {XMM, BORESIGHT, 27, /XMMShared/cls7i/Software/ccf/XMM_BORESIGHT_0027.CCF, 2000-01-01T00:00:00.000}

CifEntry {XMM, MISCDATA, 22, /XMMShared/cls7i/Software/ccf/XMM_MISCDATA_0022.CCF, 1999-01-01T00:00:00.000}

CifEntry {XRT2, XAREAEF, 10, /XMMShared/cls7i/Software/ccf/XRT2_XAREAEF_0010.CCF, 2000-01-13T00:00:00.000}

eexpmap:- eexpmap (eexpmap-4.11.2) [xmmsas_20170719_1539-16.1.0] ended: 2020-02-07T22:35:56.000

emask:- Executing (routine): emask expimageset=mos2S002-obj-imexp.fits detmaskset=mos2S002-obj-immask.fits threshold1=0.3 threshold2=0.5 regionset=region.fits withregionset=no -w 1 -V 4

emask:- emask (emask-2.14) [xmmsas_20170719_1539-16.1.0] started: 2020-02-07T22:35:56.000

emask:- emask (emask-2.14) [xmmsas_20170719_1539-16.1.0] ended: 2020-02-07T22:35:56.000

eboxdetect:- Executing (routine): eboxdetect bkgimagesets=bkgimage.fits usemap=no usematchedfilter=no detmasksets='pnS003-obj-immask.fits mos2S002-obj-immask.fits' withdetmask=yes expimagesets='pnS003-obj-imexp.fits mos2S002-obj-imexp.fits' withexpimage=yes nruncs=3 likemin=15 boxsize=5 withimagebuffersize=no imagebuffersize=640 ecf='3.2 1.2' imagesets='pnS003-obj-im.fits mos2S002-obj-im.fits' boxlistset=eboxlist_1.fits withoffsets=no mergedlistset=mergedlist.fits hrdef='1 2 2 3 3 4' pimin='400 400' pimax='7200 7200' obsmode=pointing -w 1 -V 4

eboxdetect:- eboxdetect (eboxdetect-4.27.4) [xmmsas_20170719_1539-16.1.0] started: 2020-02-07T22:35:56.000

eboxdetect:- eboxdetect (eboxdetect-4.27.4) [xmmsas_20170719_1539-16.1.0] ended: 2020-02-07T22:36:00.000

esplinemap:- Executing (routine): esplinemap scut=0.01 mlmin=1 nsplinenodes=20 excesssigma=4 nfitrun=3 idband=1 boxlistset=eboxlist_1.fits imageset=pnS003-obj-im.fits expimageset=pnS003-obj-imexp.fits withexpimage=yes expimageset2=pnS003-obj-imexpnovig.fits withexpimage2=no detmaskset=pnS003-obj-immask.fits withdetmask=yes bkgimageset=pnS003-obj-imbkg.fits cheeseimageset=pnS003-obj-imcheese.fits withcheese=no cheesemaskset=cheesemask.fits withcheesemask=no ooteventset=pnS003-clean-oot.fits withoutset=yes pimin=400 pimax=7200 fitmethod=spline snrmin=30 smoothsigma=15 -w 1 -V 4

esplinemap:- esplinemap (esplinemap-5.0.2) [xmmsas_20170719_1539-16.1.0] started: 2020-02-07T22:36:00.000

esplinemap:- esplinemap (esplinemap-5.0.2) [xmmsas_20170719_1539-16.1.0] ended: 2020-02-07T22:36:10.000

esplinemap:- Executing (routine): esplinemap scut=0.01 mlmin=1 nsplinenodes=20 excesssigma=4 nfitrun=3 idband=1 boxlistset=eboxlist_1.fits imageset=mos2S002-obj-im.fits expimageset=mos2S002-obj-imexp.fits withexpimage=yes expimageset2=mos2S002-obj-imexpnovig.fits withexpimage2=no detmaskset=mos2S002-obj-immask.fits withdetmask=yes bkgimageset=mos2S002-obj-imbkg.fits cheeseimageset=mos2S002-obj-imcheese.fits withcheese=no cheesemaskset=cheesemask.fits withcheesemask=no ooteventset=ootevents.fits withoutset=no pimin=400 pimax=7200 fitmethod=spline snrmin=30 smoothsigma=15 -w 1 -V 4

esplinemap:- esplinemap (esplinemap-5.0.2) [xmmsas_20170719_1539-16.1.0] started: 2020-02-07T22:36:10.000

esplinemap:- esplinemap (esplinemap-5.0.2) [xmmsas_20170719_1539-16.1.0] ended: 2020-02-07T22:36:11.000

eboxdetect:- Executing (routine): eboxdetect bkgimagesets='pnS003-obj-imbkg.fits mos2S002-obj-imbkg.fits' usemap=yes usematchedfilter=no detmasksets='pnS003-obj-immask.fits mos2S002-obj-immask.fits' withdetmask=yes expimagesets='pnS003-obj-imexp.fits mos2S002-obj-imexp.fits' withexpimage=yes nruncs=3

```

likemin=15 boxsize=5 withimagebuffersize=no imagebuffersize=640 ecf='3.2 1.2' imagesets='pnS003-obj-im.fits
mos2S002-obj-im.fits' boxlistset=oboxlist_m.fits withoffsets=no mergedlistset=mergedlist.fits hrdef='1 2 2 3 3 4'
pimin='400 400' pimax='7200 7200' obsmode=pointing -w 1 -V 4

eboxdetect:- eboxdetect (eboxdetect-4.27.4) [xmmsas_20170719_1539-16.1.0] started: 2020-02-07T22:36:11.000
eboxdetect:- eboxdetect (eboxdetect-4.27.4) [xmmsas_20170719_1539-16.1.0] ended: 2020-02-07T22:36:14.000

emldetect:- Executing (routine): emldetect boxlistset=oboxlist_m.fits mllistset=emllist.fits mlmin=10
determineerrors=yes fitposition=yes psfmodel=ellbeta nmaxfit=1 nmulsou=1 ecut=15 scut=15 fitextent=yes
extentmodel=beta dmlextmin=6 minextent=1.5 maxextent=20 withthreshold=yes threshold=15 threshcolumn=LIKE
withtwostage=yes withimagebuffersize=no imagebuffersize=640 withxidband=no xidfixed=no pimin='400 400'
pimax='7200 7200' hrpndef='1 2 2 3 3 4 4 5' xidpndef='2 3 4' hrm1def='1 2 2 3 3 4 4 5' xidm1def='2 3 4' hrm2def='1
2 2 3 3 4 4 5' xidm2def='2 3 4' ecf='3.2 1.2' xidecf=1 fitcounts=yes fitnegative=no mergedlistset=mergedlist.fits
useevents=no usecalpsf=yes withhotpixelfilter=no withoffsets=no withdrawrows=no imagesets='pnS003-obj-im.fits
mos2S002-obj-im.fits' bkgimagesets='pnS003-obj-imbkg.fits mos2S002-obj-imbkg.fits' detmasksets='pnS003-obj-
immask.fits mos2S002-obj-immask.fits' withdetmask=yes expimagesets='pnS003-obj-imexp.fits mos2S002-obj-
imexp.fits' withexpimage=yes sourceimagesets='pnS003-obj-imsmap.fits mos2S002-obj-imsmap.fits'
withsourcemap=yes -w 1 -V 4

emldetect:- emldetect (emldetect-7.1) [xmmsas_20170719_1539-16.1.0] started: 2020-02-07T22:36:14.000
emldetect:- CCF constituents accessed by the calibration server:

CifEntry{EMOS2, LINCOORD, 18, /XMMShared/cls7i/Software/ccf/EMOS2_LINCOORD_0018.CCF, 1998-01-
01T00:00:00.000}

CifEntry{EPN, LINCOORD, 9, /XMMShared/cls7i/Software/ccf/EPN_LINCOORD_0009.CCF, 1998-01-
01T00:00:00.000}

CifEntry{RGS2, LINCOORD, 8, /XMMShared/cls7i/Software/ccf/RGS2_LINCOORD_0008.CCF, 1998-01-
01T00:00:00.000}

CifEntry{XMM, BORESIGHT, 27, /XMMShared/cls7i/Software/ccf/XMM_BORESIGHT_0027.CCF, 2000-01-
01T00:00:00.000}

CifEntry{XMM, MISCDATA, 22, /XMMShared/cls7i/Software/ccf/XMM_MISCDATA_0022.CCF, 1999-01-
01T00:00:00.000}

CifEntry{XRT2, XAREAEC, 10, /XMMShared/cls7i/Software/ccf/XRT2_XAREAEC_0010.CCF, 2000-01-
13T00:00:00.000}

CifEntry{XRT2, XPSF, 14, /XMMShared/cls7i/Software/ccf/XRT2_XPSF_0014.CCF, 2000-01-13T00:00:00.000}

CifEntry{XRT3, XAREAEC, 12, /XMMShared/cls7i/Software/ccf/XRT3_XAREAEC_0012.CCF, 2000-01-
13T00:00:00.000}

CifEntry{XRT3, XPSF, 17, /XMMShared/cls7i/Software/ccf/XRT3_XPSF_0017.CCF, 2000-01-13T00:00:00.000}

```

[^]Cerror in emldetect imagesets="pnS003-obj-im.fits mos2S002-obj-im.fits" expimagesets="pnS003-obj-imexp.fits
mos2S002-obj-imexp.fits" boxlistset=oboxlist_m.fits bkgimagesets="pnS003-obj-imbkg.fits mos2S002-obj-
imbkg.fits" mllistset=emllist.fits pimin="400 400" pimax="7200 7200" ecf="3.2 1.2" mlmin=10
determineerrors=1 ecut=15 scut=15 fitextent=1 withsourcemap=1 sourceimagesets="pnS003-obj-imsmap.fits
mos2S002-obj-imsmap.fits" nmaxfit=1 fitnegative=0 nmulsou=1 dmlextmin=6 withdetmask=1

```
detmasksets="pnS003-obj-immask.fits mos2S002-obj-immask.fits" extentmodel=beta withtwostage=1  
withthreshold=1 threshold=15 threshcolumn=LIKE maxextent=20 psfmodel=ellbeta withimagebuffersize=0  
imagebuffersize=640  
  
esensmap:- Executing (routine): esensmap detmasksets=pnS003-obj-immask.fits expimagesets=pnS003-obj-  
imexp.fits bkgimagesets=pnS003-obj-imbkg.fits sensimageset=pnS003-obj-imsen.fits mlmin=10 -w 1 -V 4  
  
esensmap:- esensmap (esensmap-3.12.2) [xmmsas_20170719_1539-16.1.0] started: 2020-02-07T22:43:40.000  
  
esensmap:- Opening file pnS003-obj-immask.fits  
  
esensmap:- esensmap (esensmap-3.12.2) [xmmsas_20170719_1539-16.1.0] ended: 2020-02-07T22:43:41.000  
  
esensmap:- Executing (routine): esensmap detmasksets=mos2S002-obj-immask.fits expimagesets=mos2S002-obj-  
imexp.fits bkgimagesets=mos2S002-obj-imbkg.fits sensimageset=mos2S002-obj-imsen.fits mlmin=10 -w 1 -V 4  
  
esensmap:- esensmap (esensmap-3.12.2) [xmmsas_20170719_1539-16.1.0] started: 2020-02-07T22:43:41.000  
  
esensmap:- Opening file mos2S002-obj-immask.fits  
  
esensmap:- esensmap (esensmap-3.12.2) [xmmsas_20170719_1539-16.1.0] ended: 2020-02-07T22:43:42.000
```

```
emask detmaskset=mos1S003-mask-im.fits expimageset=mos1S003-obj-imexp.fits threshold1=0.1 threshold2=0.5  
verbosity=1
```

```
emask:- Executing (routine): emask expimageset=mos1S003-obj-imexp.fits detmaskset=mos1S003-mask-im.fits  
threshold1=0.1 threshold2=0.5 regionset=region.fits withregionset=no -w 1 -V 1  
  
** emask: error (datasetCouldNotBeRead), The dataset with name 'mos1S003-obj-imexp.fits' could not be read;  
either it does not exist or it is in an unrecognised format
```

```
emask detmaskset=mos2S002-mask-im.fits expimageset=mos2S002-obj-imexp.fits threshold1=0.1 threshold2=0.5  
verbosity=1
```

```
emask:- Executing (routine): emask expimageset=mos2S002-obj-imexp.fits detmaskset=mos2S002-mask-im.fits  
threshold1=0.1 threshold2=0.5 regionset=region.fits withregionset=no -w 1 -V 1
```

```
emask detmaskset=pnS003-mask-im.fits expimageset=pnS003-obj-imexp.fits threshold1=0.1 threshold2=0.5  
verbosity=1
```

```
emask:- Executing (routine): emask expimageset=pnS003-obj-imexp.fits detmaskset=pnS003-mask-im.fits  
threshold1=0.1 threshold2=0.5 regionset=region.fits withregionset=no -w 1 -V 1
```

```
region eventset=mos1S003-clean.fits operationstyle=global srclisttab=emllist.fits:SRCLIST expression='(FLUX >=  
2e-15)&&(DET_ML >= 15)&&(DIST_NN >= 40)&&(ID_BAND == 0)' bkgregionset=mos1S003-bkg_region-  
det.fits energyfraction=0.4 radiusstyle=enfrac outunit=detxy verbosity=1
```

```
region:- Executing (routine): region eventset=mos1S003-clean.fits tempset=tempset.ds usersrcid=1
srcidcol=dummy_default operationstyle=global srclisttab=emllist.fits:SRCLIST expression='(FLUX >= 2e-15)&&(DET_ML >= 15)&&(DIST_NN >= 40)&&(ID_BAND == 0)' regionset=src_region.ds
bkgregionset=mos1S003-bkg_region-det.fits shrinkconfused=yes fixedradius=12 energyfraction=0.4
bkgratecol=BG_MAP bkgratekwdsset=kwd_set.ds bkgrateimgset=bkg_rate_img.ds bkgrateuser=1 bkgratestyle=col
bkgfraction=1 nosrcellipse=no radiusstyle=enfrac fovbkgannulus=no nobkgellipse=no outunit=detxy
withboresightfudge=yes -w 1 -V 1
```

```
** region: error (datasetCouldNotBeRead), The dataset with name 'mos1S003-clean.fits' could not be read; either it does not exist or it is in an unrecognised format
```

```
region eventset=mos1S003-clean.fits operationstyle=global srclisttab=emllist.fits:SRCLIST expression='(DIST_NN >= 40)&&(DET_ML >= 15)&&(FLUX >= 2e-15)&&(ID_BAND == 0)' bkgregionset=mos1S003-bkg_region-sky.fits radiusstyle=enfrac bkgratestyle=col nosrcellipse=yes energyfraction=0.4 outunit=xy verbosity=1
```

```
region:- Executing (routine): region eventset=mos1S003-clean.fits tempset=tempset.ds usersrcid=1
srcidcol=dummy_default operationstyle=global srclisttab=emllist.fits:SRCLIST expression='(DIST_NN >= 40)&&(DET_ML >= 15)&&(FLUX >= 2e-15)&&(ID_BAND == 0)' regionset=src_region.ds
bkgregionset=mos1S003-bkg_region-sky.fits shrinkconfused=yes fixedradius=12 energyfraction=0.4
bkgratecol=BG_MAP bkgratekwdsset=kwd_set.ds bkgrateimgset=bkg_rate_img.ds bkgrateuser=1 bkgratestyle=col
bkgfraction=1 nosrcellipse=yes radiusstyle=enfrac fovbkgannulus=no nobkgellipse=no outunit=xy
withboresightfudge=yes -w 1 -V 1
```

```
** region: error (datasetCouldNotBeRead), The dataset with name 'mos1S003-clean.fits' could not be read; either it does not exist or it is in an unrecognised format
```

```
make_mask inimage=mos1S003-obj-im.fits inmask=mos1S003-mask-im.fits outmask=mos1S003-cheese.fits
reglist=mos1S003-bkg_region-sky.fits
```

```
make_mask:- Executing (routine): make_mask inimage=mos1S003-obj-im.fits inmask=mos1S003-mask-im.fits
outmask=mos1S003-cheese.fits reglist=mos1S003-bkg_region-sky.fits clobber=yes -w 1 -V 4
```

```
make_mask:- make_mask (esas-0.9.40) [xmmsas_20170719_1539-16.1.0] started: 2020-02-07T22:43:43.000
```

```
Event Image: mos1S003-obj-im.fits
```

```
Input Mask: mos1S003-mask-im.fits
```

```
Output Cheese Image: mos1S003-cheese.fits
```

```
Region File: mos1S003-bkg_region-sky.fits
```

```
Input Image: mos1S003-obj-im.fits
```

```
STATUS FTOOPEN = 104
```

```
MAKE-MASK POSITION 02
```

```
mos1S003-obj-im.fits
```

```
region eventset=mos2S002-clean.fits operationstyle=global srclisttab=emllist.fits:SRCLIST expression='(FLUX >= 2e-15)&&(DET_ML >= 15)&&(DIST_NN >= 40)&&(ID_BAND == 0)' bkgregionset=mos2S002-bkg_region-det.fits energyfraction=0.4 radiusstyle=enfrac outunit=detxy verbosity=1
```

```
region:- Executing (routine): region eventset=mos2S002-clean.fits tempset=tempset.ds usersrcid=1  
srcidcol=dummy_default operationstyle=global srclisttab=emllist.fits:SRCLIST expression='(FLUX >= 2e-15)&&(DET_ML >= 15)&&(DIST_NN >= 40)&&(ID_BAND == 0)' regionset=src_region.ds  
bkgregionset=mos2S002-bkg_region-det.fits shrinkconfused=yes fixedradius=12 energyfraction=0.4  
bkgratecol=BG_MAP bkgratekwdset=kwd_set.ds bkrateimgset=bkg_rate_img.ds bkgrateuser=1 bkgratestyle=col  
bkgfraction=1 nosrcellipse=no radiusstyle=enfrac fovbkgannulus=no nobkgellipse=no outunit=detxy  
withboresightfudge=yes -w 1 -V 1
```

```
** region: error (datasetCouldNotBeRead), The dataset with name 'emllist.fits' could not be read; either it does not exist or it is in an unrecognised format
```

```
region eventset=mos2S002-clean.fits operationstyle=global srclisttab=emllist.fits:SRCLIST expression='(DIST_NN >= 40)&&(DET_ML >= 15)&&(FLUX >= 2e-15)&&(ID_BAND == 0)' bkgregionset=mos2S002-bkg_region-sky.fits radiusstyle=enfrac bkgratestyle=col nosrcellipse=yes energyfraction=0.4 outunit=xy verbosity=1
```

```
region:- Executing (routine): region eventset=mos2S002-clean.fits tempset=tempset.ds usersrcid=1  
srcidcol=dummy_default operationstyle=global srclisttab=emllist.fits:SRCLIST expression='(DIST_NN >= 40)&&(DET_ML >= 15)&&(FLUX >= 2e-15)&&(ID_BAND == 0)' regionset=src_region.ds  
bkgregionset=mos2S002-bkg_region-sky.fits shrinkconfused=yes fixedradius=12 energyfraction=0.4  
bkgratecol=BG_MAP bkgratekwdset=kwd_set.ds bkrateimgset=bkg_rate_img.ds bkgrateuser=1 bkgratestyle=col  
bkgfraction=1 nosrcellipse=yes radiusstyle=enfrac fovbkgannulus=no nobkgellipse=no outunit=xy  
withboresightfudge=yes -w 1 -V 1
```

```
** region: error (datasetCouldNotBeRead), The dataset with name 'emllist.fits' could not be read; either it does not exist or it is in an unrecognised format
```

```
make_mask inimage=mos2S002-obj-im.fits inmask=mos2S002-mask-im.fits outmask=mos2S002-cheese.fits  
reglist=mos2S002-bkg_region-sky.fits
```

```
make_mask:- Executing (routine): make_mask inimage=mos2S002-obj-im.fits inmask=mos2S002-mask-im.fits  
outmask=mos2S002-cheese.fits reglist=mos2S002-bkg_region-sky.fits clobber=yes -w 1 -V 4
```

```
make_mask:- make_mask (esas-0.9.40) [xmmsas_20170719_1539-16.1.0] started: 2020-02-07T22:43:44.000
```

Event Image: mos2S002-obj-im.fits

Input Mask: mos2S002-mask-im.fits

Output Cheese Image: mos2S002-cheese.fits

Region File: mos2S002-bkg_region-sky.fits

Input Image: mos2S002-obj-im.fits

Input Mask: mos2S002-mask-im.fits

Template File

mos2S002-mask-im.fits

Template image coordinate system: -TAN

Template image coordinate ID: RA---TAN DEC--TAN

Template image central coordinates: 120.2604583333301 36.0463333333301

Template image reference pixel: 450.91000000000003 450.91000000000003

Template image pixel sizes: -6.944444444444501E-004 6.944444444444501E-004

Template image NAXES, NAXIS: 2 900 900

mos2S002-bkg_region-sky.fits

STATUS FTOOPEN = 104

MAKE-MASK POSITION 17

Region file does not exist, continue with now source removal

mos2S002-bkg_region-sky.fits

```
region eventset=pnS003-clean.fits operationstyle=global srclisttab=emllist.fits:SRCLIST expression='(DIST_NN >= 40)&&(DET_ML >= 15)&&(FLUX >= 2e-15)&&(ID_BAND == 0)' bkgregionset=bnS003-bkg_region-det.fits energyfraction=0.4 radiusstyle=enfrac outunit=detxy verbosity=1
```

```
region:- Executing (routine): region eventset=bnS003-clean.fits tempset=tempset.ds usersrcid=1 srcidcol=dummy_default operationstyle=global srclisttab=emllist.fits:SRCLIST expression='(DIST_NN >= 40)&&(DET_ML >= 15)&&(FLUX >= 2e-15)&&(ID_BAND == 0)' regionset=src_region.ds bkgregionset=bnS003-bkg_region-det.fits shrinkconfused=yes fixedradius=12 energyfraction=0.4 bkgratecol=BG_MAP bkgratekwdset=kwd_set.ds bkgrateimgset=bkg_rate_img.ds bkgrateuser=1 bkgratestyle=col bkgfraction=1 nosrcellipse=no radiusstyle=enfrac fovbkgannulus=no nobkgellipse=no outunit=detxy withboresightfudge=yes -w 1 -V 1
```

** region: error (datasetCouldNotBeRead), The dataset with name 'emllist.fits' could not be read; either it does not exist or it is in an unrecognised format

```
region eventset=bnS003-clean.fits operationstyle=global srclisttab=emllist.fits:SRCLIST expression='(DIST_NN >= 40)&&(DET_ML >= 15)&&(FLUX >= 2e-15)&&(ID_BAND == 0)' bkgregionset=bnS003-bkg_region-sky.fits radiusstyle=enfrac bkgratestyle=col nosrcellipse=yes energyfraction=0.4 outunit=xy verbosity=1
```

```
region:- Executing (routine): region eventset=bnS003-clean.fits tempset=tempset.ds usersrcid=1 srcidcol=dummy_default operationstyle=global srclisttab=emllist.fits:SRCLIST expression='(DIST_NN >= 40)&&(DET_ML >= 15)&&(FLUX >= 2e-15)&&(ID_BAND == 0)' regionset=src_region.ds bkgregionset=bnS003-bkg_region-sky.fits shrinkconfused=yes fixedradius=12 energyfraction=0.4 bkgratecol=BG_MAP bkgratekwdset=kwd_set.ds bkgrateimgset=bkg_rate_img.ds bkgrateuser=1 bkgratestyle=col
```

```
bkgfraction=1 nosrcellipse=yes radiusstyle=enfrac fovbkgannulus=no nobkgellipse=no outunit=xy  
withboresightfudge=yes -w 1 -V 1  
  
** region: error (datasetCouldNotBeRead), The dataset with name 'emllist.fits' could not be read; either it does not  
exist or it is in an unrecognised format
```

```
make_mask inimage=pnS003-obj-im.fits inmask=pnS003-mask-im.fits outmask=pnS003-cheese.fits  
reglist=pnS003-bkg_region-sky.fits
```

```
make_mask:- Executing (routine): make_mask inimage=pnS003-obj-im.fits inmask=pnS003-mask-im.fits  
outmask=pnS003-cheese.fits reglist=pnS003-bkg_region-sky.fits clobber=yes -w 1 -V 4  
  
make_mask:- make_mask (esas-0.9.40) [xmmsas_20170719_1539-16.1.0] started: 2020-02-07T22:43:45.000  
  
Event Image: pnS003-obj-im.fits  
  
Input Mask: pnS003-mask-im.fits  
  
Output Cheese Image: pnS003-cheese.fits  
  
Region File: pnS003-bkg_region-sky.fits  
  
Input Image: pnS003-obj-im.fits  
  
Input Mask: pnS003-mask-im.fits  
  
Template File  
  
pnS003-mask-im.fits  
  
Template image coordinate system: -TAN  
  
Template image coordinate ID: RA---TAN DEC--TAN  
  
Template image central coordinates: 120.2604583333301 36.0463333333301  
  
Template image reference pixel: 450.9100000000003 450.9100000000003  
  
Template image pixel sizes: -6.944444444444501E-004 6.944444444444501E-004  
  
Template image NAXES, NAXIS: 2 900 900  
  
pnS003-bkg_region-sky.fits  
  
STATUS FTOPEN = 104  
  
MAKE-MASK POSITION 17  
  
Region file does not exist, continue with now source removal  
  
pnS003-bkg_region-sky.fits
```

```
550.979u 2.918s 9:15.78 99.6% 0+0k 86280+172456io 28pf+0w
```

2/9/20

```
[htb3hg@xmm ~]$ ssh
```

```
usage: ssh [-1246AaCfGgKkMNnqsTtVvXxYy] [-b bind_address] [-c cipher_spec]
           [-D [bind_address:]port] [-E log_file] [-e escape_char]
           [-F configfile] [-I pkcs11] [-i identity_file]
           [-J [user@]host[:port]] [-L address] [-l login_name] [-m mac_spec]
           [-O ctl_cmd] [-o option] [-p port] [-Q query_option] [-R address]
           [-S ctl_path] [-W host:port] [-w local_tun[:remote_tun]]
           [user@]hostname [command]
```

```
[htb3hg@xmm ~]$ ssh -Y astr-XMM.astro.virginia.edu
```

htb3hg@astr-xmm.astro.virginia.edu's password:

Last login: Sun Feb 9 21:38:20 2020 from 128.143.1.85

```
[htb3hg@xmm ~]$ cd /XMMShared/htb3hg/Data/A611/XMM/0781590201/
```

```
[htb3hg@xmm 0781590201]$ sasinit
```

sasversion:- Executing (routine): sasversion -w 1 -V 4

sasversion:- sasversion (sasversion-1.2) [xmmsas_20170719_1539-16.1.0] started: 2020-02-10T02:48:48.000

sasversion:- XMM-Newton SAS release and build information:

SAS release: xmmsas_20170719_1539-16.1.0

Compiled on: Fri Jul 28 01:07:14 CEST 2017

Compiled by: sasbuild@sasbld01n.net4.lan

Platform : RHEL6.8 64

SAS-related environment variables that are set:

SAS_DIR = /XMMShared/cls7i/Software/sas_16.1.0/xmmsas_20170719_1539

SAS_PATH = /XMMShared/cls7i/Software/sas_16.1.0/xmmsas_20170719_1539

SAS_CCFPATH = /XMMShared/cls7i/Software/ccf

sasversion:- sasversion (sasversion-1.2) [xmmsas_20170719_1539-16.1.0] ended: 2020-02-10T02:48:48.000

Do not forget to define SAS_CCFPATH, SAS_CCF and SAS_ODF

```
[htb3hg@xmm 0781590201]$ cd analysis

[htb3hg@xmm analysis]$ cheese prefixm="1S003 2S002" prefixp=S003 scale=0.4 rate=0.2 \ dist=40.0
clobber=1 elow=400 ehigh=7200

mos prefix 1: 1S003
mos prefix 2: 2S002
pn prefix 1: S003
verb: 1
scale: 0.4
rate: 2e-15
rates: 1e-14
rateh: 1e-14
dist: 40
mlmin: 15
clobber: 1
Band 1: 400 7200
attitude file already exists
use the old file

nn: 1
prefix: 1S003
evselect table=mos1S003-clean.fits:EVENTS withfilteredset=yes expression='(PATTERN<=12)&&(FLAG == 0)&&(PI in [400:7200])' filtertype=expression imagebinning='imageSize' imagedatatype='Int32'
imageset=mos1S003-obj-im.fits squarepixels=yes ignorelegallimits=yes withxranges=yes withyranges=yes
xcolumn='X' ximagesize=900 ximagemax=48400 ximagemin=3401 ycolumn='Y' yimagesize=900
yimagemax=48400 yimagemin=3401 updateexposure=yes filterexposure=yes verbosity=1

evselect:- Executing (routine): evselect table=mos1S003-clean.fits:EVENTS filteredset=filtered.fits
withfilteredset=yes keepfilteroutput=yes flagcolumn=EVFLAG flagbit=-1 destruct=yes dssblock="
expression='(PATTERN<=12)&&(FLAG == 0)&&(PI in [400:7200])' filtertype=expression cleandss=no
updateexposure=yes filterexposure=yes writedss=yes blockstocopy=" attributestocopy=" energycolumn=PHA
zcolumn=WEIGHT zerrorcolumn=EWEIGHT withzerrorcolumn=no withzcolumn=no ignorelegallimits=yes
imageset=mos1S003-obj-im.fits xcolumn=X ycolumn=Y ximagebinsize=1 yimagebinsize=1 squarepixels=yes
ximagesize=900 yimagesize=900 imagebinning=imageSize ximagemin=3401 ximagemax=48400 withxranges=yes
yimagemin=3401 yimagemax=48400 withyranges=yes imagedatatype=Int32 withimagedatatype=yes
raimagecenter=0 decimagecenter=0 withcelestialcenter=no withimageset=yes spectrumset=spectrum.fits
```

```
spectralbinsize=5 specchannelmin=0 specchannelmax=11999 withspecranges=no withspectrumset=no  
rateset=rate.fits timecolumn=TIME timebinsize=1 timemin=0 timemax=1000 withtimeranges=no  
maketimecolumn=no makeratecolumn=no withrateset=no histogramset=histo.fits histogramcolumn=TIME  
histogrambinsize=1 histogrammin=0 histogrammax=1000 withhistoranges=no withhistogramset=no -w 1 -V 1  
  
** evselect: error (copyDataSetFailed), It was not possible to copy the dataset with name 'mos1S003-clean.fits' to  
'filtered.fits' because 'mos1S003-clean.fits' does not exist.
```

nn: 2

prefix: 2S002

Soft event image already exists: mos2S002-obj-im.fits

Clobber the existing file

```
evselect table=mos2S002-clean.fits:EVENTS withfilteredset=yes expression='(PATTERN<=12)&&(FLAG ==  
0)&&(PI in [400:7200])' filtertype=expression imagebinning='imageSize' imagedatatype='Int32'  
imageset=mos2S002-obj-im.fits squarepixels=yes ignorelegallimits=yes withxranges=yes withyranges=yes  
xcolumn='X' ximagesize=900 ximageymax=48400 ximageymin=3401 ycolumn='Y' yimagesize=900  
yimageymax=48400 yimageymin=3401 updateexposure=yes filterexposure=yes verbosity=1
```

```
evselect:- Executing (routine): evselect table=mos2S002-clean.fits:EVENTS filteredset=filtered.fits  
withfilteredset=yes keepfilteroutput=yes flagcolumn=EVFLAG flagbit=-1 destruct=yes dssblock="  
expression='(PATTERN<=12)&&(FLAG == 0)&&(PI in [400:7200])' filtertype=expression cleandss=no  
updateexposure=yes filterexposure=yes writedss=yes blockstocopy="" attributestocopy="" energycolumn=PHA  
zcolumn=WEIGHT zerrorcolumn=EWEIGHT withzerrorcolumn=no withzcolumn=no ignorelegallimits=yes  
imageset=mos2S002-obj-im.fits xcolumn=X ycolumn=Y ximagebinsize=1 yimagebinsize=1 squarepixels=yes  
ximagesize=900 yimagesize=900 imagebinning=imageSize ximageymin=3401 ximageymax=48400 withxranges=yes  
yimageymin=3401 yimageymax=48400 withyranges=yes imagedatatype=Int32 withimagedatatype=yes  
raimagecenter=0 decimagecenter=0 withcelestialcenter=no withimageset=yes spectrumset=spectrum.fits  
spectralbinsize=5 specchannelmin=0 specchannelmax=11999 withspecranges=no withspectrumset=no  
rateset=rate.fits timecolumn=TIME timebinsize=1 timemin=0 timemax=1000 withtimeranges=no  
maketimecolumn=no makeratecolumn=no withrateset=no histogramset=histo.fits histogramcolumn=TIME  
histogrambinsize=1 histogrammin=0 histogrammax=1000 withhistoranges=no withhistogramset=no -w 1 -V 1
```

nnp: 1

prefixp: S003

PN soft image already exists: pnS003-obj-im.fits

Clobber the existing file

```
evselect table=pnS003-clean.fits:EVENTS withfilteredset=yes expression='(PATTERN<=12)&&(FLAG ==  
0)&&(PI in [400:7200])&&(DETY in [-16510:14345])' filtertype=expression imagebinning='imageSize'  
imagedatatype='Int32' imageset=pnS003-obj-im.fits squarepixels=yes ignorelegallimits=yes withxranges=yes
```

```
withyranges=yes xcolumn='X' ximagesize=900 ximagedmax=48400 ximagedmin=3401 ycolumn='Y' yimagesize=900  
yimagedmax=48400 yimagedmin=3401 updateexposure=yes filterexposure=yes verbosity=1
```

```
evselect:- Executing (routine): evselect table=pnS003-clean.fits:EVENTS filteredset=filtered.fits withfilteredset=yes  
keepfilteroutput=yes flagcolumn=EVFLAG flagbit=-1 destruct=yes dssblock="  
expression='(PATTERN<=12)&&(FLAG == 0)&&(PI in [400:7200])&&(DETY in [-16510:14345])'  
filtertype=expression cleandss=no updateexposure=yes filterexposure=yes writedss=yes blockstocopy="  
attributestocopy=" energycolumn=PHA zcolumn=WEIGHT zerrorcolumn=EWEIGHT withzerrorcolumn=no  
withzcolumn=no ignorelegallimits=yes imageset=pnS003-obj-im.fits xcolumn=X ycolumn=Y ximagebinsize=1  
yimagebinsize=1 squarepixels=yes ximagesize=900 yimagesize=900 imagebinning=imageSize ximagedmin=3401  
ximagedmax=48400 withxranges=yes yimagedmin=3401 yimagedmax=48400 withyranges=yes imagedatatype=Int32  
withimagedatatype=yes raimagecenter=0 decimagecenter=0 withcelestialcenter=no withimageset=yes  
spectrumset=spectrum.fits spectralbinsize=5 specchannelmin=0 specchannelmax=11999 withspecranges=no  
withspectrumsset=no rateset=rate.fits timecolumn=TIME timebinsize=1 timemin=0 timemax=1000  
withtimeranges=no maketimecolumn=no makeratecolumn=no withrateset=no histogramset=histo.fits  
histogramcolumn=TIME histogrambinsize=1 histogrammin=0 histogrammax=1000 withhistoranges=no  
withhistogramset=no -w 1 -V 1
```

Run edetect_chain

```
edetect_chain imagesets='mos1S003-obj-im.fits mos2S002-obj-im.fits pnS003-obj-im.fits' eventsets='mos1S003-  
clean.fits mos2S002-clean.fits pnS003-clean.fits' attitudeset=atthk.fits pimin='400 400 400' pimax='7200 7200  
7200' witheexpmap=yes likemin=10 ecf='1.2 1.2 3.2' eboxl_likemin=15 eboxm_likemin=15 ebox_withdetmask=yes  
ebox_withexpimage=yes esp_scut=0.01 esp_withootset=yes esp_ooteventset='pnS003-clean-oot.fits'  
esp_nsplinenodes=20 eml_ecut=15 eml_scut=15 eml_withtwostage=yes eml_withthreshold=yes eml_threshold=15  
esen_mlmin=10 eml_list=emllist.fits
```

```
** edetect_chain: error (CIFMissing), Environment variable 'SAS_CCF' is not set.
```

```
emask detmaskset=mos1S003-mask-im.fits expimageset=mos1S003-obj-imexp.fits threshold1=0.1 threshold2=0.5  
verbosity=1
```

```
emask:- Executing (routine): emask expimageset=mos1S003-obj-imexp.fits detmaskset=mos1S003-mask-im.fits  
threshold1=0.1 threshold2=0.5 regionset=region.fits withregionset=no -w 1 -V 1
```

```
** emask: error (datasetCouldNotBeRead), The dataset with name 'mos1S003-obj-imexp.fits' could not be read;  
either it does not exist or it is in an unrecognised format
```

Total band mask already exists: mos2S002-mask-im.fits

Clobber the existing file

```
emask detmaskset=mos2S002-mask-im.fits expimageset=mos2S002-obj-imexp.fits threshold1=0.1 threshold2=0.5  
verbosity=1
```

```
emask:- Executing (routine): emask expimageset=mos2S002-obj-imexp.fits detmaskset=mos2S002-mask-im.fits  
threshold1=0.1 threshold2=0.5 regionset=region.fits withregionset=no -w 1 -V 1
```

```
** emask: error (datasetCouldNotBeRead), The dataset with name 'mos2S002-obj-imexp.fits' could not be read;  
either it does not exist or it is in an unrecognised format
```

PN soft mask already exists: pnS003-mask-im.fits

Clobber the existing file

```
emask detmaskset=pnS003-mask-im.fits expimageset=pnS003-obj-imexp.fits threshold1=0.1 threshold2=0.5  
verbosity=1
```

```
emask:- Executing (routine): emask expimageset=pnS003-obj-imexp.fits detmaskset=pnS003-mask-im.fits  
threshold1=0.1 threshold2=0.5 regionset=region.fits withregionset=no -w 1 -V 1
```

```
** emask: error (datasetCouldNotBeRead), The dataset with name 'pnS003-obj-imexp.fits' could not be read; either  
it does not exist or it is in an unrecognised format
```

```
region eventset=mos1S003-clean.fits operationstyle=global srclisttab=emllist.fits:SRCLIST expression='(FLUX >=  
2e-15)&&(DET_ML >= 15)&&(DIST_NN >= 40)&&(ID_BAND == 0)' bkgregionset=mos1S003-bkg_region-  
det.fits energyfraction=0.4 radiusstyle=enfrac outunit=detxy verbosity=1
```

```
region:- Executing (routine): region eventset=mos1S003-clean.fits tempset=tempset.ds usersrcid=1  
srcidcol=dummy_default operationstyle=global srclisttab=emllist.fits:SRCLIST expression='(FLUX >= 2e-  
15)&&(DET_ML >= 15)&&(DIST_NN >= 40)&&(ID_BAND == 0)' regionset=src_region.ds  
bkgregionset=mos1S003-bkg_region-det.fits shrinkconfused=yes fixedradius=12 energyfraction=0.4  
bkgratecol=BG_MAP bkgratekwdset=kwd_set.ds bkgrateimgset=bkg_rate_img.ds bkgrateuser=1 bkgratestyle=col  
bkgfraction=1 nosrcellipse=no radiusstyle=enfrac fovbkgannulus=no nobkgellipse=no outunit=detxy  
withboresightfudge=yes -w 1 -V 1
```

```
** region: error (datasetCouldNotBeRead), The dataset with name 'mos1S003-clean.fits' could not be read; either it  
does not exist or it is in an unrecognised format
```

```
region eventset=mos1S003-clean.fits operationstyle=global srclisttab=emllist.fits:SRCLIST expression='(DIST_NN  
>= 40)&&(DET_ML >= 15)&&(FLUX >= 2e-15)&&(ID_BAND == 0)' bkgregionset=mos1S003-bkg_region-  
sky.fits radiusstyle=enfrac bkgratestyle=col nosrcellipse=yes energyfraction=0.4 outunit=xy verbosity=1
```

```
region:- Executing (routine): region eventset=mos1S003-clean.fits tempset=tempset.ds usersrcid=1  
srcidcol=dummy_default operationstyle=global srclisttab=emllist.fits:SRCLIST expression='(DIST_NN >=  
40)&&(DET_ML >= 15)&&(FLUX >= 2e-15)&&(ID_BAND == 0)' regionset=src_region.ds  
bkgregionset=mos1S003-bkg_region-sky.fits shrinkconfused=yes fixedradius=12 energyfraction=0.4  
bkgratecol=BG_MAP bkgratekwdset=kwd_set.ds bkgrateimgset=bkg_rate_img.ds bkgrateuser=1 bkgratestyle=col
```

```
bkgfraction=1 nosrcellipse=yes radiusstyle=enfrac fovbkgannulus=no nobkgellipse=no outunit=xy  
withboresightfudge=yes -w 1 -V 1  
  
** region: error (datasetCouldNotBeRead), The dataset with name 'mos1S003-clean.fits' could not be read; either it  
does not exist or it is in an unrecognised format
```

```
make_mask inimage=mos1S003-obj-im.fits inmask=mos1S003-mask-im.fits outmask=mos1S003-cheese.fits  
reglist=mos1S003-bkg_region-sky.fits
```

```
make_mask:- Executing (routine): make_mask inimage=mos1S003-obj-im.fits inmask=mos1S003-mask-im.fits  
outmask=mos1S003-cheese.fits reglist=mos1S003-bkg_region-sky.fits clobber=yes -w 1 -V 4
```

```
make_mask:- make_mask (esas-0.9.40) [xmmsas_20170719_1539-16.1.0] started: 2020-02-10T02:50:35.000
```

```
Event Image: mos1S003-obj-im.fits
```

```
Input Mask: mos1S003-mask-im.fits
```

```
Output Cheese Image: mos1S003-cheese.fits
```

```
Region File: mos1S003-bkg_region-sky.fits
```

```
Input Image: mos1S003-obj-im.fits
```

```
STATUS FTOOPEN = 104
```

```
MAKE-MASK POSITION 02
```

```
mos1S003-obj-im.fits
```

```
region eventset=mos2S002-clean.fits operationstyle=global srclisttab=emllist.fits:SRCLIST expression='(FLUX >= 2e-15)&&(DET_ML >= 15)&&(DIST_NN >= 40)&&(ID_BAND == 0)' bkgregionset=mos2S002-bkg_region-det.fits energyfraction=0.4 radiusstyle=enfrac outunit=detxy verbosity=1
```

```
region:- Executing (routine): region eventset=mos2S002-clean.fits tempset=tempset.ds usersrcid=1  
srcidcol=dummy_default operationstyle=global srclisttab=emllist.fits:SRCLIST expression='(FLUX >= 2e-15)&&(DET_ML >= 15)&&(DIST_NN >= 40)&&(ID_BAND == 0)' regionset=src_region.ds  
bkgregionset=mos2S002-bkg_region-det.fits shrinkconfused=yes fixedradius=12 energyfraction=0.4  
bkgratecol=BG_MAP bkgratekwdset=kwd_set.ds bkgrateimgset=bkg_rate_img.ds bkgrateuser=1 bkgratestyle=col  
bkgfraction=1 nosrcellipse=no radiusstyle=enfrac fovbkgannulus=no nobkgellipse=no outunit=detxy  
withboresightfudge=yes -w 1 -V 1
```

```
** region: fatal error (CannotLocateCIF), No file name for Calibration Index File specified and environment  
variable 'SAS_CCF' is not set either - cannot continue.
```

```
region eventset=mos2S002-clean.fits operationstyle=global srclisttab=emllist.fits:SRCLIST expression='(DIST_NN >= 40)&&(DET_ML >= 15)&&(FLUX >= 2e-15)&&(ID_BAND == 0)' bkgregionset=mos2S002-bkg_region-sky.fits radiusstyle=enfrac bkgratestyle=col nosrcellipse=yes energyfraction=0.4 outunit=xy verbosity=1
```

```
region:- Executing (routine): region eventset=mos2S002-clean.fits tempset=tempset.ds usersrcid=1
srcidcol=dummy_default operationstyle=global srclisttab=emllist.fits:SRCLIST expression='(DIST_NN >=
40)&&(DET_ML >= 15)&&(FLUX >= 2e-15)&&(ID_BAND == 0)' regionset=src_region.ds
bkgregionset=mos2S002-bkg_region-sky.fits shrinkconfused=yes fixedradius=12 energyfraction=0.4
bkgratecol=BG_MAP bkgratekwds=kwd_set.ds bkgrateimgset=bkg_rate_img.ds bkgrateuser=1 bkgratestyle=col
bkgfraction=1 nosrcellipse=yes radiusstyle=enfrac fovbkgannulus=no nobkgellipse=no outunit=xy
withboresightfudge=yes -w 1 -V 1
```

```
** region: fatal error (CannotLocateCIF), No file name for Calibration Index File specified and environment
variable 'SAS_CCF' is not set either - cannot continue.
```

```
make_mask inimage=mos2S002-obj-im.fits inmask=mos2S002-mask-im.fits outmask=mos2S002-cheese.fits
reglist=mos2S002-bkg_region-sky.fits
```

```
make_mask:- Executing (routine): make_mask inimage=mos2S002-obj-im.fits inmask=mos2S002-mask-im.fits
outmask=mos2S002-cheese.fits reglist=mos2S002-bkg_region-sky.fits clobber=yes -w 1 -V 4
```

```
make_mask:- make_mask (esas-0.9.40) [xmmsas_20170719_1539-16.1.0] started: 2020-02-10T02:50:36.000
```

Event Image: mos2S002-obj-im.fits

Input Mask: mos2S002-mask-im.fits

Output Cheese Image: mos2S002-cheese.fits

Region File: mos2S002-bkg_region-sky.fits

Input Image: mos2S002-obj-im.fits

Input Mask: mos2S002-mask-im.fits

Template File

mos2S002-mask-im.fits

Template image coordinate system: -TAN

Template image coordinate ID: RA---TAN DEC--TAN

Template image central coordinates: 120.26045833333301 36.04633333333301

Template image reference pixel: 450.91000000000003 450.91000000000003

Template image pixel sizes: -6.94444444444501E-004 6.94444444444501E-004

Template image NAXES, NAXIS: 2 900 900

mos2S002-bkg_region-sky.fits

STATUS FTOPEN = 104

MAKE-MASK POSITION 17

Region file does not exist, continue with now source removal

mos2S002-bkg_region-sky.fits

```
region eventset=pnS003-clean.fits operationstyle=global srclisttab=emllist.fits:SRCLIST expression='(DIST_NN >= 40)&&(DET_ML >= 15)&&(FLUX >= 2e-15)&&(ID_BAND == 0)' bkgregionset=bnS003-bkg_region-det.fits energyfraction=0.4 radiusstyle=enfrac outunit=detxy verbosity=1
```

```
region:- Executing (routine): region eventset=bnS003-clean.fits tempset=tempset.ds usersrcid=1  
srcidcol=dummy_default operationstyle=global srclisttab=emllist.fits:SRCLIST expression='(DIST_NN >= 40)&&(DET_ML >= 15)&&(FLUX >= 2e-15)&&(ID_BAND == 0)' regionset=src_region.ds  
bkgregionset=bnS003-bkg_region-det.fits shrinkconfused=yes fixedradius=12 energyfraction=0.4  
bkgratecol=BG_MAP bkgratekwdset=kwd_set.ds bkrateimgset=bkg_rate_img.ds bkgrateuser=1 bkgratestyle=col  
bkgfraction=1 nosrcellipse=no radiusstyle=enfrac fovbkgannulus=no nobkgellipse=no outunit=detxy  
withboresightfudge=yes -w 1 -V 1
```

```
** region: fatal error (CannotLocateCIF), No file name for Calibration Index File specified and environment variable 'SAS_CCF' is not set either - cannot continue.
```

```
region eventset=bnS003-clean.fits operationstyle=global srclisttab=emllist.fits:SRCLIST expression='(DIST_NN >= 40)&&(DET_ML >= 15)&&(FLUX >= 2e-15)&&(ID_BAND == 0)' bkgregionset=bnS003-bkg_region-sky.fits  
radiusstyle=enfrac bkgratestyle=col nosrcellipse=yes energyfraction=0.4 outunit=xy verbosity=1
```

```
region:- Executing (routine): region eventset=bnS003-clean.fits tempset=tempset.ds usersrcid=1  
srcidcol=dummy_default operationstyle=global srclisttab=emllist.fits:SRCLIST expression='(DIST_NN >= 40)&&(DET_ML >= 15)&&(FLUX >= 2e-15)&&(ID_BAND == 0)' regionset=src_region.ds  
bkgregionset=bnS003-bkg_region-sky.fits shrinkconfused=yes fixedradius=12 energyfraction=0.4  
bkgratecol=BG_MAP bkgratekwdset=kwd_set.ds bkrateimgset=bkg_rate_img.ds bkgrateuser=1 bkgratestyle=col  
bkgfraction=1 nosrcellipse=yes radiusstyle=enfrac fovbkgannulus=no nobkgellipse=no outunit=xy  
withboresightfudge=yes -w 1 -V 1
```

```
** region: fatal error (CannotLocateCIF), No file name for Calibration Index File specified and environment variable 'SAS_CCF' is not set either - cannot continue.
```

```
make_mask inimage=bnS003-obj-im.fits inmask=bnS003-mask-im.fits outmask=bnS003-cheese.fits  
reglist=bnS003-bkg_region-sky.fits
```

```
make_mask:- Executing (routine): make_mask inimage=bnS003-obj-im.fits inmask=bnS003-mask-im.fits  
outmask=bnS003-cheese.fits reglist=bnS003-bkg_region-sky.fits clobber=yes -w 1 -V 4
```

```
make_mask:- make_mask (esas-0.9.40) [xmmsas_20170719_1539-16.1.0] started: 2020-02-10T02:50:37.000
```

Event Image: bnS003-obj-im.fits

Input Mask: bnS003-mask-im.fits

Output Cheese Image: bnS003-cheese.fits

Region File: bnS003-bkg_region-sky.fits

Input Image: bnS003-obj-im.fits

Input Mask: pnS003-mask-im.fits
Template File
pnS003-mask-im.fits
Template image coordinate system: -TAN
Template image coordinate ID: RA---TAN DEC--TAN
Template image central coordinates: 120.2604583333301 36.0463333333301
Template image reference pixel: 450.91000000000003 450.91000000000003
Template image pixel sizes: -6.944444444444501E-004 6.944444444444501E-004
Template image NAXES, NAXIS: 2 900 900
pnS003-bkg_region-sky.fits
STATUS FTOPEN = 104
MAKE-MASK POSITION 17
Region file does not exist, continue with now source removal
pnS003-bkg_region-sky.fits

```
[htb3hg@xmm analysis]$ ds9 mos1S001-obj-image-sky.fits mos1S001.fits &
[1] 15678
[htb3hg@xmm analysis]$
[1] Done /XMMShared/Software/ciao-4.10/ots/bin/ds9 mos1S001-obj-image-sky.fits
mos1S001.fits
```

2/10/20

```
[htb3hg@xmm analysis]$
[htb3hg@xmm analysis]$ ds9 mos1S001-obj-image-sky.fits mos1S001.fits &
[1] 10055
[htb3hg@xmm analysis]$
[1] Done /XMMShared/Software/ciao-4.10/ots/bin/ds9 mos1S001-obj-image-sky.fits
mos1S001.fits
[htb3hg@xmm analysis]$ cheese prefixm="1S003 2S002" prefixp=S003 scale=0.4 rate=0.2 \
? dist=40.0 clobber=1 elow=400 ehigh=7200
mos prefix 1: 1S003
mos prefix 2: 2S002
pn prefix 1: S003
```

verb: 1
scale: 0.4
rate: 2e-15
rates: 1e-14
rateh: 1e-14
dist: 40.0
mlmin: 15
clobber: 1
Band 1: 400 7200
attitude file already exists
use the old file

nn: 1
prefix: 1S003

```
evselect table=mos1S003-clean.fits:EVENTS withfilteredset=yes expression='(PATTERN<=12)&&(FLAG == 0)&&(PI in [400:7200])' filtertype=expression imagebinning='imageSize' imagedatatype='Int32' imageset=mos1S003-obj-im.fits squarepixels=yes ignorelegallimits=yes withxranges=yes withyranges=yes xcolumn='X' ximagesize=900 ximageymax=48400 ximageymin=3401 ycolumn='Y' yimagesize=900 yimageymax=48400 yimageymin=3401 updateexposure=yes filterexposure=yes verbosity=1
```

evselect:- Executing (routine): evselect table=mos1S003-clean.fits:EVENTS filteredset=filtered.fits withfilteredset=yes keepfilteroutput=yes flagcolumn=EVFLAG flagbit=-1 destruct=yes dssblock="" expression='(PATTERN<=12)&&(FLAG == 0)&&(PI in [400:7200])' filtertype=expression cleandss=no updateexposure=yes filterexposure=yes writedss=yes blockstocopy="" attributestocopy="" energycolumn=PHA zcolumn=WEIGHT zerrorcolumn=EWEIGHT withzerrorcolumn=no withzcolumn=no ignorelegallimits=yes imageset=mos1S003-obj-im.fits xcolumn=X ycolumn=Y ximagebinsize=1 yimagebinsize=1 squarepixels=yes ximagesize=900 yimagesize=900 imagebinning=imageSize ximageymin=3401 ximageymax=48400 withxranges=yes yimageymin=3401 yimageymax=48400 withyranges=yes imagedatatype=Int32 withimagedatatype=yes rimagecenter=0 decimagecenter=0 withcelestialcenter=no withimageset=yes spectrumset=spectrum.fits spectralbinsize=5 specchannelmin=0 specchannelmax=11999 withspecranges=no withspectrumsset=no rateset=rate.fits timecolumn=TIME timebinsize=1 timemin=0 timemax=1000 withtimeranges=no maketimecolumn=no makeratecolumn=no withrateset=no histogramset=histo.fits histogramcolumn=TIME histogrambinsize=1 histogrammin=0 histogrammax=1000 withhistoranges=no withhistogramset=no -w 1 -V 1

** evselect: error (copyDataSetFailed), It was not possible to copy the dataset with name 'mos1S003-clean.fits' to 'filtered.fits' because 'mos1S003-clean.fits' does not exist.

nn: 2
prefix: 2S002

Soft event image already exists: mos2S002-obj-im.fits

Clobber the existing file

```
evselect table=mos2S002-clean.fits:EVENTS withfilteredset=yes expression='(PATTERN<=12)&&(FLAG == 0)&&(PI in [400:7200])' filtertype=expression imagebinning='imageSize' imagedatatype='Int32' imageset=mos2S002-obj-im.fits squarepixels=yes ignorelegallimits=yes withxranges=yes withyranges=yes xcolumn='X' ximagesize=900 ximagemax=48400 ximagemin=3401 ycolumn='Y' yimagesize=900 yimagemax=48400 yimagemin=3401 updateexposure=yes filterexposure=yes verbosity=1
```

```
evselect:- Executing (routine): evselect table=mos2S002-clean.fits:EVENTS filteredset=filtered.fits withfilteredset=yes keepfilteroutput=yes flagcolumn=EVFLAG flagbit=-1 destruct=yes dssblock="" expression='(PATTERN<=12)&&(FLAG == 0)&&(PI in [400:7200])' filtertype=expression cleandss=no updateexposure=yes filterexposure=yes writedss=yes blockstocopy="" attributestocopy="" energycolumn=PHA zcolumn=WEIGHT zerrorcolumn=EWEIGHT withzerrorcolumn=no withzcolumn=no ignorelegallimits=yes imageset=mos2S002-obj-im.fits xcolumn=X ycolumn=Y ximagebinsize=1 yimagebinsize=1 squarepixels=yes ximagesize=900 yimagesize=900 imagebinning=imageSize ximagemin=3401 ximagemax=48400 withxranges=yes yimagemin=3401 yimagemax=48400 withyranges=yes imagedatatype=Int32 withimagedatatype=yes rimagecenter=0 decimagecenter=0 withcelestialcenter=no withimageset=yes spectrumset=spectrum.fits spectralbinsize=5 specchannelmin=0 specchannelmax=11999 withspecranges=no withspectrumset=no rateset=rate.fits timecolumn=TIME timebinsize=1 timemin=0 timemax=1000 withtimeranges=no maketimecolumn=no makeratecolumn=no withrateset=no histogramset=histo.fits histogramcolumn=TIME histogrambinsize=1 histogrammin=0 histogrammax=1000 withhistoranges=no withhistogramset=no -w 1 -V 1
```

nnp: 1

prefixp: S003

PN soft image already exists: pnS003-obj-im.fits

Clobber the existing file

```
evselect table=pnS003-clean.fits:EVENTS withfilteredset=yes expression='(PATTERN<=12)&&(FLAG == 0)&&(PI in [400:7200])&&(DETY in [-16510:14345])' filtertype=expression imagebinning='imageSize' imagedatatype='Int32' imageset=pnS003-obj-im.fits squarepixels=yes ignorelegallimits=yes withxranges=yes withyranges=yes xcolumn='X' ximagesize=900 ximagemax=48400 ximagemin=3401 ycolumn='Y' yimagesize=900 yimagemax=48400 yimagemin=3401 updateexposure=yes filterexposure=yes verbosity=1
```

```
evselect:- Executing (routine): evselect table=pnS003-clean.fits:EVENTS filteredset=filtered.fits withfilteredset=yes keepfilteroutput=yes flagcolumn=EVFLAG flagbit=-1 destruct=yes dssblock="" expression='(PATTERN<=12)&&(FLAG == 0)&&(PI in [400:7200])&&(DETY in [-16510:14345])' filtertype=expression cleandss=no updateexposure=yes filterexposure=yes writedss=yes blockstocopy="" attributestocopy="" energycolumn=PHA zcolumn=WEIGHT zerrorcolumn=EWEIGHT withzerrorcolumn=no withzcolumn=no ignorelegallimits=yes imageset=pnS003-obj-im.fits xcolumn=X ycolumn=Y ximagebinsize=1 yimagebinsize=1 squarepixels=yes ximagesize=900 yimagesize=900 imagebinning=imageSize ximagemin=3401 ximagemax=48400 withxranges=yes yimagemin=3401 yimagemax=48400 withyranges=yes imagedatatype=Int32 withimagedatatype=yes rimagecenter=0 decimagecenter=0 withcelestialcenter=no withimageset=yes
```

```
spectrumset=spectrum.fits spectralbinsize=5 specchannelmin=0 specchannelmax=11999 withspecranges=no  
withspectrumset=no rateset=rate.fits timecolumn=TIME timebinsize=1 timemin=0 timemax=1000  
withtimeranges=no maketimecolumn=no makeratecolumn=no withrateset=no histogramset=histo.fits  
histogramcolumn=TIME histogrambinsize=1 histogrammin=0 histogrammax=1000 withhistoranges=no  
withhistogramset=no -w 1 -V 1
```

Run edetect_chain

```
edetect_chain imagesets='mos1S003-obj-im.fits mos2S002-obj-im.fits pnS003-obj-im.fits' eventsets='mos1S003-  
clean.fits mos2S002-clean.fits pnS003-clean.fits' attitudeset=atthk.fits pimin='400 400 400' pimax='7200 7200  
7200' witheexpmap=yes likemin=10 ecf='1.2 1.2 3.2' eboxl_likemin=15 eboxm_likemin=15 ebox_withdetmask=yes  
ebox_withexpimage=yes esp_scut=0.01 esp_withootset=yes esp_ooeventset='pnS003-clean-oot.fits'  
esp_nsplinenodes=20 eml_ecut=15 eml_scut=15 eml_withtwostage=yes eml_withthreshold=yes eml_threshold=15  
esen_mllmin=10 eml_list=emllist.fits
```

```
** edetect_chain: error (CIFMissing), Environment variable 'SAS_CCF' is not set.
```

```
emask detmaskset=mos1S003-mask-im.fits expimageset=mos1S003-obj-imexp.fits threshold1=0.1 threshold2=0.5  
verbosity=1
```

```
emask:- Executing (routine): emask expimageset=mos1S003-obj-imexp.fits detmaskset=mos1S003-mask-im.fits  
threshold1=0.1 threshold2=0.5 regionset=region.fits withregionset=no -w 1 -V 1
```

```
** emask: error (datasetCouldNotBeRead), The dataset with name 'mos1S003-obj-imexp.fits' could not be read;  
either it does not exist or it is in an unrecognised format
```

Total band mask already exists: mos2S002-mask-im.fits

Clobber the existing file

```
emask detmaskset=mos2S002-mask-im.fits expimageset=mos2S002-obj-imexp.fits threshold1=0.1 threshold2=0.5  
verbosity=1
```

```
emask:- Executing (routine): emask expimageset=mos2S002-obj-imexp.fits detmaskset=mos2S002-mask-im.fits  
threshold1=0.1 threshold2=0.5 regionset=region.fits withregionset=no -w 1 -V 1
```

```
** emask: error (datasetCouldNotBeRead), The dataset with name 'mos2S002-obj-imexp.fits' could not be read;  
either it does not exist or it is in an unrecognised format
```

PN soft mask already exists: pnS003-mask-im.fits

Clobber the existing file

```
emask detmaskset=pnS003-mask-im.fits expimageset=pnS003-obj-imexp.fits threshold1=0.1 threshold2=0.5  
verbosity=1
```

```
emask:- Executing (routine): emask expimageset=pnS003-obj-imexp.fits detmaskset=pnS003-mask-im.fits  
threshold1=0.1 threshold2=0.5 regionset=region.fits withregionset=no -w 1 -V 1
```

```
** emask: error (datasetCouldNotBeRead), The dataset with name 'pnS003-obj-imexp.fits' could not be read; either  
it does not exist or it is in an unrecognised format
```

```
region eventset=mos1S003-clean.fits operationstyle=global srclisttab=emllist.fits:SRCLIST expression='(FLUX >=  
2e-15)&&(DET_ML >= 15)&&(DIST_NN >= 40.0)&&(ID_BAND == 0)' bkgregionset=mos1S003-bkg_region-  
det.fits energyfraction=0.4 radiusstyle=enfrac outunit=detxy verbosity=1
```

```
region:- Executing (routine): region eventset=mos1S003-clean.fits tempset=tempset.ds usersrcid=1  
srcidcol=dummy_default operationstyle=global srclisttab=emllist.fits:SRCLIST expression='(FLUX >= 2e-  
15)&&(DET_ML >= 15)&&(DIST_NN >= 40.0)&&(ID_BAND == 0)' regionset=src_region.ds  
bkgregionset=mos1S003-bkg_region-det.fits shrinkconfused=yes fixedradius=12 energyfraction=0.4  
bkgratecol=BG_MAP bkgratekwdset=kwd_set.ds bkgrateimgset=bkg_rate_img.ds bkgrateuser=1 bkgratestyle=col  
bkgfraction=1 nosrcellipse=no radiusstyle=enfrac fovbkgannulus=no nobkgellipse=no outunit=detxy  
withboresightfudge=yes -w 1 -V 1
```

```
** region: error (datasetCouldNotBeRead), The dataset with name 'mos1S003-clean.fits' could not be read; either it  
does not exist or it is in an unrecognised format
```

```
region eventset=mos1S003-clean.fits operationstyle=global srclisttab=emllist.fits:SRCLIST expression='(DIST_NN  
>= 40.0)&&(DET_ML >= 15)&&(FLUX >= 2e-15)&&(ID_BAND == 0)' bkgregionset=mos1S003-bkg_region-  
sky.fits radiusstyle=enfrac bkgratestyle=col nosrcellipse=yes energyfraction=0.4 outunit=xy verbosity=1
```

```
region:- Executing (routine): region eventset=mos1S003-clean.fits tempset=tempset.ds usersrcid=1  
srcidcol=dummy_default operationstyle=global srclisttab=emllist.fits:SRCLIST expression='(DIST_NN >=  
40.0)&&(DET_ML >= 15)&&(FLUX >= 2e-15)&&(ID_BAND == 0)' regionset=src_region.ds  
bkgregionset=mos1S003-bkg_region-sky.fits shrinkconfused=yes fixedradius=12 energyfraction=0.4  
bkgratecol=BG_MAP bkgratekwdset=kwd_set.ds bkgrateimgset=bkg_rate_img.ds bkgrateuser=1 bkgratestyle=col  
bkgfraction=1 nosrcellipse=yes radiusstyle=enfrac fovbkgannulus=no nobkgellipse=no outunit=xy  
withboresightfudge=yes -w 1 -V 1
```

```
** region: error (datasetCouldNotBeRead), The dataset with name 'mos1S003-clean.fits' could not be read; either it  
does not exist or it is in an unrecognised format
```

```
make_mask inimage=mos1S003-obj-im.fits inmask=mos1S003-mask-im.fits outmask=mos1S003-cheese.fits  
reglist=mos1S003-bkg_region-sky.fits
```

```
make_mask:- Executing (routine): make_mask inimage=mos1S003-obj-im.fits inmask=mos1S003-mask-im.fits  
outmask=mos1S003-cheese.fits reglist=mos1S003-bkg_region-sky.fits clobber=yes -w 1 -V 4
```

```
make_mask:- make_mask (esas-0.9.40) [xmmsas_20170719_1539-16.1.0] started: 2020-02-10T20:46:19.000
```

```
Event Image: mos1S003-obj-im.fits
```

```
Input Mask: mos1S003-mask-im.fits
```

```
Output Cheese Image: mos1S003-cheese.fits
```

```
Region File: mos1S003-bkg_region-sky.fits
```

```
Input Image: mos1S003-obj-im.fits
```

```
STATUS FOPEN = 104
```

```
MAKE-MASK POSITION 02
```

```
mos1S003-obj-im.fits
```

```
region eventset=mos2S002-clean.fits operationstyle=global srclisttab=emllist.fits:SRCLIST expression='(FLUX >= 2e-15)&&(DET_ML >= 15)&&(DIST_NN >= 40.0)&&(ID_BAND == 0)' bkgregionset=mos2S002-bkg_region-det.fits energyfraction=0.4 radiusstyle=enfrac outunit=detxy verbosity=1
```

```
region:- Executing (routine): region eventset=mos2S002-clean.fits tempset=tempset.ds usersrcid=1  
srcidcol=dummy_default operationstyle=global srclisttab=emllist.fits:SRCLIST expression='(FLUX >= 2e-15)&&(DET_ML >= 15)&&(DIST_NN >= 40.0)&&(ID_BAND == 0)' regionset=src_region.ds  
bkgregionset=mos2S002-bkg_region-det.fits shrinkconfused=yes fixedradius=12 energyfraction=0.4  
bkgratecol=BG_MAP bkgratekwdset=kwd_set.ds bkgrateimgset=bkg_rate_img.ds bkgrateuser=1 bkgratestyle=col  
bkgfraction=1 nosrcellipse=no radiusstyle=enfrac fovbkgannulus=no nobkgellipse=no outunit=detxy  
withboresightfudge=yes -w 1 -V 1
```

```
** region: fatal error (CannotLocateCIF), No file name for Calibration Index File specified and environment variable 'SAS_CCF' is not set either - cannot continue.
```

```
region eventset=mos2S002-clean.fits operationstyle=global srclisttab=emllist.fits:SRCLIST expression='(DIST_NN >= 40.0)&&(DET_ML >= 15)&&(FLUX >= 2e-15)&&(ID_BAND == 0)' bkgregionset=mos2S002-bkg_region-sky.fits radiusstyle=enfrac bkgratestyle=col nosrcellipse=yes energyfraction=0.4 outunit=xy verbosity=1
```

```
region:- Executing (routine): region eventset=mos2S002-clean.fits tempset=tempset.ds usersrcid=1  
srcidcol=dummy_default operationstyle=global srclisttab=emllist.fits:SRCLIST expression='(DIST_NN >= 40.0)&&(DET_ML >= 15)&&(FLUX >= 2e-15)&&(ID_BAND == 0)' regionset=src_region.ds  
bkgregionset=mos2S002-bkg_region-sky.fits shrinkconfused=yes fixedradius=12 energyfraction=0.4  
bkgratecol=BG_MAP bkgratekwdset=kwd_set.ds bkgrateimgset=bkg_rate_img.ds bkgrateuser=1 bkgratestyle=col  
bkgfraction=1 nosrcellipse=yes radiusstyle=enfrac fovbkgannulus=no nobkgellipse=no outunit=xy  
withboresightfudge=yes -w 1 -V 1
```

```
** region: fatal error (CannotLocateCIF), No file name for Calibration Index File specified and environment variable 'SAS_CCF' is not set either - cannot continue.
```

```
make_mask inimage=mos2S002-obj-im.fits inmask=mos2S002-mask-im.fits outmask=mos2S002-cheese.fits  
reglist=mos2S002-bkg_region-sky.fits
```

```
make_mask:- Executing (routine): make_mask inimage=mos2S002-obj-im.fits inmask=mos2S002-mask-im.fits  
outmask=mos2S002-cheese.fits reglist=mos2S002-bkg_region-sky.fits clobber=yes -w 1 -V 4
```

```
make_mask:- make_mask (esas-0.9.40) [xmmsas_20170719_1539-16.1.0] started: 2020-02-10T20:46:20.000
```

```
Event Image: mos2S002-obj-im.fits
```

```
Input Mask: mos2S002-mask-im.fits
```

```
Output Cheese Image: mos2S002-cheese.fits
```

```
Region File: mos2S002-bkg_region-sky.fits
```

```
Input Image: mos2S002-obj-im.fits
```

```
Input Mask: mos2S002-mask-im.fits
```

```
Template File
```

```
mos2S002-mask-im.fits
```

```
Template image coordinate system: -TAN
```

```
Template image coordinate ID: RA---TAN DEC--TAN
```

```
Template image central coordinates: 120.26045833333301 36.04633333333301
```

```
Template image reference pixel: 450.91000000000003 450.91000000000003
```

```
Template image pixel sizes: -6.944444444444501E-004 6.944444444444501E-004
```

```
Template image NAXES, NAXIS: 2 900 900
```

```
mos2S002-bkg_region-sky.fits
```

```
STATUS FTOPEN = 104
```

```
MAKE-MASK POSITION 17
```

```
Region file does not exist, continue with now source removal
```

```
mos2S002-bkg_region-sky.fits
```

```
region eventset=pnS003-clean.fits operationstyle=global srclisttab=emllist.fits:SRCLIST expression='(DIST_NN >= 40.0)&&(DET_ML >= 15)&&(FLUX >= 2e-15)&&(ID_BAND == 0)' bkgregionset=pnS003-bkg_region-det.fits  
energyfraction=0.4 radiusstyle=enfrac outunit=detxy verbosity=1
```

```
region:- Executing (routine): region eventset=pnS003-clean.fits tempset=tempset.ds usersrcid=1  
srcidcol=dummy_default operationstyle=global srclisttab=emllist.fits:SRCLIST expression='(DIST_NN >= 40.0)&&(DET_ML >= 15)&&(FLUX >= 2e-15)&&(ID_BAND == 0)' regionset=src_region.ds  
bkgregionset=pnS003-bkg_region-det.fits shrinkconfused=yes fixedradius=12 energyfraction=0.4  
bkgratecol=BG_MAP bkgratekwdsset=kwd_set.ds bkgrateimgset=bkg_rate_img.ds bkgrateuser=1 bkgratestyle=col
```

```
bkgfraction=1 nosrcellipse=no radiusstyle=enfrac fovbkgannulus=no nobkgellipse=no outunit=detxy  
withboresightfudge=yes -w 1 -V 1
```

```
** region: fatal error (CannotLocateCIF), No file name for Calibration Index File specified and environment  
variable 'SAS_CCF' is not set either - cannot continue.
```

```
region eventset=pnS003-clean.fits operationstyle=global srclisttab=emllist.fits:SRCLIST expression='(DIST_NN >= 40.0)&&(DET_ML >= 15)&&(FLUX >= 2e-15)&&(ID_BAND == 0)' bkgregionset=pnS003-bkg_region-sky.fits  
radiusstyle=enfrac bkgratestyle=col nosrcellipse=yes energyfraction=0.4 outunit=xy verbosity=1
```

```
region:- Executing (routine): region eventset=pnS003-clean.fits tempset=tempset.ds usersrcid=1  
srcidcol=dummy_default operationstyle=global srclisttab=emllist.fits:SRCLIST expression='(DIST_NN >= 40.0)&&(DET_ML >= 15)&&(FLUX >= 2e-15)&&(ID_BAND == 0)' regionset=src_region.ds  
bkgregionset=pnS003-bkg_region-sky.fits shrinkconfused=yes fixedradius=12 energyfraction=0.4  
bkgratecol=BG_MAP bkgratekwdset=kwd_set.ds bkgrateimgset=bkg_rate_img.ds bkgrateuser=1 bkgratestyle=col  
bkgfraction=1 nosrcellipse=yes radiusstyle=enfrac fovbkgannulus=no nobkgellipse=no outunit=xy  
withboresightfudge=yes -w 1 -V 1
```

```
** region: fatal error (CannotLocateCIF), No file name for Calibration Index File specified and environment  
variable 'SAS_CCF' is not set either - cannot continue.
```

```
make_mask inimage=pnS003-obj-im.fits inmask=pnS003-mask-im.fits outmask=pnS003-cheese.fits  
reglist=pnS003-bkg_region-sky.fits
```

```
make_mask:- Executing (routine): make_mask inimage=pnS003-obj-im.fits inmask=pnS003-mask-im.fits  
outmask=pnS003-cheese.fits reglist=pnS003-bkg_region-sky.fits clobber=yes -w 1 -V 4
```

```
make_mask:- make_mask (esas-0.9.40) [xmmsas_20170719_1539-16.1.0] started: 2020-02-10T20:46:21.000
```

Event Image: pnS003-obj-im.fits

Input Mask: pnS003-mask-im.fits

Output Cheese Image: pnS003-cheese.fits

Region File: pnS003-bkg_region-sky.fits

Input Image: pnS003-obj-im.fits

Input Mask: pnS003-mask-im.fits

Template File

pnS003-mask-im.fits

Template image coordinate system: -TAN

Template image coordinate ID: RA---TAN DEC--TAN

Template image central coordinates: 120.2604583333301 36.0463333333301

Template image reference pixel: 450.91000000000003 450.91000000000003

Template image pixel sizes: -6.94444444444501E-004 6.94444444444501E-004

Template image NAXES, NAXIS: 2 900 900

pnS003-bkg_region-sky.fits

STATUS FOPEN = 104

MAKE-MASK POSITION 17

Region file does not exist, continue with now source removal

pnS003-bkg_region-sky.fits

[htb3hg@xmm analysis]\$ ds9 mos1S001-obj-image-sky.fits mos1S001-cheese.fits &

[1] 4525

[htb3hg@xmm analysis]\$

[1] Done /XMMShared/Software/ciao-4.10/ots/bin/ds9 mos1S001-obj-image-sky.fits mos1S001-cheese.fits

[htb3hg@xmm analysis]\$ ds9 mos1S001-obj-image-sky.fits mos1S001-cheese.fits &

[1] 4648

[htb3hg@xmm analysis]\$

[1] Done /XMMShared/Software/ciao-4.10/ots/bin/ds9 mos1S001-obj-image-sky.fits mos1S001-cheese.fits

[htb3hg@xmm analysis]\$ cheese prefixm="1S001 2S002" prefixp=S003 scale=0.4 rate=0.2 \

? dist=40.0 clobber=1 elow=400 ehigh=7200

mos prefix 1: 1S001

mos prefix 2: 2S002

pn prefix 1: S003

verb: 1

scale: 0.4

rate: 2e-15

rates: 1e-14

rateh: 1e-14

dist: 40.0

mlmin: 15

clobber: 1

Band 1: 400 7200

attitude file already exists

use the old file

nn: 1

prefix: 1S001

```
evselect table=mos1S001-clean.fits:EVENTS withfilteredset=yes expression='(PATTERN<=12)&&(FLAG == 0)&&(PI in [400:7200])' filtertype=expression imagebinning='imageSize' imagedatatype='Int32' imageset=mos1S001-obj-im.fits squarepixels=yes ignorelegallimits=yes withxranges=yes withyranges=yes xcolumn='X' ximagesize=900 ximageymax=48400 ximageemin=3401 ycolumn='Y' yimagesize=900 yimageymax=48400 yimageemin=3401 updateexposure=yes filterexposure=yes verbosity=1
```

evselect:- Executing (routine): evselect table=mos1S001-clean.fits:EVENTS filteredset=filtered.fits withfilteredset=yes keepfilteroutput=yes flagcolumn=EVFLAG flagbit=-1 destruct=yes dssblock="" expression='(PATTERN<=12)&&(FLAG == 0)&&(PI in [400:7200])' filtertype=expression cleandss=no updateexposure=yes filterexposure=yes writedss=yes blockstocopy="" attributestocopy="" energycolumn=PHA zcolumn=WEIGHT zerrorcolumn=EWEIGHT withzerrorcolumn=no withzcolumn=no ignorelegallimits=yes imageset=mos1S001-obj-im.fits xcolumn=X ycolumn=Y ximagebinsize=1 yimagebinsize=1 squarepixels=yes ximagesize=900 yimagesize=900 imagebinning=imageSize ximageemin=3401 ximageymax=48400 withxranges=yes yimageemin=3401 yimageymax=48400 withyranges=yes imagedatatype=Int32 withimagedatatype=yes rimagecenter=0 decimagecenter=0 withcelestialcenter=no withimageset=yes spectrumset=spectrum.fits spectralbinsize=5 specchannelmin=0 specchannelmax=11999 withspecranges=no withspectrumset=no rateset=rate.fits timecolumn=TIME timebinsize=1 timemin=0 timemax=1000 withtimeranges=no maketimecolumn=no makeratecolumn=no withrateset=no histogramset=histo.fits histogramcolumn=TIME histogrambinsize=1 histogrammin=0 histogrammax=1000 withhistoranges=no withhistogramset=no -w 1 -V 1

nn: 2

prefix: 2S002

Soft event image already exists: mos2S002-obj-im.fits

Clobber the existing file

```
evselect table=mos2S002-clean.fits:EVENTS withfilteredset=yes expression='(PATTERN<=12)&&(FLAG == 0)&&(PI in [400:7200])' filtertype=expression imagebinning='imageSize' imagedatatype='Int32' imageset=mos2S002-obj-im.fits squarepixels=yes ignorelegallimits=yes withxranges=yes withyranges=yes xcolumn='X' ximagesize=900 ximageymax=48400 ximageemin=3401 ycolumn='Y' yimagesize=900 yimageymax=48400 yimageemin=3401 updateexposure=yes filterexposure=yes verbosity=1
```

evselect:- Executing (routine): evselect table=mos2S002-clean.fits:EVENTS filteredset=filtered.fits withfilteredset=yes keepfilteroutput=yes flagcolumn=EVFLAG flagbit=-1 destruct=yes dssblock="" expression='(PATTERN<=12)&&(FLAG == 0)&&(PI in [400:7200])' filtertype=expression cleandss=no updateexposure=yes filterexposure=yes writedss=yes blockstocopy="" attributestocopy="" energycolumn=PHA zcolumn=WEIGHT zerrorcolumn=EWEIGHT withzerrorcolumn=no withzcolumn=no ignorelegallimits=yes

```

imageset=mos2S002-obj-im.fits xcolumn=X ycolumn=Y ximagebinsize=1 yimagebinsize=1 squarepixels=yes
ximagesize=900 yimagesize=900 imagebinning=imageSize ximagemin=3401 ximagemax=48400 withxranges=yes
yimagemin=3401 yimagemax=48400 withyranges=yes imagedatatype=Int32 withimagedatatype=yes
raimagecenter=0 decimagecenter=0 withcelestialcenter=no withimageset=yes spectrumset=spectrum.fits
spectralbinsize=5 specchannelmin=0 specchannelmax=11999 withspecranges=no withspectrume=nt=no
rateset=rate.fits timecolumn=TIME timebinsize=1 timemin=0 timemax=1000 withtimeranges=no
maketimecolumn=no makeratecolumn=no withrateset=no histogramset=histo.fits histogramcolumn=TIME
histogrambinsize=1 histogrammin=0 histogrammax=1000 withhistoranges=no withhistogramset=no -w 1 -V 1

```

nnp: 1

prefixp: S003

PN soft image already exists: pnS003-obj-im.fits

Clobber the existing file

```

evselect table=pnS003-clean.fits:EVENTS withfilteredset=yes expression='(PATTERN<=12)&&(FLAG == 0)&&(PI in [400:7200])&&(DET Y in [-16510:14345])' filtotype=expression imagebinning='imageSize'
imagedatatype='Int32' imageset=pnS003-obj-im.fits squarepixels=yes ignorelegallimits=yes withxranges=yes
withyranges=yes xcolumn='X' ximagesize=900 ximagemax=48400 ximagemin=3401 ycolumn='Y' yimagesize=900
yimagemax=48400 yimagemin=3401 updateexposure=yes filterexposure=yes verbosity=1

```

```

evselect:- Executing (routine): evselect table=pnS003-clean.fits:EVENTS filteredset=filtered.fits withfilteredset=yes
keepfilteroutput=yes flagcolumn=EVFLAG flagbit=-1 destruct=yes dssblock="
expression='(PATTERN<=12)&&(FLAG == 0)&&(PI in [400:7200])&&(DET Y in [-16510:14345])'
filtotype=expression cleandss=no updateexposure=yes filterexposure=yes writedss=yes blockstocopy="
attributestocopy=" energycolumn=PHA zcolumn=WEIGHT zerrorcolumn=EWEIGHT withzerrorcolumn=no
withzcolumn=no ignorelegallimits=yes imageset=pnS003-obj-im.fits xcolumn=X ycolumn=Y ximagebinsize=1
yimagebinsize=1 squarepixels=yes ximagesize=900 yimagesize=900 imagebinning=imageSize ximagemin=3401
ximagemax=48400 withxranges=yes yimagemin=3401 yimagemax=48400 withyranges=yes imagedatatype=Int32
withimagedatatype=yes raimagecenter=0 decimagecenter=0 withcelestialcenter=no withimageset=yes
spectrumset=spectrum.fits spectralbinsize=5 specchannelmin=0 specchannelmax=11999 withspecranges=no
withspectrume=nt=no rateset=rate.fits timecolumn=TIME timebinsize=1 timemin=0 timemax=1000
withtimeranges=no maketimecolumn=no makeratecolumn=no withrateset=no histogramset=histo.fits
histogramcolumn=TIME histogrambinsize=1 histogrammin=0 histogrammax=1000 withhistoranges=no
withhistogramset=no -w 1 -V 1

```

Run edetect_chain

```

edetect_chain imagesets='mos1S001-obj-im.fits mos2S002-obj-im.fits pnS003-obj-im.fits' eventsets='mos1S001-
clean.fits mos2S002-clean.fits pnS003-clean.fits' attitudeset=athk.fits pimin='400 400 400' pimax='7200 7200
7200' witheexpmap=yes likemin=10 ecf='1.2 1.2 3.2' eboxl_likemin=15 eboxm_likemin=15 ebox_withdetmask=yes
ebox_withexpimage=yes esp_scut=0.01 esp_withootset=yes esp_ooeventset='pnS003-clean-oot.fits'
esp_nsplinenodes=20 eml_ecut=15 eml_scut=15 eml_withtwostage=yes eml_withthreshold=yes eml_threshold=15
esen_mllmin=10 eml_list=emllist.fits

```

** edetect_chain: error (CIFMissing), Environment variable 'SAS_CCF' is not set.

emask detmaskset=mos1S001-mask-im.fits expimageset=mos1S001-obj-imexp.fits threshold1=0.1 threshold2=0.5
verbosity=1

emask:- Executing (routine): emask expimageset=mos1S001-obj-imexp.fits detmaskset=mos1S001-mask-im.fits
threshold1=0.1 threshold2=0.5 regionset=region.fits withregionset=no -w 1 -V 1

** emask: error (datasetCouldNotBeRead), The dataset with name 'mos1S001-obj-imexp.fits' could not be read;
either it does not exist or it is in an unrecognised format

Total band mask already exists: mos2S002-mask-im.fits

Clobber the existing file

emask detmaskset=mos2S002-mask-im.fits expimageset=mos2S002-obj-imexp.fits threshold1=0.1 threshold2=0.5
verbosity=1

emask:- Executing (routine): emask expimageset=mos2S002-obj-imexp.fits detmaskset=mos2S002-mask-im.fits
threshold1=0.1 threshold2=0.5 regionset=region.fits withregionset=no -w 1 -V 1

** emask: error (datasetCouldNotBeRead), The dataset with name 'mos2S002-obj-imexp.fits' could not be read;
either it does not exist or it is in an unrecognised format

PN soft mask already exists: pnS003-mask-im.fits

Clobber the existing file

emask detmaskset=pnS003-mask-im.fits expimageset=pnS003-obj-imexp.fits threshold1=0.1 threshold2=0.5
verbosity=1

emask:- Executing (routine): emask expimageset=pnS003-obj-imexp.fits detmaskset=pnS003-mask-im.fits
threshold1=0.1 threshold2=0.5 regionset=region.fits withregionset=no -w 1 -V 1

** emask: error (datasetCouldNotBeRead), The dataset with name 'pnS003-obj-imexp.fits' could not be read; either
it does not exist or it is in an unrecognised format

region eventset=mos1S001-clean.fits operationstyle=global srclisttab=emllist.fits:SRCLIST expression='(FLUX >= 2e-15)&&(DET_ML >= 15)&&(DIST_NN >= 40.0)&&(ID_BAND == 0)' bkgregionset=mos1S001-bkg_region-
det.fits energyfraction=0.4 radiusstyle=enfrac outunit=detxy verbosity=1

```
region:- Executing (routine): region eventset=mos1S001-clean.fits tempset=tempset.ds usersrcid=1
srcidcol=dummy_default operationstyle=global srclisttab=emllist.fits:SRCLIST expression='(FLUX >= 2e-15)&&(DET_ML >= 15)&&(DIST_NN >= 40.0)&&(ID_BAND == 0)' regionset=src_region.ds
bkgregionset=mos1S001-bkg_region-det.fits shrinkconfused=yes fixedradius=12 energyfraction=0.4
bkgratecol=BG_MAP bkgratekwdset=kwd_set.ds bkgrateimgset=bkg_rate_img.ds bkgrateuser=1 bkgratestyle=col
bkgfraction=1 nosrcellipse=no radiusstyle=enfrac fovbkgannulus=no nobkgellipse=no outunit=detxy
withboresightfudge=yes -w 1 -V 1
```

```
** region: fatal error (CannotLocateCIF), No file name for Calibration Index File specified and environment
variable 'SAS_CCF' is not set either - cannot continue.
```

```
region eventset=mos1S001-clean.fits operationstyle=global srclisttab=emllist.fits:SRCLIST expression='(DIST_NN >= 40.0)&&(DET_ML >= 15)&&(FLUX >= 2e-15)&&(ID_BAND == 0)' bkgregionset=mos1S001-bkg_region-sky.fits radiusstyle=enfrac bkgratestyle=col nosrcellipse=yes energyfraction=0.4 outunit=xy verbosity=1
```

```
region:- Executing (routine): region eventset=mos1S001-clean.fits tempset=tempset.ds usersrcid=1
srcidcol=dummy_default operationstyle=global srclisttab=emllist.fits:SRCLIST expression='(DIST_NN >= 40.0)&&(DET_ML >= 15)&&(FLUX >= 2e-15)&&(ID_BAND == 0)' regionset=src_region.ds
bkgregionset=mos1S001-bkg_region-sky.fits shrinkconfused=yes fixedradius=12 energyfraction=0.4
bkgratecol=BG_MAP bkgratekwdset=kwd_set.ds bkgrateimgset=bkg_rate_img.ds bkgrateuser=1 bkgratestyle=col
bkgfraction=1 nosrcellipse=yes radiusstyle=enfrac fovbkgannulus=no nobkgellipse=no outunit=xy
withboresightfudge=yes -w 1 -V 1
```

```
** region: fatal error (CannotLocateCIF), No file name for Calibration Index File specified and environment
variable 'SAS_CCF' is not set either - cannot continue.
```

```
make_mask inimage=mos1S001-obj-im.fits inmask=mos1S001-mask-im.fits outmask=mos1S001-cheese.fits
reglist=mos1S001-bkg_region-sky.fits
```

```
make_mask:- Executing (routine): make_mask inimage=mos1S001-obj-im.fits inmask=mos1S001-mask-im.fits
outmask=mos1S001-cheese.fits reglist=mos1S001-bkg_region-sky.fits clobber=yes -w 1 -V 4
```

```
make_mask:- make_mask (esas-0.9.40) [xmmsas_20170719_1539-16.1.0] started: 2020-02-11T01:13:54.000
```

Event Image: mos1S001-obj-im.fits

Input Mask: mos1S001-mask-im.fits

Output Cheese Image: mos1S001-cheese.fits

Region File: mos1S001-bkg_region-sky.fits

Input Image: mos1S001-obj-im.fits

Input Mask: mos1S001-mask-im.fits

STATUS FTOOPEN = 104

MAKE-MASK POSITION 11

mos1S001-mask-im.fits

```
region eventset=mos2S002-clean.fits operationstyle=global srclisttab=emllist.fits:SRCLIST expression='(FLUX >= 2e-15)&&(DET_ML >= 15)&&(DIST_NN >= 40.0)&&(ID_BAND == 0)' bkgregionset=mos2S002-bkg_region-det.fits energyfraction=0.4 radiusstyle=enfrac outunit=detxy verbosity=1
```

```
region:- Executing (routine): region eventset=mos2S002-clean.fits tempset=tempset.ds usersrcid=1  
srcidcol=dummy_default operationstyle=global srclisttab=emllist.fits:SRCLIST expression='(FLUX >= 2e-15)&&(DET_ML >= 15)&&(DIST_NN >= 40.0)&&(ID_BAND == 0)' regionset=src_region.ds  
bkgregionset=mos2S002-bkg_region-det.fits shrinkconfused=yes fixedradius=12 energyfraction=0.4  
bkgratecol=BG_MAP bkgratekwds=kwd_set.ds bkgrateimgset=bkg_rate_img.ds bkgrateuser=1 bkgratestyle=col  
bkgfraction=1 nosrcellipse=no radiusstyle=enfrac fovbkgannulus=no nobkgellipse=no outunit=detxy  
withboresightfudge=yes -w 1 -V 1
```

```
** region: fatal error (CannotLocateCIF), No file name for Calibration Index File specified and environment  
variable `SAS_CCF' is not set either - cannot continue.
```

```
region eventset=mos2S002-clean.fits operationstyle=global srclisttab=emllist.fits:SRCLIST expression='(DIST_NN >= 40.0)&&(DET_ML >= 15)&&(FLUX >= 2e-15)&&(ID_BAND == 0)' bkgregionset=mos2S002-bkg_region-sky.fits radiusstyle=enfrac bkgratestyle=col nosrcellipse=yes energyfraction=0.4 outunit=xy verbosity=1
```

```
region:- Executing (routine): region eventset=mos2S002-clean.fits tempset=tempset.ds usersrcid=1  
srcidcol=dummy_default operationstyle=global srclisttab=emllist.fits:SRCLIST expression='(DIST_NN >= 40.0)&&(DET_ML >= 15)&&(FLUX >= 2e-15)&&(ID_BAND == 0)' regionset=src_region.ds  
bkgregionset=mos2S002-bkg_region-sky.fits shrinkconfused=yes fixedradius=12 energyfraction=0.4  
bkgratecol=BG_MAP bkgratekwds=kwd_set.ds bkgrateimgset=bkg_rate_img.ds bkgrateuser=1 bkgratestyle=col  
bkgfraction=1 nosrcellipse=yes radiusstyle=enfrac fovbkgannulus=no nobkgellipse=no outunit=xy  
withboresightfudge=yes -w 1 -V 1
```

```
** region: fatal error (CannotLocateCIF), No file name for Calibration Index File specified and environment  
variable `SAS_CCF' is not set either - cannot continue.
```

```
make_mask inimage=mos2S002-obj-im.fits inmask=mos2S002-mask-im.fits outmask=mos2S002-cheese.fits  
reglist=mos2S002-bkg_region-sky.fits
```

```
make_mask:- Executing (routine): make_mask inimage=mos2S002-obj-im.fits inmask=mos2S002-mask-im.fits  
outmask=mos2S002-cheese.fits reglist=mos2S002-bkg_region-sky.fits clobber=yes -w 1 -V 4
```

```
make_mask:- make_mask (esas-0.9.40) [xmmsas_20170719_1539-16.1.0] started: 2020-02-11T01:13:55.000
```

Event Image: mos2S002-obj-im.fits

Input Mask: mos2S002-mask-im.fits

Output Cheese Image: mos2S002-cheese.fits

Region File: mos2S002-bkg_region-sky.fits

Input Image: mos2S002-obj-im.fits

Input Mask: mos2S002-mask-im.fits

Template File

mos2S002-mask-im.fits

Template image coordinate system: -TAN

Template image coordinate ID: RA---TAN DEC--TAN

Template image central coordinates: 120.2604583333301 36.0463333333301

Template image reference pixel: 450.91000000000003 450.91000000000003

Template image pixel sizes: -6.944444444444501E-004 6.944444444444501E-004

Template image NAXES, NAXIS: 2 900 900

mos2S002-bkg_region-sky.fits

STATUS FTOOPEN = 104

MAKE-MASK POSITION 17

Region file does not exist, continue with now source removal

mos2S002-bkg_region-sky.fits

```
region eventset=pnS003-clean.fits operationstyle=global srclisttab=emllist.fits:SRCLIST expression='(DIST_NN >= 40.0)&&(DET_ML >= 15)&&(FLUX >= 2e-15)&&(ID_BAND == 0)' bkgregionset=bnS003-bkg_region-det.fits energyfraction=0.4 radiusstyle=enfrac outunit=detxy verbosity=1
```

```
region:- Executing (routine): region eventset=bnS003-clean.fits tempset=tempset.ds usersrcid=1 srcidcol=dummy_default operationstyle=global srclisttab=emllist.fits:SRCLIST expression='(DIST_NN >= 40.0)&&(DET_ML >= 15)&&(FLUX >= 2e-15)&&(ID_BAND == 0)' regionset=src_region.ds bkgregionset=bnS003-bkg_region-det.fits shrinkconfused=yes fixedradius=12 energyfraction=0.4 bkgratecol=BG_MAP bkgratekwdset=kwd_set.ds bkgrateimgset=bkg_rate_img.ds bkgrateuser=1 bkgratestyle=col bkgfraction=1 nosrcellipse=no radiusstyle=enfrac fovbkgannulus=no nobkgellipse=no outunit=detxy withboresightfudge=yes -w 1 -V 1
```

** region: fatal error (CannotLocateCCF), No file name for Calibration Index File specified and environment variable `SAS_CCF' is not set either - cannot continue.

```
region eventset=bnS003-clean.fits operationstyle=global srclisttab=emllist.fits:SRCLIST expression='(DIST_NN >= 40.0)&&(DET_ML >= 15)&&(FLUX >= 2e-15)&&(ID_BAND == 0)' bkgregionset=bnS003-bkg_region-sky.fits radiusstyle=enfrac bkgratestyle=col nosrcellipse=yes energyfraction=0.4 outunit=xy verbosity=1
```

```
region:- Executing (routine): region eventset=bnS003-clean.fits tempset=tempset.ds usersrcid=1 srcidcol=dummy_default operationstyle=global srclisttab=emllist.fits:SRCLIST expression='(DIST_NN >= 40.0)&&(DET_ML >= 15)&&(FLUX >= 2e-15)&&(ID_BAND == 0)' regionset=src_region.ds bkgregionset=bnS003-bkg_region-sky.fits shrinkconfused=yes fixedradius=12 energyfraction=0.4 bkgratecol=BG_MAP bkgratekwdset=kwd_set.ds bkgrateimgset=bkg_rate_img.ds bkgrateuser=1 bkgratestyle=col
```

```
bkgfraction=1 nosrcellipse=yes radiusstyle=enfrac fovbkgannulus=no nobkgellipse=no outunit=xy  
withboresightfudge=yes -w 1 -V 1  
  
** region: fatal error (CannotLocateCIF), No file name for Calibration Index File specified and environment  
variable 'SAS_CCF' is not set either - cannot continue.
```

```
make_mask inimage=pnS003-obj-im.fits inmask=pnS003-mask-im.fits outmask=pnS003-cheese.fits  
reglist=pnS003-bkg_region-sky.fits
```

```
make_mask:- Executing (routine): make_mask inimage=pnS003-obj-im.fits inmask=pnS003-mask-im.fits  
outmask=pnS003-cheese.fits reglist=pnS003-bkg_region-sky.fits clobber=yes -w 1 -V 4  
  
make_mask:- make_mask (esas-0.9.40) [xmmsas_20170719_1539-16.1.0] started: 2020-02-11T01:13:56.000  
  
Event Image: pnS003-obj-im.fits  
  
Input Mask: pnS003-mask-im.fits  
  
Output Cheese Image: pnS003-cheese.fits  
  
Region File: pnS003-bkg_region-sky.fits  
  
Input Image: pnS003-obj-im.fits  
  
Input Mask: pnS003-mask-im.fits  
  
Template File  
  
pnS003-mask-im.fits  
  
Template image coordinate system: -TAN  
  
Template image coordinate ID: RA---TAN DEC--TAN  
  
Template image central coordinates: 120.2604583333301 36.0463333333301  
  
Template image reference pixel: 450.9100000000003 450.9100000000003  
  
Template image pixel sizes: -6.944444444444501E-004 6.944444444444501E-004  
  
Template image NAXES, NAXIS: 2 900 900  
  
pnS003-bkg_region-sky.fits  
  
STATUS FTOPEN = 104  
  
MAKE-MASK POSITION 17  
  
Region file does not exist, continue with now source removal  
  
pnS003-bkg_region-sky.fits
```

```
[htb3hg@xmm analysis]$ ds9 mos1S001-obj-image-sky.fits mos1S001-cheese.fits &
```

```
[1] 27077
```

```
[htb3hg@xmm analysis]$  
[1] Done /XMMShared/Software/ciao-4.10/ots/bin/ds9 mos1S001-obj-image-sky.fits mos1S001-  
cheese.fits
```

2/11/20

```
[htb3hg@xmm ~]$ ssh -Y astr-XMM.astro.virginia.edu
```

htb3hg@astr-xmm.astro.virginia.edu's password:

Last login: Tue Feb 11 00:57:07 2020 from 172.29.243.57

```
[htb3hg@xmm ~]$ cd /XMMShared/htb3hg/Data/A611/XMM/0781590201/
```

```
[htb3hg@xmm 0781590201]$ sasinit
```

sasversion:- Executing (routine): sasversion -w 1 -V 4

sasversion:- sasversion (sasversion-1.2) [xmmsas_20170719_1539-16.1.0] started: 2020-02-11T06:11:18.000

sasversion:- XMM-Newton SAS release and build information:

SAS release: xmmsas_20170719_1539-16.1.0

Compiled on: Fri Jul 28 01:07:14 CEST 2017

Compiled by: sasbuild@sasbld01n.net4.lan

Platform : RHEL6.8 64

SAS-related environment variables that are set:

SAS_DIR = /XMMShared/cls7i/Software/sas_16.1.0/xmmsas_20170719_1539

SAS_PATH = /XMMShared/cls7i/Software/sas_16.1.0/xmmsas_20170719_1539

SAS_CCFPATH = /XMMShared/cls7i/Software/ccf

sasversion:- sasversion (sasversion-1.2) [xmmsas_20170719_1539-16.1.0] ended: 2020-02-11T06:11:18.000

Do not forget to define SAS_CCFPATH, SAS_CCF and SAS_ODF

```
[htb3hg@xmm 0781590201]$ source ./setup
```

```
[htb3hg@xmm 0781590201]$ cd analysis
```

```
[htb3hg@xmm analysis]$ cheese prefixm="1S001 2S002" prefixp=S003 scale=0.4 rate=0.2 \
```

```

?           dist=40.0 clobber=1 elow=400 ehigh=7200

mos prefix 1: 1S001

mos prefix 2: 2S002

pn prefix 1: S003

verb: 1

scale: 0.4

rate: 2e-15

rates: 1e-14

rateh: 1e-14

dist: 40.0

mlmin: 15

clobber: 1

Band 1: 400 7200

attitude file already exists

use the old file

nn: 1

prefix: 1S001

Soft event image already exists: mos1S001-obj-im.fits

Clobber the existing file

evselect table=mos1S001-clean.fits:EVENTS withfilteredset=yes expression='(PATTERN<=12)&&(FLAG == 0)&&(PI in [400:7200])' filtertype=expression imagebinning='imageSize' imagedatatype='Int32' imageset=mos1S001-obj-im.fits squarepixels=yes ignorelegallimits=yes withxranges=yes withyranges=yes xcolumn='X' ximagesize=900 ximageymax=48400 ximageymin=3401 ycolumn='Y' yimagesize=900 yimageymax=48400 yimageymin=3401 updateexposure=yes filterexposure=yes verbosity=1

evselect:- Executing (routine): evselect table=mos1S001-clean.fits:EVENTS filteredset=filtered.fits withfilteredset=yes keepfilteroutput=yes flagcolumn=EVFLAG flagbit=-1 destruct=yes dssblock="" expression='(PATTERN<=12)&&(FLAG == 0)&&(PI in [400:7200])' filtertype=expression cleandss=no updateexposure=yes filterexposure=yes writedss=yes blockstocopy="" attributestocopy="" energycolumn=PHA zcolumn=WEIGHT zerrorcolumn=EWEIGHT withzerrorcolumn=no withzcolumn=no ignorelegallimits=yes imageset=mos1S001-obj-im.fits xcolumn=X ycolumn=Y ximagebinsize=1 yimagebinsize=1 squarepixels=yes ximagesize=900 yimagesize=900 imagebinning=imageSize ximageymin=3401 ximageymax=48400 withxranges=yes yimageymin=3401 yimageymax=48400 withyranges=yes imagedatatype=Int32 withimagedatatype=yes rimagecenter=0 decimagecenter=0 withcelestialcenter=no withimageset=yes spectrumset=spectrum.fits spectralbinsize=5 specchannelmin=0 specchannelmax=11999 withspecranges=no withspectrumset=no

```

```
rateset=rate.fits timecolumn=TIME timebinsize=1 timemin=0 timemax=1000 withtimeranges=no
maketimecolumn=no makeratecolumn=no withrateset=no histogramset=histo.fits histogramcolumn=TIME
histogrambinsize=1 histogrammin=0 histogrammax=1000 withhistoranges=no withhistogramset=no -w 1 -V 1
```

nn: 2

prefix: 2S002

Soft event image already exists: mos2S002-obj-im.fits

Clobber the existing file

```
evselect table=mos2S002-clean.fits:EVENTS withfilteredset=yes expression='(PATTERN<=12)&&(FLAG == 0)&&(PI in [400:7200])' filtertype=expression imagebinning='imageSize' imagedatatype='Int32'
imageset=mos2S002-obj-im.fits squarepixels=yes ignorelegallimits=yes withxranges=yes withyranges=yes
xcolumn='X' ximagesize=900 ximagemax=48400 ximagemin=3401 ycolumn='Y' yimagesize=900
yimagemax=48400 yimagemin=3401 updateexposure=yes filterexposure=yes verbosity=1
```

```
evselect:- Executing (routine): evselect table=mos2S002-clean.fits:EVENTS filteredset=filtered.fits
withfilteredset=yes keepfilteroutput=yes flagcolumn=EVFLAG flagbit=-1 destruct=yes dssblock="
expression='(PATTERN<=12)&&(FLAG == 0)&&(PI in [400:7200])' filtertype=expression cleandss=no
updateexposure=yes filterexposure=yes writedss=yes blockstocopy=" attributestocopy=" energycolumn=PHA
zcolumn=WEIGHT zerrorcolumn=EWEIGHT withzerrorcolumn=no withzcolumn=no ignorelegallimits=yes
imageset=mos2S002-obj-im.fits xcolumn=X ycolumn=Y ximagebinsize=1 yimagebinsize=1 squarepixels=yes
ximagesize=900 yimagesize=900 imagebinning=imageSize ximagemin=3401 ximagemax=48400 withxranges=yes
yimagemin=3401 yimagemax=48400 withyranges=yes imagedatatype=Int32 withimagedatatype=yes
raimagecenter=0 decimagecenter=0 withcelestialcenter=no withimageset=yes spectrumset=spectrum.fits
spectralbinsize=5 specchannelmin=0 specchannelmax=11999 withspecranges=no withspectrumset=no
rateset=rate.fits timecolumn=TIME timebinsize=1 timemin=0 timemax=1000 withtimeranges=no
maketimecolumn=no makeratecolumn=no withrateset=no histogramset=histo.fits histogramcolumn=TIME
histogrambinsize=1 histogrammin=0 histogrammax=1000 withhistoranges=no withhistogramset=no -w 1 -V 1
```

nnp: 1

prefixp: S003

PN soft image already exists: pnS003-obj-im.fits

Clobber the existing file

```
evselect table=pnS003-clean.fits:EVENTS withfilteredset=yes expression='(PATTERN<=12)&&(FLAG == 0)&&(PI in [400:7200])&&(DETY in [-16510:14345])' filtertype=expression imagebinning='imageSize'
imagedatatype='Int32' imageset=pnS003-obj-im.fits squarepixels=yes ignorelegallimits=yes withxranges=yes
withyranges=yes xcolumn='X' ximagesize=900 ximagemax=48400 ximagemin=3401 ycolumn='Y' yimagesize=900
yimagemax=48400 yimagemin=3401 updateexposure=yes filterexposure=yes verbosity=1
```

```

evselect:- Executing (routine): evselect table=pnS003-clean.fits:EVENTS filteredset=filtered.fits withfilteredset=yes
keepfilteroutput=yes flagcolumn=EVFLAG flagbit=-1 destruct=yes dssblock="
expression='(PATTERN<=12)&&(FLAG == 0)&&(PI in [400:7200])&&(DETY in [-16510:14345])'
filtertype=expression cleandss=no updateexposure=yes filterexposure=yes writedss=yes blockstocopy="
attributestocopy=" energycolumn=PHA zcolumn=WEIGHT zerrorcolumn=EWEIGHT withzerrorcolumn=no
withzcolumn=no ignorelegallimits=yes imageset=pnS003-obj-im.fits xcolumn=X ycolumn=Y ximagebinsize=1
yimagebinsize=1 squarepixels=yes ximagesize=900 yimagesize=900 imagebinning=imageSize ximageemin=3401
ximageamax=48400 withxranges=yes yimageemin=3401 yimageamax=48400 withyranges=yes imagedatatype=Int32
withimagedatatype=yes raimagecenter=0 decimagecenter=0 withcelestialcenter=no withimageset=yes
spectrumset=spectrum.fits spectralbinsize=5 specchannelmin=0 specchannelmax=11999 withspectranges=no
withspectrumsset=no rateset=rate.fits timecolumn=TIME timebinsize=1 timemin=0 timemax=1000
withtimeranges=no maketimecolumn=no makeratecolumn=no withrateset=no histogramset=histo.fits
histogramcolumn=TIME histogrambinsize=1 histogrammin=0 histogrammax=1000 withhistoranges=no
withhistogramset=no -w 1 -V 1

```

Run edetect_chain

```

edetect_chain imagesets='mos1S001-obj-im.fits mos2S002-obj-im.fits pnS003-obj-im.fits' eventsets='mos1S001-
clean.fits mos2S002-clean.fits pnS003-clean.fits' attitudeset=atthk.fits pimin='400 400 400' pimax='7200 7200
7200' witheexpmap=yes likemin=10 ecf='1.2 1.2 3.2' eboxl_likemin=15 eboxm_likemin=15 ebox_withdetmask=yes
ebox_withexpimage=yes esp_scut=0.01 esp_withootset=yes esp_ooteventset='pnS003-clean-oot.fits'
esp_nsplinenodes=20 eml_ecut=15 eml_scut=15 eml_withtwostage=yes eml_withthreshold=yes eml_threshold=15
esen_mlmin=10 eml_list=emllist.fits

```

```

eexpmap:- Executing (routine): eexpmap imageset=pnS003-obj-im.fits attitudeset=atthk.fits eventset=pnS003-
clean.fits expimageset=pnS003-obj-imexp.fits withdetcoords=no withvignetting=yes usefastpixelization=no
usedlimap=no attrebin=4 pimin=400 pimax=7200 -w 1 -V 4

```

eexpmap:- eexpmap (eexpmap-4.11.2) [xmmsas_20170719_1539-16.1.0] started: 2020-02-11T06:12:43.000

eexpmap:- eexpmap (eexpmap-4.11.2) [xmmsas_20170719_1539-16.1.0] ended: 2020-02-11T06:12:48.000

```

emask:- Executing (routine): emask expimageset=pnS003-obj-imexp.fits detmaskset=pnS003-obj-immask.fits
threshold1=0.3 threshold2=0.5 regionset=region.fits withregionset=no -w 1 -V 4

```

emask:- emask (emask-2.14) [xmmsas_20170719_1539-16.1.0] started: 2020-02-11T06:12:48.000

emask:- emask (emask-2.14) [xmmsas_20170719_1539-16.1.0] ended: 2020-02-11T06:12:48.000

```

eexpmap:- Executing (routine): eexpmap imageset=mos1S001-obj-im.fits attitudeset=atthk.fits eventset=mos1S001-
clean.fits expimageset=mos1S001-obj-imexp.fits withdetcoords=no withvignetting=yes usefastpixelization=no
usedlimap=no attrebin=4 pimin=400 pimax=7200 -w 1 -V 4

```

eexpmap:- eexpmap (eexpmap-4.11.2) [xmmsas_20170719_1539-16.1.0] started: 2020-02-11T06:12:48.000

** eexpmap: warning (NoExpoExt), Exposure extension not found

eexpmap:- CCF constituents accessed by the calibration server:

```

CifEntry{EMOS1, LINCOORD, 18, /XMMShared/cls7i/Software/ccf/EMOS1_LINCOORD_0018.CCF, 1998-01-
01T00:00:00.000}

```

CifEntry {EPN, LINCOORD, 9, /XMMShared/cls7i/Software/ccf/EPN_LINCOORD_0009.CCF, 1998-01-01T00:00:00.000}

CifEntry {RGS1, LINCOORD, 8, /XMMShared/cls7i/Software/ccf/RGS1_LINCOORD_0008.CCF, 1998-01-01T00:00:00.000}

CifEntry {XMM, BORESIGHT, 27, /XMMShared/cls7i/Software/ccf/XMM_BORESIGHT_0027.CCF, 2000-01-01T00:00:00.000}

CifEntry {XMM, MISCDATA, 22, /XMMShared/cls7i/Software/ccf/XMM_MISCDATA_0022.CCF, 1999-01-01T00:00:00.000}

CifEntry {XRT1, XAREAEF, 9, /XMMShared/cls7i/Software/ccf/XRT1_XAREAEF_0009.CCF, 2000-01-13T00:00:00.000}

eexpmap:- eexpmap (eexpmap-4.11.2) [xmmsas_20170719_1539-16.1.0] ended: 2020-02-11T06:13:39.000

** eexpmap: warning (SummaryOfWarnings),
warning NoExpoExt silently occurred 1 times

emask:- Executing (routine): emask expimageset=mos1S001-obj-imexp.fits detmaskset=mos1S001-obj-immask.fits
threshold1=0.3 threshold2=0.5 regionset=region.fits withregionset=no -w 1 -V 4

emask:- emask (emask-2.14) [xmmsas_20170719_1539-16.1.0] started: 2020-02-11T06:13:39.000

emask:- emask (emask-2.14) [xmmsas_20170719_1539-16.1.0] ended: 2020-02-11T06:13:40.000

eexpmap:- Executing (routine): eexpmap imageset=mos2S002-obj-im.fits attitudeset=atthk.fits eventset=mos2S002-clean.fits expimageset=mos2S002-obj-imexp.fits withdetcoords=no withvignetting=yes usefastpixelization=no
usedlimap=no attrebin=4 pimin=400 pimax=7200 -w 1 -V 4

eexpmap:- eexpmap (eexpmap-4.11.2) [xmmsas_20170719_1539-16.1.0] started: 2020-02-11T06:13:40.000

eexpmap:- CCF constituents accessed by the calibration server:

CifEntry {EMOS2, LINCOORD, 18, /XMMShared/cls7i/Software/ccf/EMOS2_LINCOORD_0018.CCF, 1998-01-01T00:00:00.000}

CifEntry {EPN, LINCOORD, 9, /XMMShared/cls7i/Software/ccf/EPN_LINCOORD_0009.CCF, 1998-01-01T00:00:00.000}

CifEntry {RGS2, LINCOORD, 8, /XMMShared/cls7i/Software/ccf/RGS2_LINCOORD_0008.CCF, 1998-01-01T00:00:00.000}

CifEntry {XMM, BORESIGHT, 27, /XMMShared/cls7i/Software/ccf/XMM_BORESIGHT_0027.CCF, 2000-01-01T00:00:00.000}

CifEntry {XMM, MISCDATA, 22, /XMMShared/cls7i/Software/ccf/XMM_MISCDATA_0022.CCF, 1999-01-01T00:00:00.000}

CifEntry {XRT2, XAREAEF, 10, /XMMShared/cls7i/Software/ccf/XRT2_XAREAEF_0010.CCF, 2000-01-13T00:00:00.000}

eexpmap:- eexpmap (eexpmap-4.11.2) [xmmsas_20170719_1539-16.1.0] ended: 2020-02-11T06:14:58.000

emask:- Executing (routine): emask expimageset=mos2S002-obj-imexp.fits detmaskset=mos2S002-obj-immask.fits threshold1=0.3 threshold2=0.5 regionset=region.fits withregionset=no -w 1 -V 4

emask:- emask (emask-2.14) [xmmsas_20170719_1539-16.1.0] started: 2020-02-11T06:14:58.000

emask:- emask (emask-2.14) [xmmsas_20170719_1539-16.1.0] ended: 2020-02-11T06:14:58.000

eboxdetect:- Executing (routine): eboxdetect bkgimagesets=bgimage.fits usemap=no usematchedfilter=no detmasksets='pnS003-obj-immask.fits mos1S001-obj-immask.fits mos2S002-obj-immask.fits' withdetmask=yes expimagesets='pnS003-obj-imexp.fits mos1S001-obj-imexp.fits mos2S002-obj-imexp.fits' withexpimage=yes nruns=3 likemin=15 boxsize=5 withimagebuffersize=no imagebuffersize=640 ecf='3.2 1.2 1.2' imagesets='pnS003-obj-im.fits mos1S001-obj-im.fits mos2S002-obj-im.fits' boxlistset=eboxlist_1.fits withoffsets=no mergedlistset=mergedlist.fits hrdef='1 2 2 3 3 4' pimin='400 400 400' pimax='7200 7200 7200' obsmode=pointing -w 1 -V 4

eboxdetect:- eboxdetect (eboxdetect-4.27.4) [xmmsas_20170719_1539-16.1.0] started: 2020-02-11T06:14:58.000

eboxdetect:- eboxdetect (eboxdetect-4.27.4) [xmmsas_20170719_1539-16.1.0] ended: 2020-02-11T06:15:04.000

esplinemap:- Executing (routine): esplinemap scut=0.01 mlmin=1 nsplinenodes=20 excesssigma=4 nfitrun=3 idband=1 boxlistset=eboxlist_1.fits imageset=pnS003-obj-im.fits expimageset=pnS003-obj-imexp.fits withexpimage=yes expimageset2=pnS003-obj-imexpnovig.fits withexpimage2=no detmaskset=pnS003-obj-immask.fits withdetmask=yes bkgimageset=pnS003-obj-imbkg.fits cheeseimageset=pnS003-obj-imcheese.fits withcheese=no cheesemaskset=cheesemask.fits withcheesemask=no ooteventset=pnS003-clean-oot.fits withoutset=yes pimin=400 pimax=7200 fitmethod=spline snrmin=30 smoothsigma=15 -w 1 -V 4

esplinemap:- esplinemap (esplinemap-5.0.2) [xmmsas_20170719_1539-16.1.0] started: 2020-02-11T06:15:04.000

esplinemap:- esplinemap (esplinemap-5.0.2) [xmmsas_20170719_1539-16.1.0] ended: 2020-02-11T06:15:15.000

esplinemap:- Executing (routine): esplinemap scut=0.01 mlmin=1 nsplinenodes=20 excesssigma=4 nfitrun=3 idband=1 boxlistset=eboxlist_1.fits imageset=mos1S001-obj-im.fits expimageset=mos1S001-obj-imexp.fits withexpimage=yes expimageset2=mos1S001-obj-imexpnovig.fits withexpimage2=no detmaskset=mos1S001-obj-immask.fits withdetmask=yes bkgimageset=mos1S001-obj-imbkg.fits cheeseimageset=mos1S001-obj-imcheese.fits withcheese=no cheesemaskset=cheesemask.fits withcheesemask=no ooteventset=ooevents.fits withoutset=no pimin=400 pimax=7200 fitmethod=spline snrmin=30 smoothsigma=15 -w 1 -V 4

esplinemap:- esplinemap (esplinemap-5.0.2) [xmmsas_20170719_1539-16.1.0] started: 2020-02-11T06:15:15.000

esplinemap:- esplinemap (esplinemap-5.0.2) [xmmsas_20170719_1539-16.1.0] ended: 2020-02-11T06:15:16.000

esplinemap:- Executing (routine): esplinemap scut=0.01 mlmin=1 nsplinenodes=20 excesssigma=4 nfitrun=3 idband=1 boxlistset=eboxlist_1.fits imageset=mos2S002-obj-im.fits expimageset=mos2S002-obj-imexp.fits withexpimage=yes expimageset2=mos2S002-obj-imexpnovig.fits withexpimage2=no detmaskset=mos2S002-obj-immask.fits withdetmask=yes bkgimageset=mos2S002-obj-imbkg.fits cheeseimageset=mos2S002-obj-imcheese.fits withcheese=no cheesemaskset=cheesemask.fits withcheesemask=no ooteventset=ooevents.fits withoutset=no pimin=400 pimax=7200 fitmethod=spline snrmin=30 smoothsigma=15 -w 1 -V 4

esplinemap:- esplinemap (esplinemap-5.0.2) [xmmsas_20170719_1539-16.1.0] started: 2020-02-11T06:15:16.000

esplinemap:- esplinemap (esplinemap-5.0.2) [xmmsas_20170719_1539-16.1.0] ended: 2020-02-11T06:15:17.000

eboxdetect:- Executing (routine): eboxdetect bkgimagesets='pnS003-obj-imbkg.fits mos1S001-obj-imbkg.fits mos2S002-obj-imbkg.fits' usemap=yes usematchedfilter=no detmasksets='pnS003-obj-immask.fits mos1S001-obj-

```

immask.fits mos2S002-obj-immask.fits' withdetmask=yes expimagesets='pnS003-obj-imexp.fits mos1S001-obj-
imexp.fits mos2S002-obj-imexp.fits' withexpimage=yes nruns=3 likemin=15 boxsize=5 withimagebuffersize=no
imagebuffersize=640 ecf='3.2 1.2 1.2' imagesets='pnS003-obj-im.fits mos1S001-obj-im.fits mos2S002-obj-im.fits'
boxlistset=eboxlist_m.fits withoffsets=no mergedlistset=mergedlist.fits hrdef='1 2 2 3 3 4' pimin='400 400 400'
pimax='7200 7200 7200' obsmode=pointing -w 1 -V 4

eboxdetect:- eboxdetect (eboxdetect-4.27.4) [xmmsas_20170719_1539-16.1.0] started: 2020-02-11T06:15:17.000
eboxdetect:- eboxdetect (eboxdetect-4.27.4) [xmmsas_20170719_1539-16.1.0] ended: 2020-02-11T06:15:21.000

emldetect:- Executing (routine): emldetect boxlistset=eboxlist_m.fits mllistset=emllist.fits mlmin=10
determineerrors=yes fitposition=yes psfmodel=ellbeta nmaxfit=1 nmulsou=1 ecut=15 scut=15 fitextent=yes
extentmodel=beta dmlextmin=6 minextent=1.5 maxextent=20 withthreshold=yes threshold=15 threshcolumn=LIKE
withtwostage=yes withimagebuffersize=no imagebuffersize=640 withxidband=no xidfixed=no pimin='400 400 400'
pimax='7200 7200 7200' hrpndef='1 2 2 3 3 4 4 5' xidpndef='2 3 4' hrm1def='1 2 2 3 3 4 4 5' xidm1def='2 3 4'
hrm2def='1 2 2 3 3 4 4 5' xidm2def='2 3 4' ecf='3.2 1.2 1.2' xidecf=1 fitcounts=yes fitnegative=no
mergedlistset=mergedlist.fits useevents=no usecalpsf=yes withhotpixelfilter=no withoffsets=no withdrawrows=no
imagesets='pnS003-obj-im.fits mos1S001-obj-im.fits mos2S002-obj-im.fits' bkgimagesets='pnS003-obj-imbkg.fits
mos1S001-obj-imbkg.fits mos2S002-obj-imbkg.fits' detmasksets='pnS003-obj-immask.fits mos1S001-obj-
immask.fits mos2S002-obj-immask.fits' withdetmask=yes expimagesets='pnS003-obj-imexp.fits mos1S001-obj-
imexp.fits mos2S002-obj-imexp.fits' withexpimage=yes sourceimagesets='pnS003-obj-imsmap.fits mos1S001-obj-
imsmap.fits mos2S002-obj-imsmap.fits' withsourcemap=yes -w 1 -V 4

emldetect:- emldetect (emldetect-7.1) [xmmsas_20170719_1539-16.1.0] started: 2020-02-11T06:15:21.000
emldetect:- CCF constituents accessed by the calibration server:

CifEntry {EMOS1, LINCOORD, 18, /XMMShared/cls7i/Software/ccf/EMOS1_LINCOORD_0018.CCF, 1998-01-
01T00:00:00.000}

CifEntry {EMOS2, LINCOORD, 18, /XMMShared/cls7i/Software/ccf/EMOS2_LINCOORD_0018.CCF, 1998-01-
01T00:00:00.000}

CifEntry {EPN, LINCOORD, 9, /XMMShared/cls7i/Software/ccf/EPN_LINCOORD_0009.CCF, 1998-01-
01T00:00:00.000}

CifEntry {RGS1, LINCOORD, 8, /XMMShared/cls7i/Software/ccf/RGS1_LINCOORD_0008.CCF, 1998-01-
01T00:00:00.000}

CifEntry {XMM, BORESIGHT, 27, /XMMShared/cls7i/Software/ccf/XMM_BORESIGHT_0027.CCF, 2000-01-
01T00:00:00.000}

CifEntry {XMM, MISCDATA, 22, /XMMShared/cls7i/Software/ccf/XMM_MISCDATA_0022.CCF, 1999-01-
01T00:00:00.000}

CifEntry {XRT1, XAREAEF, 9, /XMMShared/cls7i/Software/ccf/XRT1_XAREAEF_0009.CCF, 2000-01-
13T00:00:00.000}

CifEntry {XRT1, XPSF, 14, /XMMShared/cls7i/Software/ccf/XRT1_XPSF_0014.CCF, 2000-01-13T00:00:00.000}

CifEntry {XRT2, XPSF, 14, /XMMShared/cls7i/Software/ccf/XRT2_XPSF_0014.CCF, 2000-01-13T00:00:00.000}

CifEntry {XRT3, XAREAEF, 12, /XMMShared/cls7i/Software/ccf/XRT3_XAREAEF_0012.CCF, 2000-01-
13T00:00:00.000}

CifEntry {XRT3, XPSF, 17, /XMMShared/cls7i/Software/ccf/XRT3_XPSF_0017.CCF, 2000-01-13T00:00:00.000}

```

emldetect:- CCF constituents accessed by the calibration server:

CifEntry {EMOS1, LINCOORD, 18, /XMMShared/cls7i/Software/ccf/EMOS1_LINCOORD_0018.CCF, 1998-01-01T00:00:00.000}

CifEntry {EMOS2, LINCOORD, 18, /XMMShared/cls7i/Software/ccf/EMOS2_LINCOORD_0018.CCF, 1998-01-01T00:00:00.000}

CifEntry {EPN, LINCOORD, 9, /XMMShared/cls7i/Software/ccf/EPN_LINCOORD_0009.CCF, 1998-01-01T00:00:00.000}

CifEntry {RGS1, LINCOORD, 8, /XMMShared/cls7i/Software/ccf/RGS1_LINCOORD_0008.CCF, 1998-01-01T00:00:00.000}

CifEntry {RGS1, LINESREADFUNC, 5, /XMMShared/cls7i/Software/ccf/RGS1_LINESREADFUNC_0005.CCF, 1999-01-01T00:00:00.000}

CifEntry {RGS1, QUANTUMEF, 15, /XMMShared/cls7i/Software/ccf/RGS1_QUANTUMEF_0015.CCF, 1998-01-01T00:00:00.000}

CifEntry {RGS2, LINCOORD, 8, /XMMShared/cls7i/Software/ccf/RGS2_LINCOORD_0008.CCF, 1998-01-01T00:00:00.000}

CifEntry {XMM, BORESIGHT, 27, /XMMShared/cls7i/Software/ccf/XMM_BORESIGHT_0027.CCF, 2000-01-01T00:00:00.000}

CifEntry {XMM, MISCDATA, 22, /XMMShared/cls7i/Software/ccf/XMM_MISCDATA_0022.CCF, 1999-01-01T00:00:00.000}

CifEntry {XRT1, XAREAEF, 9, /XMMShared/cls7i/Software/ccf/XRT1_XAREAEF_0009.CCF, 2000-01-13T00:00:00.000}

CifEntry {XRT1, XPSF, 14, /XMMShared/cls7i/Software/ccf/XRT1_XPSF_0014.CCF, 2000-01-13T00:00:00.000}

CifEntry {XRT2, XAREAEF, 10, /XMMShared/cls7i/Software/ccf/XRT2_XAREAEF_0010.CCF, 2000-01-13T00:00:00.000}

CifEntry {XRT2, XPSF, 14, /XMMShared/cls7i/Software/ccf/XRT2_XPSF_0014.CCF, 2000-01-13T00:00:00.000}

CifEntry {XRT3, XAREAEF, 12, /XMMShared/cls7i/Software/ccf/XRT3_XAREAEF_0012.CCF, 2000-01-13T00:00:00.000}

CifEntry {XRT3, XPSF, 17, /XMMShared/cls7i/Software/ccf/XRT3_XPSF_0017.CCF, 2000-01-13T00:00:00.000}

emldetect:- emldetect (emldetect-7.1) [xmmsas_20170719_1539-16.1.0] ended: 2020-02-11T06:25:32.000

esensmap:- Executing (routine): esensmap detmasksets=pnS003-obj-immask.fits expimagesets=pnS003-obj-imexp.fits bkgimagesets=bnS003-obj-imbkg.fits sensimageset=bnS003-obj-imsen.fits mlmin=10 -w 1 -V 4

esensmap:- esensmap (esensmap-3.12.2) [xmmsas_20170719_1539-16.1.0] started: 2020-02-11T06:25:33.000

esensmap:- Opening file pnS003-obj-immask.fits

esensmap:- esensmap (esensmap-3.12.2) [xmmsas_20170719_1539-16.1.0] ended: 2020-02-11T06:25:34.000

```
esensmap:- Executing (routine): esensmap detmasksets=mos1S001-obj-immask.fits expimagesets=mos1S001-obj-imexp.fits bkgimagesets=mos1S001-obj-imbkg.fits sensimageset=mos1S001-obj-imsen.fits mlmin=10 -w 1 -V 4
esensmap:- esensmap (esensmap-3.12.2) [xmmsas_20170719_1539-16.1.0] started: 2020-02-11T06:25:34.000
esensmap:- Opening file mos1S001-obj-immask.fits
esensmap:- esensmap (esensmap-3.12.2) [xmmsas_20170719_1539-16.1.0] ended: 2020-02-11T06:25:35.000
esensmap:- Executing (routine): esensmap detmasksets=mos2S002-obj-immask.fits expimagesets=mos2S002-obj-imexp.fits bkgimagesets=mos2S002-obj-imbkg.fits sensimageset=mos2S002-obj-imsen.fits mlmin=10 -w 1 -V 4
esensmap:- esensmap (esensmap-3.12.2) [xmmsas_20170719_1539-16.1.0] started: 2020-02-11T06:25:35.000
esensmap:- Opening file mos2S002-obj-immask.fits
esensmap:- esensmap (esensmap-3.12.2) [xmmsas_20170719_1539-16.1.0] ended: 2020-02-11T06:25:36.000
```

```
emask detmaskset=mos1S001-mask-im.fits expimageset=mos1S001-obj-imexp.fits threshold1=0.1 threshold2=0.5
verbosity=1
```

```
emask:- Executing (routine): emask expimageset=mos1S001-obj-imexp.fits detmaskset=mos1S001-mask-im.fits
threshold1=0.1 threshold2=0.5 regionset=region.fits withregionset=no -w 1 -V 1
```

Total band mask already exists: mos2S002-mask-im.fits

Clobber the existing file

```
emask detmaskset=mos2S002-mask-im.fits expimageset=mos2S002-obj-imexp.fits threshold1=0.1 threshold2=0.5
verbosity=1
```

```
emask:- Executing (routine): emask expimageset=mos2S002-obj-imexp.fits detmaskset=mos2S002-mask-im.fits
threshold1=0.1 threshold2=0.5 regionset=region.fits withregionset=no -w 1 -V 1
```

PN soft mask already exists: pnS003-mask-im.fits

Clobber the existing file

```
emask detmaskset=pnS003-mask-im.fits expimageset=pnS003-obj-imexp.fits threshold1=0.1 threshold2=0.5
verbosity=1
```

```
emask:- Executing (routine): emask expimageset=pnS003-obj-imexp.fits detmaskset=pnS003-mask-im.fits
threshold1=0.1 threshold2=0.5 regionset=region.fits withregionset=no -w 1 -V 1
```

```
region eventset=mos1S001-clean.fits operationstyle=global srclisttab=emllist.fits:SRCLIST expression='(FLUX >= 2e-15)&&(DET_ML >= 15)&&(DIST_NN >= 40.0)&&(ID_BAND == 0)' bkgregionset=mos1S001-bkg_region-det.fits energyfraction=0.4 radiusstyle=enfrac outunit=detxy verbosity=1
```

```
region:- Executing (routine): region eventset=mos1S001-clean.fits tempset=tempset.ds usersrcid=1  
srcidcol=dummy_default operationstyle=global srclisttab=emllist.fits:SRCLIST expression='(FLUX >= 2e-15)&&(DET_ML >= 15)&&(DIST_NN >= 40.0)&&(ID_BAND == 0)' regionset=src_region.ds  
bkgregionset=mos1S001-bkg_region-det.fits shrinkconfused=yes fixedradius=12 energyfraction=0.4  
bkgratecol=BG_MAP bkgratekwdset=kwd_set.ds bkgrateimgset=bkg_rate_img.ds bkgrateuser=1 bkgratestyle=col  
bkgfraction=1 nosrcellipse=no radiusstyle=enfrac fovbkgannulus=no nobkgellipse=no outunit=detxy  
withboresightfudge=yes -w 1 -V 1
```

```
region eventset=mos1S001-clean.fits operationstyle=global srclisttab=emllist.fits:SRCLIST expression='(DIST_NN >= 40.0)&&(DET_ML >= 15)&&(FLUX >= 2e-15)&&(ID_BAND == 0)' bkgregionset=mos1S001-bkg_region-sky.fits radiusstyle=enfrac bkgratestyle=col nosrcellipse=yes energyfraction=0.4 outunit=xy verbosity=1
```

```
region:- Executing (routine): region eventset=mos1S001-clean.fits tempset=tempset.ds usersrcid=1  
srcidcol=dummy_default operationstyle=global srclisttab=emllist.fits:SRCLIST expression='(DIST_NN >= 40.0)&&(DET_ML >= 15)&&(FLUX >= 2e-15)&&(ID_BAND == 0)' regionset=src_region.ds  
bkgregionset=mos1S001-bkg_region-sky.fits shrinkconfused=yes fixedradius=12 energyfraction=0.4  
bkgratecol=BG_MAP bkgratekwdset=kwd_set.ds bkgrateimgset=bkg_rate_img.ds bkgrateuser=1 bkgratestyle=col  
bkgfraction=1 nosrcellipse=yes radiusstyle=enfrac fovbkgannulus=no nobkgellipse=no outunit=xy  
withboresightfudge=yes -w 1 -V 1
```

```
make_mask inimage=mos1S001-obj-im.fits inmask=mos1S001-mask-im.fits outmask=mos1S001-cheese.fits  
reglist=mos1S001-bkg_region-sky.fits
```

```
make_mask:- Executing (routine): make_mask inimage=mos1S001-obj-im.fits inmask=mos1S001-mask-im.fits  
outmask=mos1S001-cheese.fits reglist=mos1S001-bkg_region-sky.fits clobber=yes -w 1 -V 4
```

```
make_mask:- make_mask (esas-0.9.40) [xmmsas_20170719_1539-16.1.0] started: 2020-02-11T06:25:39.000
```

Event Image: mos1S001-obj-im.fits

Input Mask: mos1S001-mask-im.fits

Output Cheese Image: mos1S001-cheese.fits

Region File: mos1S001-bkg_region-sky.fits

Input Image: mos1S001-obj-im.fits

Input Mask: mos1S001-mask-im.fits

Template File

mos1S001-mask-im.fits

Template image coordinate system: -TAN

Template image coordinate ID: RA---TAN DEC--TAN

Template image central coordinates: 120.2604583333301 36.0463333333301

Template image reference pixel: 450.91000000000003 450.91000000000003

Template image pixel sizes: -6.944444444444501E-004 6.944444444444501E-004

Template image NAXES, NAXIS: 2 900 900

mos1S001-bkg_region-sky.fits

Number of excluded sources: 24

Output image coordinate system: -TAN

Output image coordinate ID: RA---TAN DEC--TAN

Output image central coordinates: 120.2604583333301 36.0463333333301

Output image reference pixel: 450.91000000000003 450.91000000000003

Output image pixel sizes: -6.944444444444501E-004 6.944444444444501E-004

Output image NAXES, NAXIS: 2 900 900

make_mask:- make_mask (esas-0.9.40) [xmmsas_20170719_1539-16.1.0] ended: 2020-02-11T06:25:39.000

region eventset=mos2S002-clean.fits operationstyle=global srclisttab=emllist.fits:SRCLIST expression='(FLUX >= 2e-15)&&(DET_ML >= 15)&&(DIST_NN >= 40.0)&&(ID_BAND == 0)' bkgregionset=mos2S002-bkg_region-det.fits energyfraction=0.4 radiusstyle=enfrac outunit=detxy verbosity=1

region:- Executing (routine): region eventset=mos2S002-clean.fits tempset=tempset.ds usersrcid=1
 srcidcol=dummy_default operationstyle=global srclisttab=emllist.fits:SRCLIST expression='(FLUX >= 2e-15)&&(DET_ML >= 15)&&(DIST_NN >= 40.0)&&(ID_BAND == 0)' regionset=src_region.ds
 bkgregionset=mos2S002-bkg_region-det.fits shrinkconfused=yes fixedradius=12 energyfraction=0.4
 bkgratecol=BG_MAP bkgratekwdset=kwd_set.ds bkrateimgset=bkg_rate_img.ds bkgrateuser=1 bkgratestyle=col
 bkgfraction=1 nosrcellipse=no radiusstyle=enfrac fovbkgannulus=no nobkgellipse=no outunit=detxy
 withboresightfudge=yes -w 1 -V 1

region eventset=mos2S002-clean.fits operationstyle=global srclisttab=emllist.fits:SRCLIST expression='(DIST_NN >= 40.0)&&(DET_ML >= 15)&&(FLUX >= 2e-15)&&(ID_BAND == 0)' bkgregionset=mos2S002-bkg_region-sky.fits radiusstyle=enfrac bkgratestyle=col nosrcellipse=yes energyfraction=0.4 outunit=xy verbosity=1

region:- Executing (routine): region eventset=mos2S002-clean.fits tempset=tempset.ds usersrcid=1
 srcidcol=dummy_default operationstyle=global srclisttab=emllist.fits:SRCLIST expression='(DIST_NN >= 40.0)&&(DET_ML >= 15)&&(FLUX >= 2e-15)&&(ID_BAND == 0)' regionset=src_region.ds
 bkgregionset=mos2S002-bkg_region-sky.fits shrinkconfused=yes fixedradius=12 energyfraction=0.4
 bkgratecol=BG_MAP bkgratekwdset=kwd_set.ds bkrateimgset=bkg_rate_img.ds bkgrateuser=1 bkgratestyle=col
 bkgfraction=1 nosrcellipse=yes radiusstyle=enfrac fovbkgannulus=no nobkgellipse=no outunit=xy
 withboresightfudge=yes -w 1 -V 1

```
make_mask inimage=mos2S002-obj-im.fits inmask=mos2S002-mask-im.fits outmask=mos2S002-cheese.fits  
reglist=mos2S002-bkg_region-sky.fits
```

```
make_mask:- Executing (routine): make_mask inimage=mos2S002-obj-im.fits inmask=mos2S002-mask-im.fits  
outmask=mos2S002-cheese.fits reglist=mos2S002-bkg_region-sky.fits clobber=yes -w 1 -V 4
```

```
make_mask:- make_mask (esas-0.9.40) [xmmsas_20170719_1539-16.1.0] started: 2020-02-11T06:25:40.000
```

Event Image: mos2S002-obj-im.fits

Input Mask: mos2S002-mask-im.fits

Output Cheese Image: mos2S002-cheese.fits

Region File: mos2S002-bkg_region-sky.fits

Input Image: mos2S002-obj-im.fits

Input Mask: mos2S002-mask-im.fits

Template File

mos2S002-mask-im.fits

Template image coordinate system: -TAN

Template image coordinate ID: RA---TAN DEC--TAN

Template image central coordinates: 120.26045833333301 36.04633333333301

Template image reference pixel: 450.91000000000003 450.91000000000003

Template image pixel sizes: -6.944444444444501E-004 6.944444444444501E-004

Template image NAXES, NAXIS: 2 900 900

mos2S002-bkg_region-sky.fits

Number of excluded sources: 24

Output image coordinate system: -TAN

Output image coordinate ID: RA---TAN DEC--TAN

Output image central coordinates: 120.26045833333301 36.04633333333301

Output image reference pixel: 450.91000000000003 450.91000000000003

Output image pixel sizes: -6.944444444444501E-004 6.944444444444501E-004

Output image NAXES, NAXIS: 2 900 900

```
make_mask:- make_mask (esas-0.9.40) [xmmsas_20170719_1539-16.1.0] ended: 2020-02-11T06:25:40.000
```

```
region eventset=pnS003-clean.fits operationstyle=global srclisttab=emllist.fits:SRCLIST expression='(DIST_NN >= 40.0)&&(DET_ML >= 15)&&(FLUX >= 2e-15)&&(ID_BAND == 0)' bkgregionset=bnS003-bkg_region-det.fits  
energyfraction=0.4 radiusstyle=enfrac outunit=detxy verbosity=1
```

```
region:- Executing (routine): region eventset=bnS003-clean.fits tempset=tempset.ds usersrcid=1  
srcidcol=dummy_default operationstyle=global srclisttab=emllist.fits:SRCLIST expression='(DIST_NN >= 40.0)&&(DET_ML >= 15)&&(FLUX >= 2e-15)&&(ID_BAND == 0)' regionset=src_region.ds  
bkgregionset=bnS003-bkg_region-det.fits shrinkconfused=yes fixedradius=12 energyfraction=0.4  
bkgratecol=BG_MAP bkgratekwdset=kwd_set.ds bkgrateimgset=bkg_rate_img.ds bkgrateuser=1 bkgratestyle=col  
bkgfraction=1 nosrcellipse=no radiusstyle=enfrac fovbkgannulus=no nobkgellipse=no outunit=detxy  
withboresightfudge=yes -w 1 -V 1
```

```
region eventset=bnS003-clean.fits operationstyle=global srclisttab=emllist.fits:SRCLIST expression='(DIST_NN >= 40.0)&&(DET_ML >= 15)&&(FLUX >= 2e-15)&&(ID_BAND == 0)' bkgregionset=bnS003-bkg_region-sky.fits  
radiusstyle=enfrac bkgratestyle=col nosrcellipse=yes energyfraction=0.4 outunit=xy verbosity=1
```

```
region:- Executing (routine): region eventset=bnS003-clean.fits tempset=tempset.ds usersrcid=1  
srcidcol=dummy_default operationstyle=global srclisttab=emllist.fits:SRCLIST expression='(DIST_NN >= 40.0)&&(DET_ML >= 15)&&(FLUX >= 2e-15)&&(ID_BAND == 0)' regionset=src_region.ds  
bkgregionset=bnS003-bkg_region-sky.fits shrinkconfused=yes fixedradius=12 energyfraction=0.4  
bkgratecol=BG_MAP bkgratekwdset=kwd_set.ds bkgrateimgset=bkg_rate_img.ds bkgrateuser=1 bkgratestyle=col  
bkgfraction=1 nosrcellipse=yes radiusstyle=enfrac fovbkgannulus=no nobkgellipse=no outunit=xy  
withboresightfudge=yes -w 1 -V 1
```

```
make_mask inimage=bnS003-obj-im.fits inmask=bnS003-mask-im.fits outmask=bnS003-cheese.fits  
reglist=bnS003-bkg_region-sky.fits
```

```
make_mask:- Executing (routine): make_mask inimage=bnS003-obj-im.fits inmask=bnS003-mask-im.fits  
outmask=bnS003-cheese.fits reglist=bnS003-bkg_region-sky.fits clobber=yes -w 1 -V 4
```

```
make_mask:- make_mask (esas-0.9.40) [xmmsas_20170719_1539-16.1.0] started: 2020-02-11T06:25:41.000
```

Event Image: bnS003-obj-im.fits

Input Mask: bnS003-mask-im.fits

Output Cheese Image: bnS003-cheese.fits

Region File: bnS003-bkg_region-sky.fits

Input Image: bnS003-obj-im.fits

Input Mask: bnS003-mask-im.fits

Template File

bnS003-mask-im.fits

Template image coordinate system: -TAN

Template image coordinate ID: RA---TAN DEC--TAN
Template image central coordinates: 120.2604583333301 36.0463333333301
Template image reference pixel: 450.91000000000003 450.91000000000003
Template image pixel sizes: -6.944444444444501E-004 6.944444444444501E-004
Template image NAXES, NAXIS: 2 900 900
pnS003-bkg_region-sky.fits
Number of excluded sources: 24
Output image coordinate system: -TAN
Output image coordinate ID: RA---TAN DEC--TAN
Output image central coordinates: 120.2604583333301 36.0463333333301
Output image reference pixel: 450.91000000000003 450.91000000000003
Output image pixel sizes: -6.944444444444501E-004 6.944444444444501E-004
Output image NAXES, NAXIS: 2 900 900
make_mask:- make_mask (esas-0.9.40) [xmmsas_20170719_1539-16.1.0] ended: 2020-02-11T06:25:41.000

770.459u 4.559s 13:06.39 98.5% 0+0k 51312+255104io 17pf+0w

[htb3hg@xmm analysis]\$ ds9 mos1S001-obj-image-sky.fits mos1S001-cheese.fits &

[1] 30419

[htb3hg@xmm analysis]\$

2/17/20

[htb3hg@xmm ~]\$ ssh -Y astr-XMM.astro.virginia.edu

htb3hg@astr-xmm.astro.virginia.edu's password:

Last login: Mon Feb 17 16:34:24 2020 from 172.25.72.244

[htb3hg@xmm ~]\$ cd /XMMShared/htb3hg/Data/A611/XMM/0781590201/

[htb3hg@xmm 0781590201]\$ sasinit

sasversion:- Executing (routine): sasversion -w 1 -V 4

sasversion:- sasversion (sasversion-1.2) [xmmsas_20170719_1539-16.1.0] started: 2020-02-17T21:41:40.000

sasversion:- XMM-Newton SAS release and build information:

SAS release: xmmsas_20170719_1539-16.1.0
Compiled on: Fri Jul 28 01:07:14 CEST 2017
Compiled by: sasbuild@sasbld01n.net4.lan
Platform : RHEL6.8 64

SAS-related environment variables that are set:

```
SAS_DIR = /XMMShared/cls7i/Software/sas_16.1.0/xmmsas_20170719_1539
SAS_PATH = /XMMShared/cls7i/Software/sas_16.1.0/xmmsas_20170719_1539
SAS_CCFPATH = /XMMShared/cls7i/Software/ccf
```

sasversion:- sasversion (sasversion-1.2) [xmmsas_20170719_1539-16.1.0] ended: 2020-02-17T21:41:40.000

Do not forget to define SAS_CCFPATH, SAS_CCF and SAS_ODF

```
[htb3hg@xmm 0781590201]$ source ./setup
[htb3hg@xmm 0781590201]$ cd analysis
[htb3hg@xmm analysis]$ cheese prefixm="1S001 2S002" prefixp=S003 scale=0.4 rate=0.2 \
? dist=40.0 clobber=1 elow=400 ehigh=7200
mos prefix 1: 1S001
mos prefix 2: 2S002
pn prefix 1: S003
verb: 1
scale: 0.4
rate: 2e-15
rates: 1e-14
rateh: 1e-14
dist: 40.0
mlmin: 15
clobber: 1
Band 1: 400 7200
attitude file already exists
```

use the old file

nn: 1

prefix: 1S001

Soft event image already exists: mos1S001-obj-im.fits

Clobber the existing file

```
evselect table=mos1S001-clean.fits:EVENTS withfilteredset=yes expression='(PATTERN<=12)&&(FLAG == 0)&&(PI in [400:7200])' filtertype=expression imagebinning='imageSize' imagedatatype='Int32' imageset=mos1S001-obj-im.fits squarepixels=yes ignorelegallimits=yes withxranges=yes withyranges=yes xcolumn='X' ximagesize=900 ximagemax=48400 ximagemin=3401 ycolumn='Y' yimagesize=900 yimagemax=48400 yimagemin=3401 updateexposure=yes filterexposure=yes verbosity=1
```

```
evselect:- Executing (routine): evselect table=mos1S001-clean.fits:EVENTS filteredset=filtered.fits withfilteredset=yes keepfilteroutput=yes flagcolumn=EVFLAG flagbit=-1 destruct=yes dssblock="" expression='(PATTERN<=12)&&(FLAG == 0)&&(PI in [400:7200])' filtertype=expression cleandss=no updateexposure=yes filterexposure=yes writedss=yes blockstocopy="" attributestocopy="" energycolumn=PHA zcolumn=WEIGHT zerrorcolumn=EWEIGHT withzerrorcolumn=no withzcolumn=no ignorelegallimits=yes imageset=mos1S001-obj-im.fits xcolumn=X ycolumn=Y ximagebinsize=1 yimagebinsize=1 squarepixels=yes ximagesize=900 yimagesize=900 imagebinning=imageSize ximagemin=3401 ximagemax=48400 withxranges=yes yimagemin=3401 yimagemax=48400 withyranges=yes imagedatatype=Int32 withimagedatatype=yes rimagecenter=0 decimagecenter=0 withcelestialcenter=no withimageset=yes spectrumset=spectrum.fits spectralbinsize=5 specchannelmin=0 specchannelmax=11999 withspecranges=no withspectrumset=no rateset=rate.fits timecolumn=TIME timebinsize=1 timemin=0 timemax=1000 withtimeranges=no maketimecolumn=no makeratecolumn=no withrateset=no histogramset=histo.fits histogramcolumn=TIME histogrambinsize=1 histogrammin=0 histogrammax=1000 withhistoranges=no withhistogramset=no -w 1 -V 1
```

nn: 2

prefix: 2S002

Soft event image already exists: mos2S002-obj-im.fits

Clobber the existing file

```
evselect table=mos2S002-clean.fits:EVENTS withfilteredset=yes expression='(PATTERN<=12)&&(FLAG == 0)&&(PI in [400:7200])' filtertype=expression imagebinning='imageSize' imagedatatype='Int32' imageset=mos2S002-obj-im.fits squarepixels=yes ignorelegallimits=yes withxranges=yes withyranges=yes xcolumn='X' ximagesize=900 ximagemax=48400 ximagemin=3401 ycolumn='Y' yimagesize=900 yimagemax=48400 yimagemin=3401 updateexposure=yes filterexposure=yes verbosity=1
```

```
evselect:- Executing (routine): evselect table=mos2S002-clean.fits:EVENTS filteredset=filtered.fits withfilteredset=yes keepfilteroutput=yes flagcolumn=EVFLAG flagbit=-1 destruct=yes dssblock=""
```

```

expression='(PATTERN<=12)&&(FLAG == 0)&&(PI in [400:7200])' filtertype=expression cleandss=no
updateexposure=yes filterexposure=yes writedss=yes blockstocopy=" attributestocopy=" energycolumn=PHA
zcolumn=WEIGHT zerrorcolumn=EWEIGHT withzerrorcolumn=no withzcolumn=no ignorelegallimits=yes
imageset=mos2S002-obj-im.fits xcolumn=X ycolumn=Y ximagebinsize=1 yimagebinsize=1 squarepixels=yes
ximagesize=900 yimagesize=900 imagebinning=imageSize ximagemin=3401 ximagemax=48400 withxranges=yes
yimagemin=3401 yimagemax=48400 withyranges=yes imagedatatype=Int32 withimagedatatype=yes
raimagecenter=0 decimagecenter=0 withcelestialcenter=no withimageset=yes spectrumset=spectrum.fits
spectralbinsize=5 specchannelmin=0 specchannelmax=11999 withspecranges=no withspectrumset=no
rateset=rate.fits timecolumn=TIME timebinsize=1 timemin=0 timemax=1000 withtimeranges=no
maketimecolumn=no makeratecolumn=no withrateset=no histogramset=histo.fits histogramcolumn=TIME
histogrambinsize=1 histogrammin=0 histogrammax=1000 withhistoranges=no withhistogramset=no -w 1 -V 1

```

nnp: 1

prefixp: S003

PN soft image already exists: pnS003-obj-im.fits

Clobber the existing file

```

evselect table=pnS003-clean.fits:EVENTS withfilteredset=yes expression='(PATTERN<=12)&&(FLAG == 0)&&(PI in [400:7200])&&(DETY in [-16510:14345])' filtertype=expression imagebinning='imageSize'
imagedatatype='Int32' imageset=pnS003-obj-im.fits squarepixels=yes ignorelegallimits=yes withxranges=yes
withyranges=yes xcolumn='X' ximagesize=900 ximagemax=48400 ximagemin=3401 ycolumn='Y' yimagesize=900
yimagemax=48400 yimagemin=3401 updateexposure=yes filterexposure=yes verbosity=1

```

```

evselect:- Executing (routine): evselect table=pnS003-clean.fits:EVENTS filteredset=filtered.fits withfilteredset=yes
keepfilteroutput=yes flagcolumn=EVFLAG flagbit=-1 destruct=yes dssblock="
expression='(PATTERN<=12)&&(FLAG == 0)&&(PI in [400:7200])&&(DETY in [-16510:14345])'
filtertype=expression cleandss=no updateexposure=yes filterexposure=yes writedss=yes blockstocopy="
attributestocopy=" energycolumn=PHA zcolumn=WEIGHT zerrorcolumn=EWEIGHT withzerrorcolumn=no
withzcolumn=no ignorelegallimits=yes imageset=pnS003-obj-im.fits xcolumn=X ycolumn=Y ximagebinsize=1
yimagebinsize=1 squarepixels=yes ximagesize=900 yimagesize=900 imagebinning=imageSize ximagemin=3401
ximagemax=48400 withxranges=yes yimagemin=3401 yimagemax=48400 withyranges=yes imagedatatype=Int32
withimagedatatype=yes raimagecenter=0 decimagecenter=0 withcelestialcenter=no withimageset=yes
spectrumset=spectrum.fits spectralbinsize=5 specchannelmin=0 specchannelmax=11999 withspecranges=no
withspectrumset=no rateset=rate.fits timecolumn=TIME timebinsize=1 timemin=0 timemax=1000
withtimeranges=no maketimecolumn=no makeratecolumn=no withrateset=no histogramset=histo.fits
histogramcolumn=TIME histogrambinsize=1 histogrammin=0 histogrammax=1000 withhistoranges=no
withhistogramset=no -w 1 -V 1

```

ML Source List Exists: emllist.fits

Clobber: Run edetect_chain

imlist: mos1S001-obj-im.fits mos2S002-obj-im.fits pnS003-obj-im.fits

evlist: mos1S001-clean.fits mos2S002-clean.fits pnS003-clean.fits
 ootevtlist: pnS003-clean-oot.fits
 ecclist: 1.2 1.2 3.2
 piminlist: 400 400 400
 pimaxlist: 7200 7200 7200
 edetect_chain imagesets='mos1S001-obj-im.fits mos2S002-obj-im.fits pnS003-obj-im.fits' eventsets='mos1S001-clean.fits mos2S002-clean.fits pnS003-clean.fits' attitudeset=atthk.fits pimin='400 400 400' pimax='7200 7200 7200' witheexpmap=yes likemin=10 ecf='1.2 1.2 3.2' eboxl_likemin=15 eboxm_likemin=15 ebox_withdetmask=yes ebox_withexpimage=yes esp_scut=0.01 esp_WITHOUTSET=yes esp_ooteventset='pnS003-clean-oot.fits' esp_nsplinenodes=20 eml_ecut=15 eml_scut=15 eml_withtwostage=yes eml_withthreshold=yes eml_threshold=15 esen_mllmin=10 eml_list=emllist.fits

eexpmap:- Executing (routine): eexpmap imageset=pnS003-obj-im.fits attitudeset=atthk.fits eventset=pnS003-clean.fits expimageset=pnS003-obj-imexp.fits withdetcoords=no withvignetting=yes usefastpixelization=no usedlimap=no attrebin=4 pimin=400 pimax=7200 -w 1 -V 4
 eexpmap:- eexpmap (eexpmap-4.11.2) [xmmsas_20170719_1539-16.1.0] started: 2020-02-17T21:44:01.000
 eexpmap:- eexpmap (eexpmap-4.11.2) [xmmsas_20170719_1539-16.1.0] ended: 2020-02-17T21:44:06.000
 emask:- Executing (routine): emask expimageset=pnS003-obj-imexp.fits detmaskset=pnS003-obj-immask.fits threshold1=0.3 threshold2=0.5 regionset=region.fits withregionset=no -w 1 -V 4
 emask:- emask (emask-2.14) [xmmsas_20170719_1539-16.1.0] started: 2020-02-17T21:44:06.000
 emask:- emask (emask-2.14) [xmmsas_20170719_1539-16.1.0] ended: 2020-02-17T21:44:06.000
 eexpmap:- Executing (routine): eexpmap imageset=mos1S001-obj-im.fits attitudeset=atthk.fits eventset=mos1S001-clean.fits expimageset=mos1S001-obj-imexp.fits withdetcoords=no withvignetting=yes usefastpixelization=no usedlimap=no attrebin=4 pimin=400 pimax=7200 -w 1 -V 4
 eexpmap:- eexpmap (eexpmap-4.11.2) [xmmsas_20170719_1539-16.1.0] started: 2020-02-17T21:44:06.000
 ** eexpmap: warning (NoExpoExt), Exposure extension not found
 eexpmap:- CCF constituents accessed by the calibration server:
 CifEntry {EMOS1, LINCOORD, 18, /XMMShared/cls7i/Software/ccf/EMOS1_LINCOORD_0018.CCF, 1998-01-01T00:00:00.000}
 CifEntry {EPN, LINCOORD, 9, /XMMShared/cls7i/Software/ccf/EPN_LINCOORD_0009.CCF, 1998-01-01T00:00:00.000}
 CifEntry {RGS1, LINCOORD, 8, /XMMShared/cls7i/Software/ccf/RGS1_LINCOORD_0008.CCF, 1998-01-01T00:00:00.000}
 CifEntry {XMM, BORESIGHT, 27, /XMMShared/cls7i/Software/ccf/XMM_BORESIGHT_0027.CCF, 2000-01-01T00:00:00.000}
 CifEntry {XMM, MISCDATA, 22, /XMMShared/cls7i/Software/ccf/XMM_MISCDATA_0022.CCF, 1999-01-01T00:00:00.000}

CifEntry {XRT1, XAREAEF, 9, /XMMShared/cls7i/Software/ccf/XRT1_XAREAEF_0009.CCF, 2000-01-13T00:00:00.000}

eexpmap:- eexpmap (eexpmap-4.11.2) [xmmsas_20170719_1539-16.1.0] ended: 2020-02-17T21:44:55.000

** eexpmap: warning (SummaryOfWarnings),

warning NoExpoExt silently occurred 1 times

emask:- Executing (routine): emask expimageset=mos1S001-obj-imexp.fits detmaskset=mos1S001-obj-immask.fits threshold1=0.3 threshold2=0.5 regionset=region.fits withregionset=no -w 1 -V 4

emask:- emask (emask-2.14) [xmmsas_20170719_1539-16.1.0] started: 2020-02-17T21:44:55.000

emask:- emask (emask-2.14) [xmmsas_20170719_1539-16.1.0] ended: 2020-02-17T21:44:55.000

eexpmap:- Executing (routine): eexpmap imageset=mos2S002-obj-im.fits attitudeset=atthk.fits eventset=mos2S002-clean.fits expimageset=mos2S002-obj-imexp.fits withdetcoords=no withvignetting=yes usefastpixelization=no usedlimap=no attrebin=4 pimin=400 pimax=7200 -w 1 -V 4

eexpmap:- eexpmap (eexpmap-4.11.2) [xmmsas_20170719_1539-16.1.0] started: 2020-02-17T21:44:55.000

eexpmap:- CCF constituents accessed by the calibration server:

CifEntry {EMOS2, LINCOORD, 18, /XMMShared/cls7i/Software/ccf/EMOS2_LINCOORD_0018.CCF, 1998-01-01T00:00:00.000}

CifEntry {EPN, LINCOORD, 9, /XMMShared/cls7i/Software/ccf/EPN_LINCOORD_0009.CCF, 1998-01-01T00:00:00.000}

CifEntry {RGS2, LINCOORD, 8, /XMMShared/cls7i/Software/ccf/RGS2_LINCOORD_0008.CCF, 1998-01-01T00:00:00.000}

CifEntry {XMM, BORESIGHT, 27, /XMMShared/cls7i/Software/ccf/XMM_BORESIGHT_0027.CCF, 2000-01-01T00:00:00.000}

CifEntry {XMM, MISCDATA, 22, /XMMShared/cls7i/Software/ccf/XMM_MISCDATA_0022.CCF, 1999-01-01T00:00:00.000}

CifEntry {XRT2, XAREAEF, 10, /XMMShared/cls7i/Software/ccf/XRT2_XAREAEF_0010.CCF, 2000-01-13T00:00:00.000}

eexpmap:- eexpmap (eexpmap-4.11.2) [xmmsas_20170719_1539-16.1.0] ended: 2020-02-17T21:46:11.000

emask:- Executing (routine): emask expimageset=mos2S002-obj-imexp.fits detmaskset=mos2S002-obj-immask.fits threshold1=0.3 threshold2=0.5 regionset=region.fits withregionset=no -w 1 -V 4

emask:- emask (emask-2.14) [xmmsas_20170719_1539-16.1.0] started: 2020-02-17T21:46:11.000

emask:- emask (emask-2.14) [xmmsas_20170719_1539-16.1.0] ended: 2020-02-17T21:46:11.000

eboxdetect:- Executing (routine): eboxdetect bkgimagesets=bgimage.fits usemap=no usematchedfilter=no detmasksets='pnS003-obj-immask.fits mos1S001-obj-immask.fits mos2S002-obj-immask.fits' withdetmask=yes expimagesets='pnS003-obj-imexp.fits mos1S001-obj-imexp.fits mos2S002-obj-imexp.fits' withexpimage=yes nruns=3 likemin=15 boxsize=5 withimagebuffersize=no imagebuffersize=640 ecf='3.2 1.2 1.2' imagesets='pnS003-obj-im.fits mos1S001-obj-im.fits mos2S002-obj-im.fits' boxlistset=eboxlist_1.fits withoffsets=no mergedlistset=mergedlist.fits hrdef='1 2 2 3 3 4' pimin='400 400 400' pimax='7200 7200 7200' obsmode=pointing -w 1 -V 4

eboxdetect:- eboxdetect (eboxdetect-4.27.4) [xmmsas_20170719_1539-16.1.0] started: 2020-02-17T21:46:11.000
eboxdetect:- eboxdetect (eboxdetect-4.27.4) [xmmsas_20170719_1539-16.1.0] ended: 2020-02-17T21:46:17.000

esplinemap:- Executing (routine): esplinemap scut=0.01 mlmin=1 nsplinenodes=20 excesssigma=4 nfitrun=3 idband=1 boxlistset=eboxlist_1.fits imageset=pnS003-obj-im.fits expimageset=pnS003-obj-imexp.fits withexpimage=yes expimageset2=pnS003-obj-imexpnovig.fits withexpimage2=no detmaskset=pnS003-obj-immask.fits withdetmask=yes bkgimageset=pnS003-obj-imbkg.fits cheeseimageset=pnS003-obj-imcheese.fits withcheese=no cheesemaskset=cheesemask.fits withcheesemask=no ooteventset=pnS003-clean-oot.fits withoutset=yes pimin=400 pimax=7200 fitmethod=spline snrmin=30 smoothsigma=15 -w 1 -V 4

esplinemap:- esplinemap (esplinemap-5.0.2) [xmmsas_20170719_1539-16.1.0] started: 2020-02-17T21:46:17.000
esplinemap:- esplinemap (esplinemap-5.0.2) [xmmsas_20170719_1539-16.1.0] ended: 2020-02-17T21:46:26.000

esplinemap:- Executing (routine): esplinemap scut=0.01 mlmin=1 nsplinenodes=20 excesssigma=4 nfitrun=3 idband=1 boxlistset=eboxlist_1.fits imageset=mos1S001-obj-im.fits expimageset=mos1S001-obj-imexp.fits withexpimage=yes expimageset2=mos1S001-obj-imexpnovig.fits withexpimage2=no detmaskset=mos1S001-obj-immask.fits withdetmask=yes bkgimageset=mos1S001-obj-imbkg.fits cheeseimageset=mos1S001-obj-imcheese.fits withcheese=no cheesemaskset=cheesemask.fits withcheesemask=no ooteventset=ootevents.fits withoutset=no pimin=400 pimax=7200 fitmethod=spline snrmin=30 smoothsigma=15 -w 1 -V 4

esplinemap:- esplinemap (esplinemap-5.0.2) [xmmsas_20170719_1539-16.1.0] started: 2020-02-17T21:46:26.000
esplinemap:- esplinemap (esplinemap-5.0.2) [xmmsas_20170719_1539-16.1.0] ended: 2020-02-17T21:46:28.000

esplinemap:- Executing (routine): esplinemap scut=0.01 mlmin=1 nsplinenodes=20 excesssigma=4 nfitrun=3 idband=1 boxlistset=eboxlist_1.fits imageset=mos2S002-obj-im.fits expimageset=mos2S002-obj-imexp.fits withexpimage=yes expimageset2=mos2S002-obj-imexpnovig.fits withexpimage2=no detmaskset=mos2S002-obj-immask.fits withdetmask=yes bkgimageset=mos2S002-obj-imbkg.fits cheeseimageset=mos2S002-obj-imcheese.fits withcheese=no cheesemaskset=cheesemask.fits withcheesemask=no ooteventset=ootevents.fits withoutset=no pimin=400 pimax=7200 fitmethod=spline snrmin=30 smoothsigma=15 -w 1 -V 4

esplinemap:- esplinemap (esplinemap-5.0.2) [xmmsas_20170719_1539-16.1.0] started: 2020-02-17T21:46:28.000
esplinemap:- esplinemap (esplinemap-5.0.2) [xmmsas_20170719_1539-16.1.0] ended: 2020-02-17T21:46:28.000

eboxdetect:- Executing (routine): eboxdetect bkgimagesets='pnS003-obj-imbkg.fits mos1S001-obj-imbkg.fits mos2S002-obj-imbkg.fits' usemap=yes usematchedfilter=no detmasksets='pnS003-obj-immask.fits mos1S001-obj-immask.fits mos2S002-obj-immask.fits' withdetmask=yes expimagesets='pnS003-obj-imexp.fits mos1S001-obj-imexp.fits mos2S002-obj-imexp.fits' withexpimage=yes nruns=3 likemin=15 boxsize=5 withimagebuffersize=no imagebuffersize=640 ecf='3.2 1.2 1.2' imagesets='pnS003-obj-im.fits mos1S001-obj-im.fits mos2S002-obj-im.fits' boxlistset=eboxlist_m.fits withoffsets=no mergedlistset=mergedlist.fits hrdef='1 2 2 3 3 4' pimin='400 400 400' pimax='7200 7200 7200' obsmode=pointing -w 1 -V 4

eboxdetect:- eboxdetect (eboxdetect-4.27.4) [xmmsas_20170719_1539-16.1.0] started: 2020-02-17T21:46:28.000
eboxdetect:- eboxdetect (eboxdetect-4.27.4) [xmmsas_20170719_1539-16.1.0] ended: 2020-02-17T21:46:32.000

```
emldetect:- Executing (routine): emldetect boxlistset=oboxlist_m.fits mllistset=emllist.fits mlmin=10
determineerrors=yes fitposition=yes psfmodel=ellbeta nmaxfit=1 nmulsou=1 ecut=15 scut=15 fitextent=yes
extentmodel=beta dmlextmin=6 minextent=1.5 maxextent=20 withthreshold=yes threshold=15 threshcolumn=LIKE
withtwostage=yes withimagebuffersize=no imagebuffersize=640 withxidband=no xidfixed=no pimin='400 400 400'
pimax='7200 7200 7200' hrpndef='1 2 2 3 3 4 4 5' xidpndef='2 3 4' hrm1def='1 2 2 3 3 4 4 5' xidm1def='2 3 4'
hrm2def='1 2 2 3 3 4 4 5' xidm2def='2 3 4' ecf='3.2 1.2 1.2' xidecf=1 fitcounts=yes fitnegative=no
mergedlistset=mergedlist.fits useevents=no usecalpsf=yes withhotpixelfilter=no withoffsets=no withdrawrows=no
imagesets='pnS003-obj-im.fits mos1S001-obj-im.fits mos2S002-obj-im.fits' bkgimagesets='pnS003-obj-imbkg.fits
mos1S001-obj-imbkg.fits mos2S002-obj-imbkg.fits' detmasksets='pnS003-obj-immask.fits mos1S001-obj-
immask.fits mos2S002-obj-immask.fits' withdetmask=yes expimagesets='pnS003-obj-imexp.fits mos1S001-obj-
imexp.fits mos2S002-obj-imexp.fits' withexpimage=yes sourceimagesets='pnS003-obj-imsmap.fits mos1S001-obj-
imsmap.fits mos2S002-obj-imsmap.fits' withsourcemap=yes -w 1 -V 4
```

```
emldetect:- emldetect (emldetect-7.1) [xmmsas_20170719_1539-16.1.0] started: 2020-02-17T21:46:32.000
```

```
emldetect:- CCF constituents accessed by the calibration server:
```

```
CifEntry {EMOS1, LINCOORD, 18, /XMMShared/cls7i/Software/ccf/EMOS1_LINCOORD_0018.CCF, 1998-01-
01T00:00:00.000}
```

```
CifEntry {EMOS2, LINCOORD, 18, /XMMShared/cls7i/Software/ccf/EMOS2_LINCOORD_0018.CCF, 1998-01-
01T00:00:00.000}
```

```
CifEntry {EPN, LINCOORD, 9, /XMMShared/cls7i/Software/ccf/EPN_LINCOORD_0009.CCF, 1998-01-
01T00:00:00.000}
```

```
CifEntry {RGS1, LINCOORD, 8, /XMMShared/cls7i/Software/ccf/RGS1_LINCOORD_0008.CCF, 1998-01-
01T00:00:00.000}
```

```
CifEntry {XMM, BORESIGHT, 27, /XMMShared/cls7i/Software/ccf/XMM_BORESIGHT_0027.CCF, 2000-01-
01T00:00:00.000}
```

```
CifEntry {XMM, MISCDATA, 22, /XMMShared/cls7i/Software/ccf/XMM_MISCDATA_0022.CCF, 1999-01-
01T00:00:00.000}
```

```
CifEntry {XRT1, XAREAEC, 9, /XMMShared/cls7i/Software/ccf/XRT1_XAREAEC_0009.CCF, 2000-01-
13T00:00:00.000}
```

```
CifEntry {XRT1, XPSF, 14, /XMMShared/cls7i/Software/ccf/XRT1_XPSF_0014.CCF, 2000-01-13T00:00:00.000}
```

```
CifEntry {XRT2, XPSF, 14, /XMMShared/cls7i/Software/ccf/XRT2_XPSF_0014.CCF, 2000-01-13T00:00:00.000}
```

```
CifEntry {XRT3, XAREAEC, 12, /XMMShared/cls7i/Software/ccf/XRT3_XAREAEC_0012.CCF, 2000-01-
13T00:00:00.000}
```

```
CifEntry {XRT3, XPSF, 17, /XMMShared/cls7i/Software/ccf/XRT3_XPSF_0017.CCF, 2000-01-13T00:00:00.000}
```

```
emldetect:- CCF constituents accessed by the calibration server:
```

```
CifEntry {EMOS1, LINCOORD, 18, /XMMShared/cls7i/Software/ccf/EMOS1_LINCOORD_0018.CCF, 1998-01-
01T00:00:00.000}
```

```
CifEntry {EMOS2, LINCOORD, 18, /XMMShared/cls7i/Software/ccf/EMOS2_LINCOORD_0018.CCF, 1998-01-
01T00:00:00.000}
```

CifEntry {EPN, LINCOORD, 9, /XMMShared/cls7i/Software/ccf/EPN_LINCOORD_0009.CCF, 1998-01-01T00:00:00.000}

CifEntry {RGS1, LINCOORD, 8, /XMMShared/cls7i/Software/ccf/RGS1_LINCOORD_0008.CCF, 1998-01-01T00:00:00.000}

CifEntry {RGS1, LINESREADFUNC, 5, /XMMShared/cls7i/Software/ccf/RGS1_LINESREADFUNC_0005.CCF, 1999-01-01T00:00:00.000}

CifEntry {RGS1, QUANTUMEF, 15, /XMMShared/cls7i/Software/ccf/RGS1_QUANTUMEF_0015.CCF, 1998-01-01T00:00:00.000}

CifEntry {RGS2, LINCOORD, 8, /XMMShared/cls7i/Software/ccf/RGS2_LINCOORD_0008.CCF, 1998-01-01T00:00:00.000}

CifEntry {XMM, BORESIGHT, 27, /XMMShared/cls7i/Software/ccf/XMM_BORESIGHT_0027.CCF, 2000-01-01T00:00:00.000}

CifEntry {XMM, MISCDATA, 22, /XMMShared/cls7i/Software/ccf/XMM_MISCDATA_0022.CCF, 1999-01-01T00:00:00.000}

CifEntry {XRT1, XAREAEF, 9, /XMMShared/cls7i/Software/ccf/XRT1_XAREAEF_0009.CCF, 2000-01-13T00:00:00.000}

CifEntry {XRT1, XPSF, 14, /XMMShared/cls7i/Software/ccf/XRT1_XPSF_0014.CCF, 2000-01-13T00:00:00.000}

CifEntry {XRT2, XAREAEF, 10, /XMMShared/cls7i/Software/ccf/XRT2_XAREAEF_0010.CCF, 2000-01-13T00:00:00.000}

CifEntry {XRT2, XPSF, 14, /XMMShared/cls7i/Software/ccf/XRT2_XPSF_0014.CCF, 2000-01-13T00:00:00.000}

CifEntry {XRT3, XAREAEF, 12, /XMMShared/cls7i/Software/ccf/XRT3_XAREAEF_0012.CCF, 2000-01-13T00:00:00.000}

CifEntry {XRT3, XPSF, 17, /XMMShared/cls7i/Software/ccf/XRT3_XPSF_0017.CCF, 2000-01-13T00:00:00.000}

emldetect:- emldetect (emldetect-7.1) [xmmsas_20170719_1539-16.1.0] ended: 2020-02-17T21:56:27.000

esensmap:- Executing (routine): esensmap detmasksets=pnS003-obj-immask.fits expimagesets=pnS003-obj-imexp.fits bkgimagesets=pnS003-obj-imbkg.fits sensimageset=pnS003-obj-imsen.fits mlmin=10 -w 1 -V 4

esensmap:- esensmap (esensmap-3.12.2) [xmmsas_20170719_1539-16.1.0] started: 2020-02-17T21:56:28.000

esensmap:- Opening file pnS003-obj-immask.fits

esensmap:- esensmap (esensmap-3.12.2) [xmmsas_20170719_1539-16.1.0] ended: 2020-02-17T21:56:29.000

esensmap:- Executing (routine): esensmap detmasksets=mos1S001-obj-immask.fits expimagesets=mos1S001-obj-imexp.fits bkgimagesets=mos1S001-obj-imbkg.fits sensimageset=mos1S001-obj-imsen.fits mlmin=10 -w 1 -V 4

esensmap:- esensmap (esensmap-3.12.2) [xmmsas_20170719_1539-16.1.0] started: 2020-02-17T21:56:29.000

```
esensmap:- Opening file mos1S001-obj-immask.fits
esensmap:- esensmap (esensmap-3.12.2) [xmmsas_20170719_1539-16.1.0] ended: 2020-02-17T21:56:29.000
esensmap:- Executing (routine): esensmap detmasksets=mos2S002-obj-immask.fits expimagesets=mos2S002-obj-
imexp.fits bkgimagesets=mos2S002-obj-imbkg.fits sensimageset=mos2S002-obj-imsen.fits mlmin=10 -w 1 -V 4
esensmap:- esensmap (esensmap-3.12.2) [xmmsas_20170719_1539-16.1.0] started: 2020-02-17T21:56:29.000
esensmap:- Opening file mos2S002-obj-immask.fits
esensmap:- esensmap (esensmap-3.12.2) [xmmsas_20170719_1539-16.1.0] ended: 2020-02-17T21:56:30.000
```

Total band mask already exists: mos1S001-mask-im.fits

Clobber the existing file

```
emask detmaskset=mos1S001-mask-im.fits expimageset=mos1S001-obj-imexp.fits threshold1=0.1 threshold2=0.5
verbosity=1
```

```
emask:- Executing (routine): emask expimageset=mos1S001-obj-imexp.fits detmaskset=mos1S001-mask-im.fits
threshold1=0.1 threshold2=0.5 regionset=region.fits withregionset=no -w 1 -V 1
```

Total band mask already exists: mos2S002-mask-im.fits

Clobber the existing file

```
emask detmaskset=mos2S002-mask-im.fits expimageset=mos2S002-obj-imexp.fits threshold1=0.1 threshold2=0.5
verbosity=1
```

```
emask:- Executing (routine): emask expimageset=mos2S002-obj-imexp.fits detmaskset=mos2S002-mask-im.fits
threshold1=0.1 threshold2=0.5 regionset=region.fits withregionset=no -w 1 -V 1
```

PN soft mask already exists: pnS003-mask-im.fits

Clobber the existing file

```
emask detmaskset=pnS003-mask-im.fits expimageset=pnS003-obj-imexp.fits threshold1=0.1 threshold2=0.5
verbosity=1
```

```
emask:- Executing (routine): emask expimageset=pnS003-obj-imexp.fits detmaskset=pnS003-mask-im.fits
threshold1=0.1 threshold2=0.5 regionset=region.fits withregionset=no -w 1 -V 1
```

```
region eventset=mos1S001-clean.fits operationstyle=global srclisttab=emllist.fits:SRCLIST expression='(FLUX >= 2e-15)&&(DET_ML >= 15)&&(DIST_NN >= 40.0)&&(ID_BAND == 0)' bkgregionset=mos1S001-bkg_region-det.fits energyfraction=0.4 radiusstyle=enfrac outunit=detxy verbosity=1
```

```
region:- Executing (routine): region eventset=mos1S001-clean.fits tempset=tempset.ds usersrcid=1  
srcidcol=dummy_default operationstyle=global srclisttab=emllist.fits:SRCLIST expression='(FLUX >= 2e-15)&&(DET_ML >= 15)&&(DIST_NN >= 40.0)&&(ID_BAND == 0)' regionset=src_region.ds  
bkgregionset=mos1S001-bkg_region-det.fits shrinkconfused=yes fixedradius=12 energyfraction=0.4  
bkgratecol=BG_MAP bkgratekwdset=kwd_set.ds bkrateimgset=bkg_rate_img.ds bkgrateuser=1 bkgratestyle=col  
bkgfraction=1 nosrcellipse=no radiusstyle=enfrac fovbkgannulus=no nobkgellipse=no outunit=detxy  
withboresightfudge=yes -w 1 -V 1
```

```
region eventset=mos1S001-clean.fits operationstyle=global srclisttab=emllist.fits:SRCLIST expression='(DIST_NN >= 40.0)&&(DET_ML >= 15)&&(FLUX >= 2e-15)&&(ID_BAND == 0)' bkgregionset=mos1S001-bkg_region-sky.fits radiusstyle=enfrac bkgratestyle=col nosrcellipse=yes energyfraction=0.4 outunit=xy verbosity=1
```

```
region:- Executing (routine): region eventset=mos1S001-clean.fits tempset=tempset.ds usersrcid=1  
srcidcol=dummy_default operationstyle=global srclisttab=emllist.fits:SRCLIST expression='(DIST_NN >= 40.0)&&(DET_ML >= 15)&&(FLUX >= 2e-15)&&(ID_BAND == 0)' regionset=src_region.ds  
bkgregionset=mos1S001-bkg_region-sky.fits shrinkconfused=yes fixedradius=12 energyfraction=0.4  
bkgratecol=BG_MAP bkgratekwdset=kwd_set.ds bkrateimgset=bkg_rate_img.ds bkgrateuser=1 bkgratestyle=col  
bkgfraction=1 nosrcellipse=yes radiusstyle=enfrac fovbkgannulus=no nobkgellipse=no outunit=xy  
withboresightfudge=yes -w 1 -V 1
```

```
make_mask inimage=mos1S001-obj-im.fits inmask=mos1S001-mask-im.fits outmask=mos1S001-cheese.fits  
reglist=mos1S001-bkg_region-sky.fits
```

```
make_mask:- Executing (routine): make_mask inimage=mos1S001-obj-im.fits inmask=mos1S001-mask-im.fits  
outmask=mos1S001-cheese.fits reglist=mos1S001-bkg_region-sky.fits clobber=yes -w 1 -V 4
```

```
make_mask:- make_mask (esas-0.9.40) [xmmsas_20170719_1539-16.1.0] started: 2020-02-17T21:56:32.000
```

Event Image: mos1S001-obj-im.fits

Input Mask: mos1S001-mask-im.fits

Output Cheese Image: mos1S001-cheese.fits

Region File: mos1S001-bkg_region-sky.fits

Input Image: mos1S001-obj-im.fits

Input Mask: mos1S001-mask-im.fits

Template File

mos1S001-mask-im.fits

Template image coordinate system: -TAN
 Template image coordinate ID: RA---TAN DEC--TAN
 Template image central coordinates: 120.2604583333301 36.04633333333301
 Template image reference pixel: 450.91000000000003 450.91000000000003
 Template image pixel sizes: -6.944444444444501E-004 6.944444444444501E-004
 Template image NAXES, NAXIS: 2 900 900
 mos1S001-bkg_region-sky.fits
 Number of excluded sources: 24
 File exists with output file name
 mos1S001-cheese.fits
 Clobber the file and continue
 Output image coordinate system: -TAN
 Output image coordinate ID: RA---TAN DEC--TAN
 Output image central coordinates: 120.2604583333301 36.0463333333301
 Output image reference pixel: 450.91000000000003 450.91000000000003
 Output image pixel sizes: -6.944444444444501E-004 6.944444444444501E-004
 Output image NAXES, NAXIS: 2 900 900
 make_mask:- make_mask (esas-0.9.40) [xmmsas_20170719_1539-16.1.0] ended: 2020-02-17T21:56:32.000

```

region eventset=mos2S002-clean.fits operationstyle=global srclisttab=emllist.fits:SRCLIST expression='(FLUX >= 2e-15)&&(DET_ML >= 15)&&(DIST_NN >= 40.0)&&(ID_BAND == 0)' bkgregionset=mos2S002-bkg_region-det.fits energyfraction=0.4 radiusstyle=enfrac outunit=detxy verbosity=1
  
```

region:- Executing (routine): region eventset=mos2S002-clean.fits tempset=tempset.ds usersrcid=1
 srcidcol=dummy_default operationstyle=global srclisttab=emllist.fits:SRCLIST expression='(FLUX >= 2e-15)&&(DET_ML >= 15)&&(DIST_NN >= 40.0)&&(ID_BAND == 0)' regionset=src_region.ds
 bkgregionset=mos2S002-bkg_region-det.fits shrinkconfused=yes fixedradius=12 energyfraction=0.4
 bkgratecol=BG_MAP bkgratekwdset=kwd_set.ds bkgrateimgset=bkg_rate_img.ds bkgrateuser=1 bkgratestyle=col
 bkgfraction=1 nosrcellipse=no radiusstyle=enfrac fovbkgannulus=no nobkgellipse=no outunit=detxy
 withboresightfudge=yes -w 1 -V 1

```

region eventset=mos2S002-clean.fits operationstyle=global srclisttab=emllist.fits:SRCLIST expression='(DIST_NN >= 40.0)&&(DET_ML >= 15)&&(FLUX >= 2e-15)&&(ID_BAND == 0)' bkgregionset=mos2S002-bkg_region-sky.fits radiusstyle=enfrac bkgratestyle=col nosrcellipse=yes energyfraction=0.4 outunit=xy verbosity=1
  
```

```
region:- Executing (routine): region eventset=mos2S002-clean.fits tempset=tempset.ds usersrcid=1
srcidcol=dummy_default operationstyle=global srclisttab=emllist.fits:SRCLIST expression='(DIST_NN >=
40.0)&&(DET_ML >= 15)&&(FLUX >= 2e-15)&&(ID_BAND == 0)' regionset=src_region.ds
bkgregionset=mos2S002-bkg_region-sky.fits shrinkconfused=yes fixedradius=12 energyfraction=0.4
bkgratecol=BG_MAP bkgratekwds=kwd_set.ds bkgrateimgset=bkg_rate_img.ds bkgrateuser=1 bkgratestyle=col
bkgfraction=1 nosrcellipse=yes radiusstyle=enfrac fovbkgannulus=no nobkgellipse=no outunit=xy
withboresightfudge=yes -w 1 -V 1
```

```
make_mask inimage=mos2S002-obj-im.fits inmask=mos2S002-mask-im.fits outmask=mos2S002-cheese.fits
reglist=mos2S002-bkg_region-sky.fits
```

```
make_mask:- Executing (routine): make_mask inimage=mos2S002-obj-im.fits inmask=mos2S002-mask-im.fits
outmask=mos2S002-cheese.fits reglist=mos2S002-bkg_region-sky.fits clobber=yes -w 1 -V 4
```

```
make_mask:- make_mask (esas-0.9.40) [xmmsas_20170719_1539-16.1.0] started: 2020-02-17T21:56:33.000
```

Event Image: mos2S002-obj-im.fits

Input Mask: mos2S002-mask-im.fits

Output Cheese Image: mos2S002-cheese.fits

Region File: mos2S002-bkg_region-sky.fits

Input Image: mos2S002-obj-im.fits

Input Mask: mos2S002-mask-im.fits

Template File

mos2S002-mask-im.fits

Template image coordinate system: -TAN

Template image coordinate ID: RA---TAN DEC--TAN

Template image central coordinates: 120.2604583333301 36.04633333333301

Template image reference pixel: 450.9100000000003 450.9100000000003

Template image pixel sizes: -6.944444444444501E-004 6.944444444444501E-004

Template image NAXES, NAXIS: 2 900 900

mos2S002-bkg_region-sky.fits

Number of excluded sources: 24

File exists with output file name

mos2S002-cheese.fits

Clobber the file and continue

Output image coordinate system: -TAN

Output image coordinate ID: RA---TAN DEC--TAN

```
Output image central coordinates: 120.2604583333301      36.04633333333301
Output image reference pixel: 450.91000000000003      450.91000000000003
Output image pixel sizes: -6.944444444444501E-004 6.944444444444501E-004
Output image NAXES, NAXIS:      2      900      900
make_mask:- make_mask (esas-0.9.40) [xmmsas_20170719_1539-16.1.0] ended: 2020-02-17T21:56:33.000
```

```
region eventset=pnS003-clean.fits operationstyle=global srclisttab=emllist.fits:SRCLIST expression='(DIST_NN >= 40.0)&&(DET_ML >= 15)&&(FLUX >= 2e-15)&&(ID_BAND == 0)' bkgregionset=bnS003-bkg_region-det.fits energyfraction=0.4 radiusstyle=enfrac outunit=detxy verbosity=1
```

```
region:- Executing (routine): region eventset=bnS003-clean.fits tempset=tempset.ds usersrcid=1
srcidcol=dummy_default operationstyle=global srclisttab=emllist.fits:SRCLIST expression='(DIST_NN >= 40.0)&&(DET_ML >= 15)&&(FLUX >= 2e-15)&&(ID_BAND == 0)' regionset=src_region.ds
bkgregionset=bnS003-bkg_region-det.fits shrinkconfused=yes fixedradius=12 energyfraction=0.4
bkgratecol=BG_MAP bkgratekwdset=kwd_set.ds bkgrateimgset=bkg_rate_img.ds bkgrateuser=1 bkgrateststyle=col
bkgfraction=1 nosrcellipse=no radiusstyle=enfrac fovbkgannulus=no nobkgellipse=no outunit=detxy
withboresightfudge=yes -w 1 -V 1
```

```
region eventset=bnS003-clean.fits operationstyle=global srclisttab=emllist.fits:SRCLIST expression='(DIST_NN >= 40.0)&&(DET_ML >= 15)&&(FLUX >= 2e-15)&&(ID_BAND == 0)' bkgregionset=bnS003-bkg_region-sky.fits
radiusstyle=enfrac bkgrateststyle=col nosrcellipse=yes energyfraction=0.4 outunit=xy verbosity=1
```

```
region:- Executing (routine): region eventset=bnS003-clean.fits tempset=tempset.ds usersrcid=1
srcidcol=dummy_default operationstyle=global srclisttab=emllist.fits:SRCLIST expression='(DIST_NN >= 40.0)&&(DET_ML >= 15)&&(FLUX >= 2e-15)&&(ID_BAND == 0)' regionset=src_region.ds
bkgregionset=bnS003-bkg_region-sky.fits shrinkconfused=yes fixedradius=12 energyfraction=0.4
bkgratecol=BG_MAP bkgratekwdset=kwd_set.ds bkgrateimgset=bkg_rate_img.ds bkgrateuser=1 bkgrateststyle=col
bkgfraction=1 nosrcellipse=yes radiusstyle=enfrac fovbkgannulus=no nobkgellipse=no outunit=xy
withboresightfudge=yes -w 1 -V 1
```

```
make_mask inimage=bnS003-obj-im.fits inmask=bnS003-mask-im.fits outmask=bnS003-cheese.fits
reglist=bnS003-bkg_region-sky.fits
```

```
make_mask:- Executing (routine): make_mask inimage=bnS003-obj-im.fits inmask=bnS003-mask-im.fits
outmask=bnS003-cheese.fits reglist=bnS003-bkg_region-sky.fits clobber=yes -w 1 -V 4
```

```
make_mask:- make_mask (esas-0.9.40) [xmmsas_20170719_1539-16.1.0] started: 2020-02-17T21:56:34.000
```

Event Image: bnS003-obj-im.fits

Input Mask: bnS003-mask-im.fits

Output Cheese Image: bnS003-cheese.fits

Region File: pnS003-bkg_region-sky.fits

Input Image: pnS003-obj-im.fits

Input Mask: pnS003-mask-im.fits

Template File

pnS003-mask-im.fits

Template image coordinate system: -TAN

Template image coordinate ID: RA---TAN DEC--TAN

Template image central coordinates: 120.2604583333301 36.0463333333301

Template image reference pixel: 450.9100000000003 450.9100000000003

Template image pixel sizes: -6.944444444444501E-004 6.944444444444501E-004

Template image NAXES, NAXIS: 2 900 900

pnS003-bkg_region-sky.fits

Number of excluded sources: 24

File exists with output file name

pnS003-cheese.fits

Clobber the file and continue

Output image coordinate system: -TAN

Output image coordinate ID: RA---TAN DEC--TAN

Output image central coordinates: 120.2604583333301 36.0463333333301

Output image reference pixel: 450.9100000000003 450.9100000000003

Output image pixel sizes: -6.944444444444501E-004 6.944444444444501E-004

Output image NAXES, NAXIS: 2 900 900

make_mask:- make_mask (esas-0.9.40) [xmmsas_20170719_1539-16.1.0] ended: 2020-02-17T21:56:34.000

751.284u 3.677s 12:39.36 99.4% 0+0k 281192+255104io 133pf+0w

[htb3hg@xmm analysis]\$

[htb3hg@xmm analysis]\$

[htb3hg@xmm analysis]\$ ds9 mos1S001-obj-image-sky.fits mos1S001-cheese.fits &

[1] 22026

[htb3hg@xmm analysis]\$

[1] Done /XMMShared/Software/ciao-4.10/ots/bin/ds9 mos1S001-obj-image-sky.fits mos1S001-cheese.fits

```
57.524u 5.546s 28:13.21 3.7%      0+0k 21168+12768io 61pf+0w
[htb3hg@xmm analysis]$ ds9 mos1S001-obj-image-sky.fits mos1S001-cheese.fits &
[1] 28709
[htb3hg@xmm analysis]$
[1] Done          /XMMShared/Software/ciao-4.10/ots/bin/ds9 mos1S001-obj-image-sky.fits mos1S001-
cheese.fits
32.697u 2.370s 12:33.01 4.6%      0+0k 0+12672io 0pf+0w
[htb3hg@xmm analysis]$ ds9 mos2S002-obj-image-sky.fits mos2S002-cheese.fits &
[1] 31514
[htb3hg@xmm analysis]$
[1] Done          /XMMShared/Software/ciao-4.10/ots/bin/ds9 mos2S002-obj-image-sky.fits mos2S002-
cheese.fits
39.000u 2.551s 8:32.33 8.1%      0+0k 6456+12752io 0pf+0w
[htb3hg@xmm analysis]$ ds9 mos2S002-obj-image-sky.fits mos2S002-cheese.fits &
[1] 883
[htb3hg@xmm analysis]$
[1] Done          /XMMShared/Software/ciao-4.10/ots/bin/ds9 mos2S002-obj-image-sky.fits mos2S002-
cheese.fits
10.745u 0.801s 1:31.13 12.6%     0+0k 0+0io 0pf+0w
[htb3hg@xmm analysis]$ ds9 mos2S002-obj-image-sky.fits mos2S002-cheese.fits &
[1] 1239
[htb3hg@xmm analysis]$
[1] Done          /XMMShared/Software/ciao-4.10/ots/bin/ds9 mos2S002-obj-image-sky.fits mos2S002-
cheese.fits
[htb3hg@xmm analysis]$ ds9 mos2S002-obj-image-sky.fits mos2S002-cheese.fits &
[1] 30129
[htb3hg@xmm analysis]$
[1] Done          /XMMShared/Software/ciao-4.10/ots/bin/ds9 mos2S002-obj-image-sky.fits mos2S002-
cheese.fits
75.689u 5.174s 9:37.32 14.0%     0+0k 0+12752io 0pf+0w
[htb3hg@xmm analysis]$ ds9 mos2S002-obj-image-sky.fits mos2S002-cheese.fits &
[1] 32138
[htb3hg@xmm analysis]$
```

```

[1] Done          /XMMShared/Software/ciao-4.10/ots/bin/ds9 mos2S002-obj-image-sky.fits mos2S002-
cheese.fits

18.523u 1.479s 3:20.47 9.9%      0+0k 0+12672io 0pf+0w

[htb3hg@xmm analysis]$ ds9 pnS003-obj-image-sky.fits pnS003-cheese.fits &

[1] 482

[htb3hg@xmm analysis]$

[1] Done          /XMMShared/Software/ciao-4.10/ots/bin/ds9 pnS003-obj-image-sky.fits pnS003-
cheese.fits

40.761u 2.849s 16:53.06 4.3%      0+0k 6504+12736io 0pf+0w

[htb3hg@xmm analysis]$ ds9 pnS003-obj-image-sky.fits pnS003-cheese.fits &

[1] 4246

[htb3hg@xmm analysis]$

[1] Done          /XMMShared/Software/ciao-4.10/ots/bin/ds9 pnS003-obj-image-sky.fits pnS003-
cheese.fits

24.889u 1.984s 3:31.70 12.6%      0+0k 0+12672io 0pf+0w

[htb3hg@xmm analysis]$

```

3/23/20

```

[htb3hg@xmm ~]$ ssh -Y astr-XMM.astro.virginia.edu

htb3hg@astr-xmm.astro.virginia.edu's password:

Last login: Mon Mar 23 18:50:05 2020 from 128.143.0.10

[htb3hg@xmm ~]$ cd /XMMShared/htb3hg/Data/A611/XMM/0781590201/

[htb3hg@xmm 0781590201]$ sasinit

```

```

sasversion:- Executing (routine): sasversion -w 1 -V 4

sasversion:- sasversion (sasversion-1.2) [xmmsas_20170719_1539-16.1.0] started: 2020-03-
23T22:54:05.000

sasversion:- XMM-Newton SAS release and build information:

```

```

SAS release: xmmsas_20170719_1539-16.1.0

Compiled on: Fri Jul 28 01:07:14 CEST 2017

Compiled by: sasbuild@sasbld01n.net4.lan

Platform : RHEL6.8 64

```

SAS-related environment variables that are set:

```
SAS_DIR = /XMMShared/cls7i/Software/sas_16.1.0/xmmsas_20170719_1539  
SAS_PATH = /XMMShared/cls7i/Software/sas_16.1.0/xmmsas_20170719_1539  
SAS_CCFPATH = /XMMShared/cls7i/Software/ccf
```

```
sasversion:- sasversion (sasversion-1.2) [xmmsas_20170719_1539-16.1.0] ended: 2020-03-  
23T22:54:05.000
```

Do not forget to define SAS_CCFPATH, SAS_CCF and SAS_ODF

```
[htb3hg@xmm 0781590201]$ source ./setup  
[htb3hg@xmm 0781590201]$ cd analysis  
[htb3hg@xmm analysis]$ cheese prefixm="1S001 2S002" prefixp=S003 scale=0.4 rate=0.2 \  
? dist=40.0 clobber=1 elow=400 ehigh=7200  
mos prefix 1: 1S001  
mos prefix 2: 2S002  
pn prefix 1: S003  
verb: 1  
scale: 0.4  
rate: 2e-15  
rates: 1e-14  
rateh: 1e-14  
dist: 40.0  
mlmin: 15  
clobber: 1  
Band 1: 400 7200  
attitude file already exists  
use the old file
```

nn: 1

prefix: 1S001

Soft event image already exists: mos1S001-obj-im.fits

Clobber the existing file

```
evselect table=mos1S001-clean.fits:EVENTS withfilteredset=yes  
expression='(PATTERN<=12)&&(FLAG == 0)&&(PI in [400:7200])' filtertype=expression  
imagebinning='imageSize' imagedatatype='Int32' imageset=mos1S001-obj-im.fits squarepixels=yes  
ignorelegallimits=yes withxranges=yes withyranges=yes xcolumn='X' ximagesize=900  
ximageymax=48400 ximageamin=3401 ycolumn='Y' yimagesize=900 yimageymax=48400 yimageamin=3401  
updateexposure=yes filterexposure=yes verbosity=1
```

```
evselect:- Executing (routine): evselect table=mos1S001-clean.fits:EVENTS filteredset=filtered.fits  
withfilteredset=yes keepfilteroutput=yes flagcolumn=EVFLAG flagbit=-1 destruct=yes dssblock=""  
expression='(PATTERN<=12)&&(FLAG == 0)&&(PI in [400:7200])' filtertype=expression cleandss=no  
updateexposure=yes filterexposure=yes writedss=yes blockscopy="" attributescopy=""  
energycolumn=PHA zcolumn=WEIGHT zerrorcolumn=EWEIGHT withzerrorcolumn=no  
withzcolumn=no ignorelegallimits=yes imageset=mos1S001-obj-im.fits xcolumn=X ycolumn=Y  
ximagebinsize=1 yimagebinsize=1 squarepixels=yes ximagesize=900 yimagesize=900  
imagebinning=imageSize ximageamin=3401 ximageymax=48400 withxranges=yes yimageamin=3401  
yimageymax=48400 withyranges=yes imagedatatype=Int32 withimagedatatype=yes raimagecenter=0  
decimagecenter=0 withcelestialcenter=no withimageset=yes spectrumset=spectrum.fits spectralbinsize=5  
specchannelmin=0 specchannelmax=11999 withspecranges=no withspectrumset=no rateset=rate.fits  
timecolumn=TIME timebinsize=1 timemin=0 timemax=1000 withtimeranges=no maketimecolumn=no  
makeratecolumn=no withrateset=no histogramset=histo.fits histogramcolumn=TIME histogrambinsize=1  
histogrammin=0 histogrammax=1000 withhistoranges=no withhistogramset=no -w 1 -V 1
```

nn: 2

prefix: 2S002

Soft event image already exists: mos2S002-obj-im.fits

Clobber the existing file

```
evselect table=mos2S002-clean.fits:EVENTS withfilteredset=yes  
expression='(PATTERN<=12)&&(FLAG == 0)&&(PI in [400:7200])' filtertype=expression  
imagebinning='imageSize' imagedatatype='Int32' imageset=mos2S002-obj-im.fits squarepixels=yes  
ignorelegallimits=yes withxranges=yes withyranges=yes xcolumn='X' ximagesize=900
```

```
ximageMAX=48400 ximageMIN=3401 ycolumn='Y' yimageSIZE=900 yimageMAX=48400 yimageMIN=3401  
updateEXPOSURE=yes filterEXPOSURE=yes VERBOSITY=1
```

```
evselect:- Executing (routine): evselect table=mos2S002-clean.fits:EVENTS filteredset=filtered.fits  
withfilteredset=yes keepfilteroutput=yes flagcolumn=EVFLAG flagbit=-1 destruct=yes dssblock=""  
expression='(PATTERN<=12)&&(FLAG == 0)&&(PI in [400:7200])' filtertype=expression cleandss=no  
updateexposure=yes filterexposure=yes writedss=yes blockstocopy=" attributestocopy="  
energycolumn=PHA zcolumn=WEIGHT zerrorcolumn=EWEIGHT withzerrorcolumn=no  
withzcolumn=no ignorelegallimits=yes imageset=mos2S002-obj-im.fits xcolumn=X ycolumn=Y  
ximagebinsize=1 yimagebinsize=1 squarepixels=yes ximagesize=900 yimagesize=900  
imagebinning=imageSize ximageMIN=3401 ximageMAX=48400 withxranges=yes yimageMIN=3401  
yimageMAX=48400 withyranges=yes imagedatatype=Int32 withimagedatatype=yes raimagecenter=0  
decimagecenter=0 withcelestialcenter=no withimageset=yes spectrumset=spectrum.fits spectralbinsize=5  
specchannelmin=0 specchannelmax=11999 withspecranges=no withspectrumset=no rateset=rate.fits  
timecolumn=TIME timebinsize=1 timemin=0 timemax=1000 withtimeranges=no maketimecolumn=no  
makeratecolumn=no withrateset=no histogramset=histo.fits histogramcolumn=TIME histogrambinsize=1  
histogrammin=0 histogrammax=1000 withhistoranges=no withhistogramset=no -w 1 -V 1
```

nnp: 1

prefixp: S003

PN soft image already exists: pnS003-obj-im.fits

Clobber the existing file

```
evselect table=pnS003-clean.fits:EVENTS withfilteredset=yes expression='(PATTERN<=12)&&(FLAG == 0)&&(PI in [400:7200])&&(DET Y in [-16510:14345])' filtertype=expression  
imagebinning='imageSize' imagedatatype='Int32' imageset=pnS003-obj-im.fits squarepixels=yes  
ignorelegallimits=yes withxranges=yes withyranges=yes xcolumn='X' ximagesize=900  
ximageMAX=48400 ximageMIN=3401 ycolumn='Y' yimageSIZE=900 yimageMAX=48400 yimageMIN=3401  
updateEXPOSURE=yes filterEXPOSURE=yes VERBOSITY=1
```

```
evselect:- Executing (routine): evselect table=pnS003-clean.fits:EVENTS filteredset=filtered.fits  
withfilteredset=yes keepfilteroutput=yes flagcolumn=EVFLAG flagbit=-1 destruct=yes dssblock=""  
expression='(PATTERN<=12)&&(FLAG == 0)&&(PI in [400:7200])&&(DET Y in [-16510:14345])'  
filtertype=expression cleandss=no updateEXPOSURE=yes filterEXPOSURE=yes writedss=yes blockstocopy="  
attributestocopy=" energycolumn=PHA zcolumn=WEIGHT zerrorcolumn=EWEIGHT  
withzerrorcolumn=no withzcolumn=no ignorelegallimits=yes imageset=pnS003-obj-im.fits xcolumn=X  
ycolumn=Y ximagebinsize=1 yimagebinsize=1 squarepixels=yes ximagesize=900 yimagesize=900  
imagebinning=imageSize ximageMIN=3401 ximageMAX=48400 withxranges=yes yimageMIN=3401  
yimageMAX=48400 withyranges=yes imagedatatype=Int32 withimagedatatype=yes raimagecenter=0  
decimagecenter=0 withcelestialcenter=no withimageset=yes spectrumset=spectrum.fits spectralbinsize=5  
specchannelmin=0 specchannelmax=11999 withspecranges=no withspectrumset=no rateset=rate.fits
```

```
timecolumn=TIME timebinsize=1 timemin=0 timemax=1000 withtimeranges=no maketimecolumn=no  
makeratecolumn=no withrateset=no histogramset=histo.fits histogramcolumn=TIME histogrambinsize=1  
histogrammin=0 histogrammax=1000 withhistoranges=no withhistogramset=no -w 1 -V 1
```

ML Source List Exists: emllist.fits

Clobber: Run edetect_chain

```
imlist: mos1S001-obj-im.fits mos2S002-obj-im.fits pnS003-obj-im.fits
```

```
evlist: mos1S001-clean.fits mos2S002-clean.fits pnS003-clean.fits
```

```
ootevtlist: pnS003-clean-oot.fits
```

```
eclist: 1.2 1.2 3.2
```

```
piminlist: 400 400 400
```

```
pimaxlist: 7200 7200 7200
```

```
edetect_chain imagesets='mos1S001-obj-im.fits mos2S002-obj-im.fits pnS003-obj-im.fits'  
eventsets='mos1S001-clean.fits mos2S002-clean.fits pnS003-clean.fits' attitudeset=atthk.fits pimin='400  
400 400' pimax='7200 7200 7200' witheexpmap=yes likemin=10 ecf='1.2 1.2 3.2' eboxl_likemin=15  
eboxm_likemin=15 ebox_withdetmask=yes ebox_withexpimage=yes esp_scut=0.01 esp_withootset=yes  
esp_ooteventset='pnS003-clean-oot.fits' esp_nsplinenodes=20 eml_ecut=15 eml_scut=15  
eml_withtwostage=yes eml_withthreshold=yes eml_threshold=15 esen_mlmin=10 eml_list=emllist.fits
```

```
eexpmap:- Executing (routine): eexpmap imageset=pnS003-obj-im.fits attitudeset=atthk.fits  
eventset=pnS003-clean.fits expimageset=pnS003-obj-imexp.fits withdetcards=no withvignetting=yes  
usefastpixelization=no usedlimap=no attrabin=4 pimin=400 pimax=7200 -w 1 -V 4
```

```
eexpmap:- eexpmap (eexpmap-4.11.2) [xmmsas_20170719_1539-16.1.0] started: 2020-03-  
23T22:55:50.000
```

```
eexpmap:- eexpmap (eexpmap-4.11.2) [xmmsas_20170719_1539-16.1.0] ended: 2020-03-  
23T22:55:55.000
```

```
emask:- Executing (routine): emask expimageset=pnS003-obj-imexp.fits detmaskset=pnS003-obj-  
immask.fits threshold1=0.3 threshold2=0.5 regionset=region.fits withregionset=no -w 1 -V 4
```

```
emask:- emask (emask-2.14) [xmmsas_20170719_1539-16.1.0] started: 2020-03-23T22:55:55.000
```

```
emask:- emask (emask-2.14) [xmmsas_20170719_1539-16.1.0] ended: 2020-03-23T22:55:55.000
```

```
eexpmap:- Executing (routine): eexpmap imageset=mos1S001-obj-im.fits attitudeset=atthk.fits  
eventset=mos1S001-clean.fits expimageset=mos1S001-obj-imexp.fits withdetcards=no  
withvignetting=yes usefastpixelization=no usedlimap=no attrabin=4 pimin=400 pimax=7200 -w 1 -V 4
```

```
eexpmap:- eexpmap (eexpmap-4.11.2) [xmmsas_20170719_1539-16.1.0] started: 2020-03-  
23T22:55:56.000  
** eexpmap: warning (NoExpoExt), Exposure extension not found  
eexpmap:- CCF constituents accessed by the calibration server:  
CifEntry{EMOS1, LINCOORD, 18, /XMMShared/cls7i/Software/ccf/EMOS1_LINCOORD_0018.CCF,  
1998-01-01T00:00:00.000}  
CifEntry{EPN, LINCOORD, 9, /XMMShared/cls7i/Software/ccf/EPN_LINCOORD_0009.CCF, 1998-  
01-01T00:00:00.000}  
CifEntry{RGS1, LINCOORD, 8, /XMMShared/cls7i/Software/ccf/RGS1_LINCOORD_0008.CCF,  
1998-01-01T00:00:00.000}  
CifEntry{XMM, BORESIGHT, 27, /XMMShared/cls7i/Software/ccf/XMM_BORESIGHT_0027.CCF,  
2000-01-01T00:00:00.000}  
CifEntry{XMM, MISCDATA, 22, /XMMShared/cls7i/Software/ccf/XMM_MISCDATA_0022.CCF,  
1999-01-01T00:00:00.000}  
CifEntry{XRT1, XAREAEF, 9, /XMMShared/cls7i/Software/ccf/XRT1_XAREAEF_0009.CCF, 2000-  
01-13T00:00:00.000}
```

```
eexpmap:- eexpmap (eexpmap-4.11.2) [xmmsas_20170719_1539-16.1.0] ended: 2020-03-  
23T22:56:44.000  
** eexpmap: warning (SummaryOfWarnings),  
warning NoExpoExt silently occurred 1 times  
emask:- Executing (routine): emask expimageset=mos1S001-obj-imexp.fits detmaskset=mos1S001-obj-  
immask.fits threshold1=0.3 threshold2=0.5 regionset=region.fits withregionset=no -w 1 -V 4  
emask:- emask (emask-2.14) [xmmsas_20170719_1539-16.1.0] started: 2020-03-23T22:56:44.000  
emask:- emask (emask-2.14) [xmmsas_20170719_1539-16.1.0] ended: 2020-03-23T22:56:44.000  
eexpmap:- Executing (routine): eexpmap imageset=mos2S002-obj-im.fits attitudeset=atthk.fits  
eventset=mos2S002-clean.fits expimageset=mos2S002-obj-imexp.fits withdetcards=no  
withvignetting=yes usefastpixelization=no usedlimap=no attrebin=4 pimin=400 pimax=7200 -w 1 -V 4  
eexpmap:- eexpmap (eexpmap-4.11.2) [xmmsas_20170719_1539-16.1.0] started: 2020-03-  
23T22:56:44.000  
eexpmap:- CCF constituents accessed by the calibration server:  
CifEntry{EMOS2, LINCOORD, 18, /XMMShared/cls7i/Software/ccf/EMOS2_LINCOORD_0018.CCF,  
1998-01-01T00:00:00.000}
```

CifEntry{EPN, LINCOORD, 9, /XMMShared/cls7i/Software/ccf/EPN_LINCOORD_0009.CCF, 1998-01-01T00:00:00.000}

CifEntry{RGS2, LINCOORD, 8, /XMMShared/cls7i/Software/ccf/RGS2_LINCOORD_0008.CCF, 1998-01-01T00:00:00.000}

CifEntry{XMM, BORESIGHT, 27, /XMMShared/cls7i/Software/ccf/XMM_BORESIGHT_0027.CCF, 2000-01-01T00:00:00.000}

CifEntry{XMM, MISCDATA, 22, /XMMShared/cls7i/Software/ccf/XMM_MISCDATA_0022.CCF, 1999-01-01T00:00:00.000}

CifEntry{XRT2, XAREAEF, 10, /XMMShared/cls7i/Software/ccf/XRT2_XAREAEF_0010.CCF, 2000-01-13T00:00:00.000}

eexpmap:- eexpmap (eexpmap-4.11.2) [xmmsas_20170719_1539-16.1.0] ended: 2020-03-23T22:58:00.000

emask:- Executing (routine): emask expimageset=mos2S002-obj-imexp.fits detmaskset=mos2S002-obj-immask.fits threshold1=0.3 threshold2=0.5 regionset=region.fits withregionset=no -w 1 -V 4

emask:- emask (emask-2.14) [xmmsas_20170719_1539-16.1.0] started: 2020-03-23T22:58:00.000

emask:- emask (emask-2.14) [xmmsas_20170719_1539-16.1.0] ended: 2020-03-23T22:58:00.000

eboxdetect:- Executing (routine): eboxdetect bkgimagesets=bgimage.fits usemap=no usematchedfilter=no detmasksets='pnS003-obj-immask.fits mos1S001-obj-immask.fits mos2S002-obj-immask.fits' withdetectmask=yes expimagesets='pnS003-obj-imexp.fits mos1S001-obj-imexp.fits mos2S002-obj-imexp.fits' withexpimage=yes nruns=3 likemin=15 boxsize=5 withimagebuffersize=no imagebuffersize=640 ecf='3.2 1.2 1.2' imagesets='pnS003-obj-im.fits mos1S001-obj-im.fits mos2S002-obj-im.fits' boxlistset=eboxlist_1.fits withoffsets=no mergedlistset=mergedlist.fits hrdef='1 2 2 3 3 4' pimin='400 400 400' pimax='7200 7200 7200' obsmode=pointing -w 1 -V 4

eboxdetect:- eboxdetect (eboxdetect-4.27.4) [xmmsas_20170719_1539-16.1.0] started: 2020-03-23T22:58:00.000

eboxdetect:- eboxdetect (eboxdetect-4.27.4) [xmmsas_20170719_1539-16.1.0] ended: 2020-03-23T22:58:06.000

esplinemap:- Executing (routine): esplinemap scut=0.01 mlmin=1 nsplinenodes=20 excesssigma=4 nfitrun=3 idband=1 boxlistset=eboxlist_1.fits imageset=pnS003-obj-im.fits expimageset=pnS003-obj-imexp.fits withexpimage=yes expimageset2=pnS003-obj-imexpnovig.fits withexpimage2=no detmaskset=pnS003-obj-immask.fits withdetectmask=yes bkgimageset=pnS003-obj-imbkg.fits cheeseimageset=pnS003-obj-imcheese.fits withcheese=no cheesemaskset=cheesemask.fits withcheesemask=no ooteventset=pnS003-clean-oot.fits withoutset=yes pimin=400 pimax=7200 fitmethod=spline snrmin=30 smoothsigma=15 -w 1 -V 4

esplinemap:- esplinemap (esplinemap-5.0.2) [xmmsas_20170719_1539-16.1.0] started: 2020-03-23T22:58:06.000

esplinemap:- esplinemap (esplinemap-5.0.2) [xmmsas_20170719_1539-16.1.0] ended: 2020-03-23T22:58:16.000

esplinemap:- Executing (routine): esplinemap scut=0.01 mlmin=1 nsplinenodes=20 excesssigma=4 nfitrun=3 idband=1 boxlistset=eboxlist_1.fits imageset=mos1S001-obj-im.fits expimageset=mos1S001-obj-imexp.fits withexpimage=yes expimageset2=mos1S001-obj-imexpnovig.fits withexpimage2=no detmaskset=mos1S001-obj-immask.fits withdetmask=yes bkgimageset=mos1S001-obj-imbkg.fits cheeseimageset=mos1S001-obj-imcheese.fits withcheese=no cheesemaskset=cheesemask.fits withcheesemask=no ooteventset=ooevents.fits withoutset=no pimin=400 pimax=7200 fitmethod=spline snrmin=30 smoothsigma=15 -w 1 -V 4

esplinemap:- esplinemap (esplinemap-5.0.2) [xmmsas_20170719_1539-16.1.0] started: 2020-03-23T22:58:16.000

esplinemap:- esplinemap (esplinemap-5.0.2) [xmmsas_20170719_1539-16.1.0] ended: 2020-03-23T22:58:17.000

esplinemap:- Executing (routine): esplinemap scut=0.01 mlmin=1 nsplinenodes=20 excesssigma=4 nfitrun=3 idband=1 boxlistset=eboxlist_1.fits imageset=mos2S002-obj-im.fits expimageset=mos2S002-obj-imexp.fits withexpimage=yes expimageset2=mos2S002-obj-imexpnovig.fits withexpimage2=no detmaskset=mos2S002-obj-immask.fits withdetmask=yes bkgimageset=mos2S002-obj-imbkg.fits cheeseimageset=mos2S002-obj-imcheese.fits withcheese=no cheesemaskset=cheesemask.fits withcheesemask=no ooteventset=ooevents.fits withoutset=no pimin=400 pimax=7200 fitmethod=spline snrmin=30 smoothsigma=15 -w 1 -V 4

esplinemap:- esplinemap (esplinemap-5.0.2) [xmmsas_20170719_1539-16.1.0] started: 2020-03-23T22:58:17.000

esplinemap:- esplinemap (esplinemap-5.0.2) [xmmsas_20170719_1539-16.1.0] ended: 2020-03-23T22:58:18.000

eboxdetect:- Executing (routine): eboxdetect bkgimagesets='pnS003-obj-imbkg.fits mos1S001-obj-imbkg.fits mos2S002-obj-imbkg.fits' usemap=yes usematchedfilter=no detmasksets='pnS003-obj-immask.fits mos1S001-obj-immask.fits mos2S002-obj-immask.fits' withdetmask=yes expimagesets='pnS003-obj-imexp.fits mos1S001-obj-imexp.fits mos2S002-obj-imexp.fits' withexpimage=yes nruns=3 likemin=15 boxsize=5 withimagebuffersize=no imagebuffersize=640 ecf='3.2 1.2 1.2' imagesets='pnS003-obj-im.fits mos1S001-obj-im.fits mos2S002-obj-im.fits' boxlistset=eboxlist_m.fits withoffsets=no mergedlistset=mergedlist.fits hrdef='1 2 2 3 3 4' pimin='400 400 400' pimax='7200 7200 7200' obsmode=pointing -w 1 -V 4

eboxdetect:- eboxdetect (eboxdetect-4.27.4) [xmmsas_20170719_1539-16.1.0] started: 2020-03-23T22:58:18.000

eboxdetect:- eboxdetect (eboxdetect-4.27.4) [xmmsas_20170719_1539-16.1.0] ended: 2020-03-23T22:58:21.000

emldetect:- Executing (routine): emldetect boxlistset=eboxlist_m.fits mllistset=emllist.fits mlmin=10 determineerrors=yes fitposition=yes psfmodel=ellbeta nmaxfit=1 nmulsou=1 ecut=15 scut=15 fitextent=yes extentmodel=beta dmlextmin=6 minextent=1.5 maxextent=20 withthreshold=yes threshold=15 threshcolumn=LIKE withtwostage=yes withimagebuffersize=no imagebuffersize=640 withxidband=no xidfixed=no pimin='400 400 400' pimax='7200 7200 7200' hrpndef='1 2 2 3 3 4 4 5'

```
xidpndef='2 3 4' hrm1def='1 2 2 3 3 4 4 5' xidm1def='2 3 4' hrm2def='1 2 2 3 3 4 4 5' xidm2def='2 3 4'  
ecf='3.2 1.2 1.2' xidecf=1 fitcounts=yes fitnegative=no mergedlistset=mergedlist.fits useevents=no  
usecalpsf=yes withhotpixelfilter=no withoffsets=no withdrawrows=no imagesets='pnS003-obj-im.fits  
mos1S001-obj-im.fits mos2S002-obj-im.fits' bkgimagesets='pnS003-obj-imbkg.fits mos1S001-obj-  
imbkg.fits mos2S002-obj-imbkg.fits' detmasksets='pnS003-obj-immask.fits mos1S001-obj-immask.fits  
mos2S002-obj-immask.fits' withdetmask=yes expimagesets='pnS003-obj-imexp.fits mos1S001-obj-  
imexp.fits mos2S002-obj-imexp.fits' withexpimage=yes sourceimagesets='pnS003-obj-imsmap.fits  
mos1S001-obj-imsmap.fits mos2S002-obj-imsmap.fits' withsourcemap=yes -w 1 -V 4
```

emldetect:- emldetect (emldetect-7.1) [xmmsas_20170719_1539-16.1.0] started: 2020-03-
23T22:58:21.000

emldetect:- CCF constituents accessed by the calibration server:

CifEntry{EMOS1, LINCOORD, 18, /XMMShared/cls7i/Software/ccf/EMOS1_LINCOORD_0018.CCF,
1998-01-01T00:00:00.000}

CifEntry{EMOS2, LINCOORD, 18, /XMMShared/cls7i/Software/ccf/EMOS2_LINCOORD_0018.CCF,
1998-01-01T00:00:00.000}

CifEntry{EPN, LINCOORD, 9, /XMMShared/cls7i/Software/ccf/EPN_LINCOORD_0009.CCF, 1998-
01-01T00:00:00.000}

CifEntry{RGS1, LINCOORD, 8, /XMMShared/cls7i/Software/ccf/RGS1_LINCOORD_0008.CCF,
1998-01-01T00:00:00.000}

CifEntry{XMM, BORESIGHT, 27, /XMMShared/cls7i/Software/ccf/XMM_BORESIGHT_0027.CCF,
2000-01-01T00:00:00.000}

CifEntry{XMM, MISCDATA, 22, /XMMShared/cls7i/Software/ccf/XMM_MISCDATA_0022.CCF,
1999-01-01T00:00:00.000}

CifEntry{XRT1, XAREAEF, 9, /XMMShared/cls7i/Software/ccf/XRT1_XAREAEF_0009.CCF, 2000-
01-13T00:00:00.000}

CifEntry{XRT1, XPSF, 14, /XMMShared/cls7i/Software/ccf/XRT1_XPSF_0014.CCF, 2000-01-
13T00:00:00.000}

CifEntry{XRT2, XPSF, 14, /XMMShared/cls7i/Software/ccf/XRT2_XPSF_0014.CCF, 2000-01-
13T00:00:00.000}

CifEntry{XRT3, XAREAEF, 12, /XMMShared/cls7i/Software/ccf/XRT3_XAREAEF_0012.CCF, 2000-
01-13T00:00:00.000}

CifEntry{XRT3, XPSF, 17, /XMMShared/cls7i/Software/ccf/XRT3_XPSF_0017.CCF, 2000-01-
13T00:00:00.000}

emldetect:- CCF constituents accessed by the calibration server:

CifEntry{EMOS1, LINCOORD, 18, /XMMShared/cls7i/Software/ccf/EMOS1_LINCOORD_0018.CCF, 1998-01-01T00:00:00.000}

CifEntry{EMOS2, LINCOORD, 18, /XMMShared/cls7i/Software/ccf/EMOS2_LINCOORD_0018.CCF, 1998-01-01T00:00:00.000}

CifEntry{EPN, LINCOORD, 9, /XMMShared/cls7i/Software/ccf/EPN_LINCOORD_0009.CCF, 1998-01-01T00:00:00.000}

CifEntry{RGS1, LINCOORD, 8, /XMMShared/cls7i/Software/ccf/RGS1_LINCOORD_0008.CCF, 1998-01-01T00:00:00.000}

CifEntry{RGS1, LINESPREADFUNC, 5, /XMMShared/cls7i/Software/ccf/RGS1_LINESPREADFUNC_0005.CCF, 1999-01-01T00:00:00.000}

CifEntry{RGS1, QUANTUMEF, 15, /XMMShared/cls7i/Software/ccf/RGS1_QUANTUMEF_0015.CCF, 1998-01-01T00:00:00.000}

CifEntry{RGS2, LINCOORD, 8, /XMMShared/cls7i/Software/ccf/RGS2_LINCOORD_0008.CCF, 1998-01-01T00:00:00.000}

CifEntry{XMM, BORESIGHT, 27, /XMMShared/cls7i/Software/ccf/XMM_BORESIGHT_0027.CCF, 2000-01-01T00:00:00.000}

CifEntry{XMM, MISCDATA, 22, /XMMShared/cls7i/Software/ccf/XMM_MISCDATA_0022.CCF, 1999-01-01T00:00:00.000}

CifEntry{XRT1, XAREAEF, 9, /XMMShared/cls7i/Software/ccf/XRT1_XAREAEF_0009.CCF, 2000-01-13T00:00:00.000}

CifEntry{XRT1, XPSF, 14, /XMMShared/cls7i/Software/ccf/XRT1_XPSF_0014.CCF, 2000-01-13T00:00:00.000}

CifEntry{XRT2, XAREAEF, 10, /XMMShared/cls7i/Software/ccf/XRT2_XAREAEF_0010.CCF, 2000-01-13T00:00:00.000}

CifEntry{XRT2, XPSF, 14, /XMMShared/cls7i/Software/ccf/XRT2_XPSF_0014.CCF, 2000-01-13T00:00:00.000}

CifEntry{XRT3, XAREAEF, 12, /XMMShared/cls7i/Software/ccf/XRT3_XAREAEF_0012.CCF, 2000-01-13T00:00:00.000}

CifEntry{XRT3, XPSF, 17, /XMMShared/cls7i/Software/ccf/XRT3_XPSF_0017.CCF, 2000-01-13T00:00:00.000}

emldetect:- emldetect (emldetect-7.1) [xmmsas_20170719_1539-16.1.0] ended: 2020-03-23T23:08:25.000

esensmap:- Executing (routine): esensmap detmasksets=pnS003-obj-immask.fits expimagesets=pnS003-obj-imexp.fits bkgimagesets=pnS003-obj-imbkg.fits sensimageset=pnS003-obj-imsen.fits mlmin=10 -w 1 -V 4

esensmap:- esensmap (esensmap-3.12.2) [xmmsas_20170719_1539-16.1.0] started: 2020-03-23T23:08:25.000

esensmap:- Opening file pnS003-obj-immask.fits

esensmap:- esensmap (esensmap-3.12.2) [xmmsas_20170719_1539-16.1.0] ended: 2020-03-23T23:08:26.000

esensmap:- Executing (routine): esensmap detmasksets=mos1S001-obj-immask.fits expimagesets=mos1S001-obj-imexp.fits bkgimagesets=mos1S001-obj-imbkg.fits sensimageset=mos1S001-obj-imsen.fits mlmin=10 -w 1 -V 4

esensmap:- esensmap (esensmap-3.12.2) [xmmsas_20170719_1539-16.1.0] started: 2020-03-23T23:08:26.000

esensmap:- Opening file mos1S001-obj-immask.fits

esensmap:- esensmap (esensmap-3.12.2) [xmmsas_20170719_1539-16.1.0] ended: 2020-03-23T23:08:27.000

esensmap:- Executing (routine): esensmap detmasksets=mos2S002-obj-immask.fits expimagesets=mos2S002-obj-imexp.fits bkgimagesets=mos2S002-obj-imbkg.fits sensimageset=mos2S002-obj-imsen.fits mlmin=10 -w 1 -V 4

esensmap:- esensmap (esensmap-3.12.2) [xmmsas_20170719_1539-16.1.0] started: 2020-03-23T23:08:27.000

esensmap:- Opening file mos2S002-obj-immask.fits

esensmap:- esensmap (esensmap-3.12.2) [xmmsas_20170719_1539-16.1.0] ended: 2020-03-23T23:08:27.000

Total band mask already exists: mos1S001-mask-im.fits

Clobber the existing file

emask detmaskset=mos1S001-mask-im.fits expimageset=mos1S001-obj-imexp.fits threshold1=0.1 threshold2=0.5 verbosity=1

```
emask:- Executing (routine): emask expimageset=mos1S001-obj-imexp.fits detmaskset=mos1S001-
mask-im.fits threshold1=0.1 threshold2=0.5 regionset=region.fits withregionset=no -w 1 -V 1
```

Total band mask already exists: mos2S002-mask-im.fits

Clobber the existing file

```
emask detmaskset=mos2S002-mask-im.fits expimageset=mos2S002-obj-imexp.fits threshold1=0.1
threshold2=0.5 verbosity=1
```

```
emask:- Executing (routine): emask expimageset=mos2S002-obj-imexp.fits detmaskset=mos2S002-
mask-im.fits threshold1=0.1 threshold2=0.5 regionset=region.fits withregionset=no -w 1 -V 1
```

PN soft mask already exists: pnS003-mask-im.fits

Clobber the existing file

```
emask detmaskset=pnS003-mask-im.fits expimageset=pnS003-obj-imexp.fits threshold1=0.1
threshold2=0.5 verbosity=1
```

```
emask:- Executing (routine): emask expimageset=pnS003-obj-imexp.fits detmaskset=pnS003-mask-
im.fits threshold1=0.1 threshold2=0.5 regionset=region.fits withregionset=no -w 1 -V 1
```

```
region eventset=mos1S001-clean.fits operationstyle=global srclisttab=emllist.fits:SRCLIST
expression='(FLUX >= 2e-15)&&(DET_ML >= 15)&&(DIST_NN >= 40.0)&&(ID_BAND == 0)'
bkgregionset=mos1S001-bkg_region-det.fits energyfraction=0.4 radiusstyle=enfrac outunit=detxy
verbosity=1
```

```
region:- Executing (routine): region eventset=mos1S001-clean.fits tempset=tempset.ds usersrcid=1
srcidcol=dummy_default operationstyle=global srclisttab=emllist.fits:SRCLIST expression='(FLUX >=
2e-15)&&(DET_ML >= 15)&&(DIST_NN >= 40.0)&&(ID_BAND == 0)' regionset=src_region.ds
bkgregionset=mos1S001-bkg_region-det.fits shrinkconfused=yes fixedradius=12 energyfraction=0.4
bkgratecol=BG_MAP bkgratekwdset=kwd_set.ds bkgrateimgset=bkg_rate_img.ds bkgrateuser=1
bkgratestyle=col bkgfraction=1 nosrcellipse=no radiusstyle=enfrac fovbkgannulus=no nobkgellipse=no
outunit=detxy withboresightfudge=yes -w 1 -V 1
```

```
region eventset=mos1S001-clean.fits operationstyle=global srclisttab=emllist.fits:SRCLIST  
expression='(DIST_NN >= 40.0)&&(DET_ML >= 15)&&(FLUX >= 2e-15)&&(ID_BAND == 0)'  
bkgregionset=mos1S001-bkg_region-sky.fits radiusstyle=enfrac bkgratestyle=col nosrcellipse=yes  
energyfraction=0.4 outunit=xy verbosity=1
```

```
region:- Executing (routine): region eventset=mos1S001-clean.fits tempset=tempset.ds usersrcid=1  
srcidcol=dummy_default operationstyle=global srclisttab=emllist.fits:SRCLIST expression='(DIST_NN  
>= 40.0)&&(DET_ML >= 15)&&(FLUX >= 2e-15)&&(ID_BAND == 0)' regionset=src_region.ds  
bkgregionset=mos1S001-bkg_region-sky.fits shrinkconfused=yes fixedradius=12 energyfraction=0.4  
bkgratecol=BG_MAP bkgratekwdset=kwd_set.ds bkgrateimgset=bkg_rate_img.ds bkgrateuser=1  
bkgratestyle=col bkgfraction=1 nosrcellipse=yes radiusstyle=enfrac fovbkgannulus=no nobkgellipse=no  
outunit=xy withboresightfudge=yes -w 1 -V 1
```

```
make_mask inimage=mos1S001-obj-im.fits inmask=mos1S001-mask-im.fits outmask=mos1S001-  
cheese.fits reglist=mos1S001-bkg_region-sky.fits
```

```
make_mask:- Executing (routine): make_mask inimage=mos1S001-obj-im.fits inmask=mos1S001-mask-  
im.fits outmask=mos1S001-cheese.fits reglist=mos1S001-bkg_region-sky.fits clobber=yes -w 1 -V 4
```

```
make_mask:- make_mask (esas-0.9.40) [xmmsas_20170719_1539-16.1.0] started: 2020-03-  
23T23:08:29.000
```

Event Image: mos1S001-obj-im.fits

Input Mask: mos1S001-mask-im.fits

Output Cheese Image: mos1S001-cheese.fits

Region File: mos1S001-bkg_region-sky.fits

Input Image: mos1S001-obj-im.fits

Input Mask: mos1S001-mask-im.fits

Template File

mos1S001-mask-im.fits

Template image coordinate system: -TAN

Template image coordinate ID: RA---TAN DEC---TAN

Template image central coordinates: 120.2604583333301 36.04633333333301

Template image reference pixel: 450.91000000000003 450.91000000000003

Template image pixel sizes: -6.944444444444501E-004 6.944444444444501E-004

Template image NAXES, NAXIS: 2 900 900

mos1S001-bkg_region-sky.fits

Number of excluded sources: 24

File exists with output file name

mos1S001-cheese.fits

Clobber the file and continue

Output image coordinate system: -TAN

Output image coordinate ID: RA---TAN DEC---TAN

Output image central coordinates: 120.26045833333301 36.04633333333301

Output image reference pixel: 450.91000000000003 450.91000000000003

Output image pixel sizes: -6.944444444444501E-004 6.944444444444501E-004

Output image NAXES, NAXIS: 2 900 900

make_mask:- make_mask (esas-0.9.40) [xmmsas_20170719_1539-16.1.0] ended: 2020-03-23T23:08:29.000

region eventset=mos2S002-clean.fits operationstyle=global srclisttab=emllist.fits:SRCLIST
expression='(FLUX >= 2e-15)&&(DET_ML >= 15)&&(DIST_NN >= 40.0)&&(ID_BAND == 0)'
bkgregionset=mos2S002-bkg_region-det.fits energyfraction=0.4 radiusstyle=enfrac outunit=detxy
verbosity=1

region:- Executing (routine): region eventset=mos2S002-clean.fits tempset=tempset.ds usersrcid=1
srcidcol=dummy_default operationstyle=global srclisttab=emllist.fits:SRCLIST expression='(FLUX >= 2e-15)&&(DET_ML >= 15)&&(DIST_NN >= 40.0)&&(ID_BAND == 0)' regionset=src_region.ds
bkgregionset=mos2S002-bkg_region-det.fits shrinkconfused=yes fixedradius=12 energyfraction=0.4
bkgratecol=BG_MAP bkgratekwdset=kwd_set.ds bkgrateimgset=bkg_rate_img.ds bkgrateuser=1
bkgratestyle=col bkgfraction=1 nosrcellipse=no radiusstyle=enfrac fovbkgannulus=no nobkgellipse=no
outunit=detxy withboresightfudge=yes -w 1 -V 1

region eventset=mos2S002-clean.fits operationstyle=global srclisttab=emllist.fits:SRCLIST
expression='(DIST_NN >= 40.0)&&(DET_ML >= 15)&&(FLUX >= 2e-15)&&(ID_BAND == 0)'
bkgregionset=mos2S002-bkg_region-sky.fits radiusstyle=enfrac bkgratestyle=col nosrcellipse=yes
energyfraction=0.4 outunit=xy verbosity=1

region:- Executing (routine): region eventset=mos2S002-clean.fits tempset=tempset.ds usersrcid=1
srcidcol=dummy_default operationstyle=global srclisttab=emllist.fits:SRCLIST expression='(DIST_NN >= 40.0)&&(DET_ML >= 15)&&(FLUX >= 2e-15)&&(ID_BAND == 0)' regionset=src_region.ds
bkgregionset=mos2S002-bkg_region-sky.fits shrinkconfused=yes fixedradius=12 energyfraction=0.4

```
bkgratecol=BG_MAP bkgratekwdset=kwd_set.ds bkgrateimgset=bkg_rate_img.ds bkgrateuser=1  
bkgratestyle=col bkgfraction=1 nosrcellipse=yes radiusstyle=enfrac fovbkgannulus=no nobkgellipse=no  
outunit=xy withboresightfudge=yes -w 1 -V 1
```

```
make_mask inimage=mos2S002-obj-im.fits inmask=mos2S002-mask-im.fits outmask=mos2S002-  
cheese.fits reglist=mos2S002-bkg_region-sky.fits
```

```
make_mask:- Executing (routine): make_mask inimage=mos2S002-obj-im.fits inmask=mos2S002-mask-  
im.fits outmask=mos2S002-cheese.fits reglist=mos2S002-bkg_region-sky.fits clobber=yes -w 1 -V 4
```

```
make_mask:- make_mask (esas-0.9.40) [xmmsas_20170719_1539-16.1.0] started: 2020-03-  
23T23:08:30.000
```

Event Image: mos2S002-obj-im.fits

Input Mask: mos2S002-mask-im.fits

Output Cheese Image: mos2S002-cheese.fits

Region File: mos2S002-bkg_region-sky.fits

Input Image: mos2S002-obj-im.fits

Input Mask: mos2S002-mask-im.fits

Template File

mos2S002-mask-im.fits

Template image coordinate system: -TAN

Template image coordinate ID: RA---TAN DEC--TAN

Template image central coordinates: 120.2604583333301 36.04633333333301

Template image reference pixel: 450.91000000000003 450.91000000000003

Template image pixel sizes: -6.94444444444501E-004 6.94444444444501E-004

Template image NAXES, NAXIS: 2 900 900

mos2S002-bkg_region-sky.fits

Number of excluded sources: 24

File exists with output file name

mos2S002-cheese.fits

Clobber the file and continue

Output image coordinate system: -TAN

Output image coordinate ID: RA---TAN DEC--TAN

Output image central coordinates: 120.2604583333301 36.04633333333301

Output image reference pixel: 450.91000000000003 450.91000000000003

Output image pixel sizes: -6.944444444444501E-004 6.944444444444501E-004

Output image NAXES, NAXIS: 2 900 900

make_mask:- make_mask (esas-0.9.40) [xmmsas_20170719_1539-16.1.0] ended: 2020-03-23T23:08:30.000

```
region eventset=pnS003-clean.fits operationstyle=global srclisttab=emllist.fits:SRCLIST
expression='(DIST_NN >= 40.0)&&(DET_ML >= 15)&&(FLUX >= 2e-15)&&(ID_BAND == 0)'
bkgregionset=pnS003-bkg_region-det.fits energyfraction=0.4 radiusstyle=enfrac outunit=detxy
verbosity=1
```

```
region:- Executing (routine): region eventset=pnS003-clean.fits tempset=tempset.ds usersrcid=1
srcidcol=dummy_default operationstyle=global srclisttab=emllist.fits:SRCLIST expression='(DIST_NN
>= 40.0)&&(DET_ML >= 15)&&(FLUX >= 2e-15)&&(ID_BAND == 0)' regionset=src_region.ds
bkgregionset=pnS003-bkg_region-det.fits shrinkconfused=yes fixedradius=12 energyfraction=0.4
bkgratecol=BG_MAP bkgratekwdset=kwd_set.ds bkgrateimgset=bkg_rate_img.ds bkgrateuser=1
bkgratestyle=col bkgfraction=1 nosrcellipse=no radiusstyle=enfrac fovbkgannulus=no nobkgellipse=no
outunit=detxy withboresightfudge=yes -w 1 -V 1
```

```
region eventset=pnS003-clean.fits operationstyle=global srclisttab=emllist.fits:SRCLIST
expression='(DIST_NN >= 40.0)&&(DET_ML >= 15)&&(FLUX >= 2e-15)&&(ID_BAND == 0)'
bkgregionset=pnS003-bkg_region-sky.fits radiusstyle=enfrac bkgratestyle=col nosrcellipse=yes
energyfraction=0.4 outunit=xy verbosity=1
```

```
region:- Executing (routine): region eventset=pnS003-clean.fits tempset=tempset.ds usersrcid=1
srcidcol=dummy_default operationstyle=global srclisttab=emllist.fits:SRCLIST expression='(DIST_NN
>= 40.0)&&(DET_ML >= 15)&&(FLUX >= 2e-15)&&(ID_BAND == 0)' regionset=src_region.ds
bkgregionset=pnS003-bkg_region-sky.fits shrinkconfused=yes fixedradius=12 energyfraction=0.4
bkgratecol=BG_MAP bkgratekwdset=kwd_set.ds bkgrateimgset=bkg_rate_img.ds bkgrateuser=1
bkgratestyle=col bkgfraction=1 nosrcellipse=yes radiusstyle=enfrac fovbkgannulus=no nobkgellipse=no
outunit=xy withboresightfudge=yes -w 1 -V 1
```

make_mask inimage=pnS003-obj-im.fits inmask=pnS003-mask-im.fits outmask=pnS003-cheese.fits
reglist=pnS003-bkg_region-sky.fits

make_mask:- Executing (routine): make_mask inimage=pnS003-obj-im.fits inmask=pnS003-mask-im.fits
outmask=pnS003-cheese.fits reglist=pnS003-bkg_region-sky.fits clobber=yes -w 1 -V 4

make_mask:- make_mask (esas-0.9.40) [xmmsas_20170719_1539-16.1.0] started: 2020-03-23T23:08:31.000

Event Image: pnS003-obj-im.fits

Input Mask: pnS003-mask-im.fits

Output Cheese Image: pnS003-cheese.fits

Region File: pnS003-bkg_region-sky.fits

Input Image: pnS003-obj-im.fits

Input Mask: pnS003-mask-im.fits

Template File

pnS003-mask-im.fits

Template image coordinate system: -TAN

Template image coordinate ID: RA---TAN DEC--TAN

Template image central coordinates: 120.26045833333301 36.04633333333301

Template image reference pixel: 450.91000000000003 450.91000000000003

Template image pixel sizes: -6.944444444444501E-004 6.944444444444501E-004

Template image NAXES, NAXIS: 2 900 900

pnS003-bkg_region-sky.fits

Number of excluded sources: 24

File exists with output file name

pnS003-cheese.fits

Clobber the file and continue

Output image coordinate system: -TAN

Output image coordinate ID: RA---TAN DEC--TAN

Output image central coordinates: 120.26045833333301 36.04633333333301

Output image reference pixel: 450.91000000000003 450.91000000000003

Output image pixel sizes: -6.944444444444501E-004 6.944444444444501E-004

Output image NAXES, NAXIS: 2 900 900

make_mask:- make_mask (esas-0.9.40) [xmmsas_20170719_1539-16.1.0] ended: 2020-03-23T23:08:31.000

759.246u 3.624s 12:47.24 99.4% 0+0k 281096+255104io 133pf+0w

```
[htb3hg@xmm analysis]$  
[htb3hg@xmm analysis]$  
[htb3hg@xmm analysis]$  
[htb3hg@xmm analysis]$  
[htb3hg@xmm analysis]$ ds9 mos1S001-obj-image-sky.fits mos1S001-cheese.fits & [1] 29205  
[htb3hg@xmm analysis]$  
[1] Done /XMMShared/Software/ciao-4.10/ots/bin/ds9 mos1S001-obj-image-sky.fits  
mos1S001-cheese.fits  
95.585u 9.612s 45:43.25 3.8% 0+0k 34400+24io 114pf+0w  
[htb3hg@xmm analysis]$ ds9 mos1S001-obj-image-sky.fits mos1S001-cheese.fits &  
[1] 6496  
[htb3hg@xmm analysis]$  
[1] Done /XMMShared/Software/ciao-4.10/ots/bin/ds9 mos1S001-obj-image-sky.fits  
mos1S001-cheese.fits  
[htb3hg@xmm analysis]$ ds9 mos2S002-obj-image-sky.fits mos2S002-cheese.fits &  
[1] 7698  
[htb3hg@xmm analysis]$  
[1] Done /XMMShared/Software/ciao-4.10/ots/bin/ds9 mos2S002-obj-image-sky.fits  
mos2S002-cheese.fits  
66.009u 6.080s 18:34.77 6.4% 0+0k 6456+48io 0pf+0w  
[htb3hg@xmm analysis]$ ds9 pn3S003-obj-image-sky.fits pn3S003-cheese.fits &  
[1] 11700  
[htb3hg@xmm analysis]$  
[1] Done /XMMShared/Software/ciao-4.10/ots/bin/ds9 pn3S003-obj-image-sky.fits  
pn3S003-cheese.fits  
[htb3hg@xmm analysis]$ ds9 pnS003-obj-image-sky.fits pnS003-cheese.fits &  
[1] 11800  
[htb3hg@xmm analysis]$  
[1] Done /XMMShared/Software/ciao-4.10/ots/bin/ds9 pnS003-obj-image-sky.fits  
pnS003-cheese.fits  
13.858u 1.454s 5:03.52 5.0% 0+0k 6504+0io 0pf+0w  
[htb3hg@xmm analysis]$ ds9 mos2S002-obj-image-sky.fits mos2S002-cheese.fits &
```

```
[1] 12882

[htb3hg@xmm analysis]$ 

[1] Done          /XMMShared/Software/ciao-4.10/ots/bin/ds9 mos2S002-obj-image-sky.fits
mos2S002-cheese.fits

[htb3hg@xmm analysis]$ ds9 pnS003-obj-image-sky.fits pnS003-cheese.fits &
[1] 12911

[htb3hg@xmm analysis]$ 

[1] Done          /XMMShared/Software/ciao-4.10/ots/bin/ds9 pnS003-obj-image-sky.fits
pnS003-cheese.fits

36.170u 3.498s 10:42.69 6.1% 0+0k 0+32io 0pf+0w

[htb3hg@xmm analysis]$ cp /pps/*EPX000REGION0000.ASC pps_srcs.reg
cp: No match.

[htb3hg@xmm analysis]$ cd pps
pps: No such file or directory.

[htb3hg@xmm analysis]$ cd ..
[htb3hg@xmm 0781590201]$ ls
analysis/ ODF/ PPS/ setup

[htb3hg@xmm 0781590201]$ cd analysis
[htb3hg@xmm analysis]$ cp /PPS/*EPX000REGION0000.ASC pps_srcs.reg
cp: No match.

[htb3hg@xmm analysis]$ cp /PPS/*EPX000REGION0000.ASC PPS_srcs.reg
cp: No match.

[htb3hg@xmm analysis]$ cd ..
[htb3hg@xmm 0781590201]$ ls
analysis/ ODF/ PPS/ setup

[htb3hg@xmm 0781590201]$ cd PPS
[htb3hg@xmm PPS]$ ls
INDEX.HTM          P0781590201M2X000DETMSK4000.FTZ
P0781590201CAX000CATPLT0000.PDF P0781590201M2X000DETMSK5000.FTZ
P0781590201CAX000D0001A0000.HTM P0781590201M2X000MEXPMP1000.FTZ
P0781590201CAX000D0002A0000.HTM P0781590201M2X000MEXPMP2000.FTZ
```

P0781590201CAX000D0003A0000.HTM P0781590201M2X000MEXPMP3000.FTZ
P0781590201CAX000D0013A0000.HTM P0781590201M2X000MEXPMP4000.FTZ
P0781590201CAX000D0475T0000.HTM P0781590201M2X000MEXPMP5000.FTZ
P0781590201CAX000D0730T0000.HTM P0781590201OBX000ATTSR0000.FTZ
P0781590201CAX000D1252A0000.HTM P0781590201OBX000CALIND0000.FTZ
P0781590201CAX000D1259A0000.HTM P0781590201OBX000CDSLG10000.PNG
P0781590201CAX000D1267A0000.HTM P0781590201OBX000CDSLG20000.PNG
P0781590201CAX000D1284A0000.HTM P0781590201OBX000CDSLG30000.PNG
P0781590201CAX000D1297A0000.HTM P0781590201OBX000CDSLG40000.PNG
P0781590201CAX000D1305A0000.HTM P0781590201OBX000PINDEX0000.FTZ
P0781590201CAX000D1337A0000.HTM P0781590201OBX000PPSSUM0000.HTM
P0781590201CAX000D2156A0000.HTM P0781590201OBX000REFCAT0000.FTZ
P0781590201CAX000D2246A0000.HTM P0781590201OBX000SCRLOG0000.ASC
P0781590201CAX000D2306B0000.HTM P0781590201OBX000SSCLG10000.PNG
P0781590201CAX000D2311A0000.HTM P0781590201OBX000SSCLG20000.PNG
P0781590201CAX000D2340A0000.HTM P0781590201OBX000SUMMAR0000.HTM
P0781590201CAX000D5109A0000.HTM P0781590201OMS006IMAGE_0000.FTZ
P0781590201CAX000D7193A0000.HTM P0781590201OMS006IMAGE_1000.FTZ
P0781590201CAX000D7233A0000.HTM P0781590201OMS006SIMAGE0000.FTZ
P0781590201CAX000D7237A0000.HTM P0781590201OMS006SIMAGE0000.PNG
P0781590201CAX000D7258A0000.HTM P0781590201OMS006SIMAGE1000.FTZ
P0781590201CAX000D7260A0000.HTM P0781590201OMS006SIMAGE1000.PNG
P0781590201CAX000D8013A0000.HTM P0781590201OMS006SWSREG0000.ASC
P0781590201CAX000D8040A0000.HTM P0781590201OMS006SWSREG1000.ASC
P0781590201CAX000D8062A0000.HTM P0781590201OMS006SWSRLI0000.FTZ
P0781590201CAX000D8065A0000.HTM P0781590201OMS006SWSRLI1000.FTZ
P0781590201CAX000D8071A0000.HTM P0781590201OMS006TSHPLT0000.PDF
P0781590201CAX000D9010A0000.HTM P0781590201OMS006TSTRTS0000.FTZ
P0781590201CAX000D9010B0000.HTM P0781590201OMS401IMAGE_0000.FTZ
P0781590201CAX000D9028A0000.HTM P0781590201OMS401IMAGE_1000.FTZ

P0781590201CAX000D9050A0000.HTM P0781590201OMS401SIMAGE0000.FTZ
P0781590201CAX000F0001A0000.FTZ P0781590201OMS401SIMAGE0000.PNG
P0781590201CAX000F0003A0000.FTZ P0781590201OMS401SIMAGE1000.FTZ
P0781590201CAX000F0013A0000.FTZ P0781590201OMS401SIMAGE1000.PNG
P0781590201CAX000F0730T0000.FTZ P0781590201OMS401SWSREG0000.ASC
P0781590201CAX000F2156A0000.FTZ P0781590201OMS401SWSREG1000.ASC
P0781590201CAX000F7258A0000.FTZ P0781590201OMS401SWSRLI0000.FTZ
P0781590201CAX000F7260A0000.FTZ P0781590201OMS401SWSRLI1000.FTZ
P0781590201CAX000F9010A0000.FTZ P0781590201OMS401TSHPLT0000.PDF
P0781590201CAX000F9010B0000.FTZ P0781590201OMS401TSTRTS0000.FTZ
P0781590201CAX000F9028A0000.FTZ P0781590201OMS402IMAGE_0000.FTZ
P0781590201CAX000F9050A0000.FTZ P0781590201OMS402IMAGE_1000.FTZ
P0781590201CAX000FCHART0001.PDF P0781590201OMS402SIMAGE0000.FTZ
P0781590201CAX000FCHART0002.PDF P0781590201OMS402SIMAGE0000.PNG
P0781590201CAX000FCHART0003.PDF P0781590201OMS402SIMAGE1000.FTZ
P0781590201CAX000FCHART0004.PDF P0781590201OMS402SIMAGE1000.PNG
P0781590201CAX000FCHART0005.PDF P0781590201OMS402SWSREG0000.ASC
P0781590201CAX000FCHART0006.PDF P0781590201OMS402SWSREG1000.ASC
P0781590201CAX000FCHART0007.PDF P0781590201OMS402SWSRLI0000.FTZ
P0781590201CAX000FCHART0008.PDF P0781590201OMS402SWSRLI1000.FTZ
P0781590201CAX000FCHART0009.PDF P0781590201OMS402TSHPLT0000.PDF
P0781590201CAX000FCHART000A.PDF P0781590201OMS402TSTRTS0000.FTZ
P0781590201CAX000FCHART000B.PDF P0781590201OMS403IMAGE_0000.FTZ
P0781590201CAX000FCHART000C.PDF P0781590201OMS403IMAGE_1000.FTZ
P0781590201CAX000FCHART000D.PDF P0781590201OMS403SIMAGE0000.FTZ
P0781590201CAX000FCHART000E.PDF P0781590201OMS403SIMAGE0000.PNG
P0781590201CAX000FCHART000F.PDF P0781590201OMS403SIMAGE1000.FTZ
P0781590201CAX000FCHART0010.PDF P0781590201OMS403SIMAGE1000.PNG
P0781590201CAX000FCHART0011.PDF P0781590201OMS403SWSREG0000.ASC
P0781590201CAX000FCHART0012.PDF P0781590201OMS403SWSREG1000.ASC

P0781590201CAX000FCHART0013.PDF P0781590201OMS403SWSRLI0000.FTZ
P0781590201CAX000FCHART0014.PDF P0781590201OMS403SWSRLI1000.FTZ
P0781590201CAX000FCHART0015.PDF P0781590201OMS403TSHPLT0000.PDF
P0781590201CAX000FCHART0016.PDF P0781590201OMS403TSTRTS0000.FTZ
P0781590201CAX000FCHART0017.PDF P0781590201OMS404IMAGE_0000.FTZ
P0781590201CAX000FCHART0018.PDF P0781590201OMS404IMAGE_1000.FTZ
P0781590201CAX000FCHART0019.PDF P0781590201OMS404SIMAGE0000.FTZ
P0781590201CAX000FCHART001A.PDF P0781590201OMS404SIMAGE0000.PNG
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analysis/ ODF/ PPS/ setup

[htb3hg@xmm 0781590201]\$ cd analysis

[htb3hg@xmm analysis]\$ cp /PPS/P0781590201EPX000REGION0000.ASC pps_srcs.reg
cp: cannot stat \u2018/PPS/P0781590201EPX000REGION0000.ASC\u2019: No such file or directory

[htb3hg@xmm analysis]\$
[htb3hg@xmm analysis]\$ cp /PPS/P0781590201EPX000REGION0000.ASC pps_srcs.reg
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[htb3hg@xmm analysis]\$ cd ..

[htb3hg@xmm 0781590201]\$ ls
analysis/ ODF/ PPS/ setup

[htb3hg@xmm 0781590201]\$ cd PPA

PPA: No such file or directory.

[htb3hg@xmm 0781590201]\$ cd PPS

[htb3hg@xmm PPS]\$ cp /PPS/P0781590201EPX000REGION0000.ASC pps_srcs.reg
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[htb3hg@xmm 0781590201]\$ cd analysis

[htb3hg@xmm analysis]\$ cp /PPS/P0781590201EPX000REGION0000.ASC pps_srcs.reg
cp: cannot stat \u2018/PPS/P0781590201EPX000REGION0000.ASC\u2019: No such file or directory

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analysis/ ODF/ PPS/ setup  
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XMM/  
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A611/  
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[htb3hg@xmm /XMMSHARED]$ ls  
chs3gn/ cls7i/ ecpl5kf/ htb3hg/ jhs3mc/ mnc3z/ rjv7s/ Software@  
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Chandra_Greg/	MANIFEST_4.4.3_upgrade.txt*	verify_caldb.sh*
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heasoft-6.12/	reduce_acis_old2/	

[htb3hg@xmm Software]\$ cd Chandra_Greg

[htb3hg@xmm Chandra_Greg]\$ ls

apply_fixed_problem_regions.pl*	make_position_table.pl*
apply_fixed_problem_regions.pl~*	make_position_table.pl~*
asmooth_imcoor.pl*	make_source_table.pl*
asmooth_matchscale_imcoor.pl*	make_variability_table.pl*
asmooth_matchscale.pl*	make_variability_table.pl~*
asmooth.pl*	make_wd_photometry_table.pl*
better_ps_spec.pl*	make_wd_photometry_table.pl~*
check_extended.pl*	match_lines.pl*
checklinks.pl*	merge_regions.pl*
cl_source_offset*	merge_regions.pl~*
color_asmooth2_dmfilt.h.pl*	model_hardness_calc.pl*
color_asmooth2_fix.pl*	multiobs_spec.pl*
color_asmooth2.pl*	number_list.pl*
color_asmooth.pl*	number_regions.pl*
color_asmooth_wdmfilt.h.pl*	number_regions.pl~*

color_gsmooth.pl*	optical_summary.pl*
color_gsmooth_wdmfilth.pl*	pntsrc_obs_spec.pl*
convert_coord.pl*	pntsrc_obs_spec.pl~*
exclude_lineprint.pl*	proper_motion.pl*
exclude_src_luminosity.pl*	qe_correct.pl*
find_agn_flux.pl*	radec2regions.pl*
fix_problem_regions.pl*	radec2regions.pl~*
fix_problem_regions.pl~*	radec2xy_regions.pl*
fluxerror_bremss_calc.pl*	radec2xy_regions.pl~*
fluxerror_power_calc.pl*	range_bbbodyrad_calc.pl*
fofo*	range_diskbb_calc.pl*
ggy.pl*	reduce_acis_3.4_6.1.1/
grid_hardness.pl*	regionprint.pl*
grs_psextract.pl*	regionprint.pl~*
grs_psextract.pl~*	reindex.pl*
Incompleteness/	same_ll_nearest_sep_search*
lineprint.pl*	sort_regions.pl*
ll_cross_correlate*	sort_regions.pl~*
ll_cross_correlate.c*	source_offset*
ll_nearest_sep_search*	src_obs_spec.pl*
ll_sep_search*	stack_dmextract.pl*
low_exposure_fraction.pl*	stack_dmextract.pl~*
make_events_photometry_table.pl*	stack_exposure_calc.pl*
make_events_photometry_table.pl~*	stack_exposure_calc.pl~*
make_hardness_plots.pl*	stack_image_extract.pl*
make_hardness_table2.pl*	stack_image_extract.pl~*
make_hardness_table2.pl~*	stack_region_check.pl*
make_hardness_table.pl*	stack_region_check.pl~*
make_image_photometry_table.pl*	stack_src_spec.pl*
make_image_photometry_table.pl~*	stack_varying_exposure.pl*

```

make_luminosity_table.pl*           strip_blank_lines.pl*
make_multi_events_photometry_table.pl*   term.pl*
make_multi_events_photometry_table.pl~*  xy2radec_regions.pl*
make_multi_hardness_table.pl*        xy2radec_regions.pl~*

[htb3hg@xmm Chandra_Greg]$ cd number_regions.pl pps_srcs.reg \ pps_srcs_num.reg
cd: Too many arguments.

[htb3hg@xmm Chandra_Greg]$ cd number_regions.pl
number_regions.pl: Not a directory.

[htb3hg@xmm Chandra_Greg]$ number_regions.pl pps_srcs.reg
number_regions.pl: Command not found.

[htb3hg@xmm Chandra_Greg]$ number_regions.pl pps_srcs.reg \ pps_srcs_num.reg
number_regions.pl: Command not found.

[htb3hg@xmm Chandra_Greg]$ cd number_regions.pl*
number_regions.pl*: Ambiguous.

[htb3hg@xmm Chandra_Greg]$ ls
apply_fixed_problem_regions.pl*      make_position_table.pl*
apply_fixed_problem_regions.pl~*     make_position_table.pl~*
asmooth_imcoor.pl*                  make_source_table.pl*
asmooth_matchscale_imcoor.pl*        make_variability_table.pl*
asmooth_matchscale.pl*               make_variability_table.pl~*
asmooth.pl*                         make_wd_photometry_table.pl*
better_ps_spec.pl*                  make_wd_photometry_table.pl~*
check_extended.pl*                  match_lines.pl*
checklinks.pl*                     merge_regions.pl*
cl_source_offset*                  merge_regions.pl~*
color_asmooth2_dmfilt.h.pl*        model_hardness_calc.pl*
color_asmooth2_fix.pl*             multiobs_spec.pl*
color_asmooth2.pl*                 number_list.pl*
color_asmooth.pl*                  number_regions.pl*
color_asmooth_wdmfilt.h.pl*        number_regions.pl~*

```

color_gsmooth.pl*	optical_summary.pl*
color_gsmooth_wdmfilth.pl*	pntsrc_obs_spec.pl*
convert_coord.pl*	pntsrc_obs_spec.pl~*
exclude_lineprint.pl*	proper_motion.pl*
exclude_src_luminosity.pl*	qe_correct.pl*
find_agn_flux.pl*	radec2regions.pl*
fix_problem_regions.pl*	radec2regions.pl~*
fix_problem_regions.pl~*	radec2xy_regions.pl*
fluxerror_bremss_calc.pl*	radec2xy_regions.pl~*
fluxerror_power_calc.pl*	range_bbodyrad_calc.pl*
fofo*	range_diskbb_calc.pl*
ggy.pl*	reduce_acis_3.4_6.1.1/
grid_hardness.pl*	regionprint.pl*
grs_psextract.pl*	regionprint.pl~*
grs_psextract.pl~*	reindex.pl*
Incompleteness/	same_ll_nearest_sep_search*
lineprint.pl*	sort_regions.pl*
ll_cross_correlate*	sort_regions.pl~*
ll_cross_correlate.c*	source_offset*
ll_nearest_sep_search*	src_obs_spec.pl*
ll_sep_search*	stack_dmextract.pl*
low_exposure_fraction.pl*	stack_dmextract.pl~*
make_events_photometry_table.pl*	stack_exposure_calc.pl*
make_events_photometry_table.pl~*	stack_exposure_calc.pl~*
make_hardness_plots.pl*	stack_image_extract.pl*
make_hardness_table2.pl*	stack_image_extract.pl~*
make_hardness_table2.pl~*	stack_region_check.pl*
make_hardness_table.pl*	stack_region_check.pl~*
make_image_photometry_table.pl*	stack_src_spec.pl*
make_image_photometry_table.pl~*	stack_varying_exposure.pl*

```
make_luminosity_table.pl*           strip_blank_lines.pl*
make_multi_events_photometry_table.pl*   term.pl*
make_multi_events_photometry_table.pl~* xy2radec_regions.pl*
make_multi_hardness_table.pl*        xy2radec_regions.pl~*
[htb3hg@xmm Chandra_Greg]$ cd number_regions.pl0781590201
number_regions.pl0781590201: No such file or directory.
[htb3hg@xmm Chandra_Greg]$ cd number
```

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```
[htb3hg@xmm Chandra_Greg]$ cd ..
[htb3hg@xmm Software]$ cd ..
[htb3hg@xmm cls7i]$ cd ..
[htb3hg@xmm /XMMShared]$ ls
chs3gn/  ccp5kf/  jhs3mc/  rjv7s/
cls7i/  htb3hg/  mnc3z/  Software@
[htb3hg@xmm /XMMShared]$ cd htb3hg/Data/A611/XMM/0781590201/
[htb3hg@xmm 0781590201]$ ls
analysis/  ODF/  PPS/  setup
[htb3hg@xmm 0781590201]$ cd analysis
[htb3hg@xmm analysis]$ ls
atthk.fits
ccf.cif
command.csh
eboxlist_l.fits
eboxlist_m.fits
emllist.fits
mos1_falsesources.reg
mos1_falsesources_wcs.reg
mos1_missedsources.reg
mos1_missedsources_wcs.reg
mos1S001-bkg_region-det.fits
mos1S001-bkg_region-sky.fits
```

mos1S001-cheese.fits
mos1S001-clean.fits
mos1S001-corn.fits
mos1S001-corn-image.fits
mos1S001-gti.fits
mos1S001-gti.txt
mos1S001-hist.ps
mos1S001-hist.qdp
mos1S001-mask-im.fits
mos1S001-obj-image-det.fits
mos1S001-obj-image-det-soft.fits
mos1S001-obj-image-det-unfilt.fits
mos1S001-obj-image-sky.fits
mos1S001-obj-im.fits
mos1S001-ori.fits
mos1S001-ratec.fits
mos1S001-rate.fits
mos2_falsesources.reg
mos2_falsesources_wcs.reg
mos2_missedsources.reg
mos2_missedsources_wcs.reg
mos2S002-bkg_region-det.fits
mos2S002-bkg_region-sky.fits
mos2S002-cheese.fits
mos2S002-clean.fits
mos2S002-corn.fits
mos2S002-corn-image.fits
mos2S002-gti.fits
mos2S002-gti.txt
mos2S002-hist.ps
mos2S002-hist.qdp
mos2S002-mask-im.fits

mos2S002-obj-image-det.fits
mos2S002-obj-image-det-soft.fits
mos2S002-obj-image-det-unfilt.fits
mos2S002-obj-image-sky.fits
mos2S002-obj-im.fits
mos2S002-ori.fits
mos2S002-ratec.fits
mos2S002-rate.fits
P0781590201EMX000FBKGTI0000.FIT
P0781590201EMX000FBKTSR0000.FIT
P0781590201M1S001-corimgfilt.FIT
P0781590201M1S001FBKTSR0000.FIT
P0781590201M1S001-objimgfilt.FIT
P0781590201M1S001-objimg.FIT
P0781590201M1X000HK_GTI0000.FIT
P0781590201M2S002-corimgfilt.FIT
P0781590201M2S002FBKTSR0000.FIT
P0781590201M2S002-objimgfilt.FIT
P0781590201M2S002-objimg.FIT
P0781590201M2X000HK_GTI0000.FIT
P0781590201OBX000ATTSR0000.FIT
P0781590201PNS003BPXHMK0001.FIT
P0781590201PNS003BPXHMK0002.FIT
P0781590201PNS003BPXHMK0003.FIT
P0781590201PNS003BPXHMK0004.FIT
P0781590201PNS003BPXHMK0005.FIT
P0781590201PNS003BPXHMK0006.FIT
P0781590201PNS003BPXHMK0007.FIT
P0781590201PNS003BPXHMK0008.FIT
P0781590201PNS003BPXHMK0009.FIT
P0781590201PNS003BPXHMK0010.FIT
P0781590201PNS003BPXHMK0011.FIT

P0781590201PNS003BPXHMK0012.FIT
P0781590201PNS003BPXMSK0001.FIT
P0781590201PNS003BPXMSK0002.FIT
P0781590201PNS003BPXMSK0003.FIT
P0781590201PNS003BPXMSK0004.FIT
P0781590201PNS003BPXMSK0005.FIT
P0781590201PNS003BPXMSK0006.FIT
P0781590201PNS003BPXMSK0007.FIT
P0781590201PNS003BPXMSK0008.FIT
P0781590201PNS003BPXMSK0009.FIT
P0781590201PNS003BPXMSK0010.FIT
P0781590201PNS003BPXMSK0011.FIT
P0781590201PNS003BPXMSK0012.FIT
P0781590201PNS003FBKGTI0000.FIT
P0781590201PNS003FBKSPC0000.FIT
P0781590201PNS003FBKTSR0000.FIT
P0781590201PNS003-objimgfilt.FIT
P0781590201PNS003-objimg.FIT
pn_falsesources.reg
pn_falsesources_wcs.reg
pn_missedsources.reg
pn_missedsources_wcs.reg
pnS003-bkg_region-det.fits
pnS003-bkg_region-sky.fits
pnS003-cheese.fits
pnS003-clean.fits
pnS003-clean-oot.fits
pnS003_falsesources.reg
pnS003_falsesources_wcs.reg
pnS003-gti.fits
pnS003-gti-oot.fits
pnS003-gti-oot.txt

pnS003-gti.txt
pnS003-hist-oot.qdp
pnS003-hist.ps
pnS003-hist.qdp
pnS003-mask-im.fits
pnS003_missedsources.reg
pnS003_missedsources_wcs.reg
pnS003-obj-image-det.fits
pnS003-obj-image-det-oot.fits
pnS003-obj-image-det-unfilt.fits
pnS003-obj-image-det-unfilt-oot.fits
pnS003-obj-image-sky.fits
pnS003-obj-image-sky-oot.fits
pnS003-obj-im.fits
pnS003-oot.fits
pnS003-ori.fits
pnS003-rate.fits
pnS003-rate-oot.fits
temp_events.fits

[htb3hg@xmm analysis]\$ /XMMShared/Software/Chandra_Greg/number_regions.pl pps_srcs.reg \
pps_srcs_num.reg

Program Exiting Unsuccessfully

pps_srcs.reg does not exist.

[htb3hg@xmm analysis]\$ /XMMShared/Software/Chandra_Greg/number_regions.pl pps_srcs.reg \
pps_srcs_num.reg

Program Exiting Unsuccessfully

pps_srcs.reg does not exist.

[htb3hg@xmm analysis]\$ ls ..

analysis/ ODF/ PPS/ setup

[htb3hg@xmm analysis]\$ cp ..//PPS/P0781590201EPX000REGION0000.ASC pps_srcs.reg

[htb3hg@xmm analysis]\$ /XMMShared/Software/Chandra_Greg/number_regions.pl pps_srcs.reg \
pps_srcs_num.reg

[htb3hg@xmm analysis]\$ ls pps_src*

```
pps_srcs_num.reg pps_srcs.reg
[htb3hg@xmm analysis]$ more pps
pps_srcs_num.reg pps_srcs.reg
[htb3hg@xmm analysis]$ more pps_srcs*
:::::::::::
pps_srcs_num.reg
:::::::::::
fk5;circle(120.235803, 36.056333,48") # color=green # text={1}
fk5;circle(120.537076, 36.071537,45") # color=green # text={2}
fk5;circle(120.503912, 36.056112,43") # color=green # text={3}
fk5;circle(120.229225, 36.153478,35") # color=green # text={4}
fk5;circle(120.284506, 35.872575,38") # color=green # text={5}
fk5;circle(120.258899, 36.045814,18") # color=green # text={6}
fk5;circle(120.258365, 36.014654,28") # color=green # text={7}
fk5;circle(120.080146, 35.921861,37") # color=green # text={8}
fk5;circle(120.362004, 36.016264,31") # color=green # text={9}
fk5;circle(120.066406, 36.072618,26") # color=green # text={10}
fk5;circle(120.066819, 36.065040,37") # color=green # text={11}
fk5;circle(120.254073, 36.096927,23") # color=green # text={12}
fk5;circle(120.105752, 36.223219,31") # color=green # text={13}
fk5;circle(120.269552, 36.246019,30") # color=green # text={14}
fk5;circle(120.193716, 36.202510,26") # color=green # text={15}
fk5;circle(120.001484, 36.043124,30") # color=green # text={16}
fk5;circle(120.032951, 36.068808,30") # color=green # text={17}
[htb3hg@xmm analysis]$ hedit pps_srcs.region &
```

CORRECT>gedit pps_srcs.region & (y|n|e|a)? yes

[1] 25121

[htb3hg@xmm analysis]\$

** (gedit:25121): WARNING **: 14:13:45.264: Set document metadata failed: Setting attribute metadata::gedit-position not supported

```
[1] Done gedit pps_srcs.region
[htb3hg@xmm analysis]$ more pps_srcs.region
pps_srcs.region: No such file or directory
[htb3hg@xmm analysis]$ gedit pps_srcs.reg &
[1] 26278
[htb3hg@xmm analysis]$ gedit pps_srcs_num.reg &
[2] 26462
[htb3hg@xmm analysis]$
[2] Done gedit pps_srcs_num.reg
[htb3hg@xmm analysis]$
** (gedit:26278): WARNING **: 14:20:16.341: Set document metadata failed: Setting attribute metadata::gedit-spell-language not supported

** (gedit:26278): WARNING **: 14:20:16.341: Set document metadata failed: Setting attribute metadata::gedit-encoding not supported

** (gedit:26278): WARNING **: 14:20:22.647: Set document metadata failed: Setting attribute metadata::gedit-position not supported

** (gedit:26278): WARNING **: 14:20:22.787: Set document metadata failed: Setting attribute metadata::gedit-position not supported

[1] Done gedit pps_srcs.reg
[htb3hg@xmm analysis]$ ds9 mos1S001-obj-image-sky.fits &
[1] 26894
[htb3hg@xmm analysis]$ Failed to parse xml

[htb3hg@xmm analysis]$ gedit pps_srcs.reg &
[2] 27745
[htb3hg@xmm analysis]$ gedit pps_srcs_num.reg &
[3] 27793
[htb3hg@xmm analysis]$
[3] Done gedit pps_srcs_num.reg
```

[htb3hg@xmm analysis]\$

** (gedit:27745): WARNING **: 14:28:01.710: Set document metadata failed: Setting attribute metadata::gedit-spell-language not supported

** (gedit:27745): WARNING **: 14:28:01.711: Set document metadata failed: Setting attribute metadata::gedit-encoding not supported

** (gedit:27745): WARNING **: 14:31:24.399: Set document metadata failed: Setting attribute metadata::gedit-spell-language not supported

** (gedit:27745): WARNING **: 14:31:24.399: Set document metadata failed: Setting attribute metadata::gedit-encoding not supported

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[htb3hg@xmm analysis]\$ ds9 mos1S001-obj-image-sky.fits &

[3] 7362

[htb3hg@xmm analysis]\$

[3] Done /XMMShared/Software/ciao-4.10/ots/bin/ds9 mos1S001-obj-image-sky.fits

[htb3hg@xmm analysis]\$ ds9 mos1S001-obj-image-sky.fits &

[3] 7832

[htb3hg@xmm analysis]\$

[1] Done /XMMShared/Software/ciao-4.10/ots/bin/ds9 mos1S001-obj-image-sky.fits
76.269u 55.908s 147:04:33.59 0.0% 0+0k 0+0io 0pf+0w

[htb3hg@xmm analysis]\$

[3] Done /XMMShared/Software/ciao-4.10/ots/bin/ds9 mos1S001-obj-image-sky.fits
59.387u 5.562s 35:44.63 3.0% 0+0k 448+32io 4pf+0w

[htb3hg@xmm analysis]\$ ds9 mos2S002-obj-image-sky.fits &

[3] 16209

[htb3hg@xmm analysis]\$

[3] Done /XMMShared/Software/ciao-4.10/ots/bin/ds9 mos2S002-obj-image-sky.fits
49.787u 4.925s 20:12.49 4.5% 0+0k 176+16io 1pf+0w

[htb3hg@xmm analysis]\$ ds9 pnS003-obj-image-sky.fits &

```
[3] 20473  
[htb3hg@xmm analysis]$  
[3] Done          /XMMShared/Software/ciao-4.10/ots/bin/ds9 pnS003-obj-image-sky.fits  
35.687u 5.730s 8:21:14.44 0.1%0+0k 552+8io 0pf+0w  
[htb3hg@xmm analysis]$ ds9 mos1S001-obj-image-sky.fits &  
[3] 18132  
[htb3hg@xmm analysis]$  
[3] Done          /XMMShared/Software/ciao-4.10/ots/bin/ds9 mos1S001-obj-image-sky.fits  
[htb3hg@xmm analysis]$ ds9 mos1S001-obj-image-sky.fits &  
[3] 18424  
[htb3hg@xmm analysis]$  
[3] Done          /XMMShared/Software/ciao-4.10/ots/bin/ds9 mos1S001-obj-image-sky.fits  
[htb3hg@xmm analysis]$ ds9 mos1S001-obj-image-sky.fits &  
[3] 20159  
[htb3hg@xmm analysis]$  
[3] Done          /XMMShared/Software/ciao-4.10/ots/bin/ds9 mos1S001-obj-image-sky.fits  
23.347u 2.115s 8:33.08 4.9%  0+0k 0+0io 0pf+0w  
[htb3hg@xmm analysis]$ ds9 mos1S001-obj-image-sky.fits &  
[3] 21974  
[htb3hg@xmm analysis]$  
[3] Done          /XMMShared/Software/ciao-4.10/ots/bin/ds9 mos1S001-obj-image-sky.fits  
16.405u 1.666s 4:39.09 6.4%  0+0k 8+16io 0pf+0w  
[htb3hg@xmm analysis]$ ds9 mos2S002-obj-image-sky.fits &  
[3] 22949  
[htb3hg@xmm analysis]$  
[3] Done          /XMMShared/Software/ciao-4.10/ots/bin/ds9 mos2S002-obj-image-sky.fits  
18.584u 1.638s 4:52.14 6.9%  0+0k 8+8io 0pf+0w  
[htb3hg@xmm analysis]$ ds9 pnS003-obj-image-sky.fits &  
[3] 23965  
[htb3hg@xmm analysis]$
```

```
[3] Done          /XMMShared/Software/ciao-4.10/ots/bin/ds9 pnS003-obj-image-sky.fits
[htb3hg@xmm analysis]$ ds9 pnS003-obj-image-sky.fits &
[3] 24157
[htb3hg@xmm analysis]$

[3] Done          /XMMShared/Software/ciao-4.10/ots/bin/ds9 pnS003-obj-image-sky.fits
[htb3hg@xmm analysis]$ ds9 pnS003-obj-image-sky.fits &
[3] 24495
[htb3hg@xmm analysis]$

[3] Done          /XMMShared/Software/ciao-4.10/ots/bin/ds9 pnS003-obj-image-sky.fits
32.879u 4.050s 20:03.35 3.0% 0+0k 0+16io 0pf+0w
[htb3hg@xmm analysis]$
```

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```
[htb3hg@xmm analysis]$ region eventset=mos1S001-clean.fits operationstyle=global \
srclisttab=emllist_extra.fits:SRCLIST \ bkgregionset = mos1S001-bkg_region-det_extra.fits \
energyfraction=0.85 radiusstyle=enfrac \ outunit=detxy verbosity=1
** region: error (invalidOption), invalid option ' srclisttab=emllist_extra.fits:SRCLIST'

[htb3hg@xmm analysis]$ region eventset=mos1S001-clean.fits operationstyle=global \
srclisttab=emllist_extra.fits:SRCLIST \ bkgregionset = mos1S001-bkg_region-sky_extra.fits \
energyfraction=0.85 radiusstyle=enfrac \ outunit=xy verbosity=1
** region: error (invalidOption), invalid option ' srclisttab=emllist_extra.fits:SRCLIST'
```

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```
[htb3hg@xmm analysis]$ region eventset=mos1S001-clean.fits operationstyle=global
srclisttab=emllist_extra.fits:SRCLIST bkgregionset=mos1S001-bkg_region-det_extra.fits
energyfraction=0.85 radiusstyle=enfrac outunit=detxy verbosity=1

region:- Executing (routine): region eventset=mos1S001-clean.fits tempset=tempset.ds usersrcid=1
srcidcol=dummy_default operationstyle=global srclisttab=emllist_extra.fits:SRCLIST expression="
regionset=src_region.ds bkgregionset=mos1S001-bkg_region-det_extra.fits shrinkconfused=yes
fixedradius=12 energyfraction=0.85 bkgratecol=BG_MAP bkgratekwds=kwd_set.ds
bkgrateimgset=bkg_rate_img.ds bkgrateuser=1 bkgratestyle=col bkgfraction=1 nosrcellipse=no
radiusstyle=enfrac fovbkgannulus=no nobkgellipse=no outunit=detxy withboresightfudge=yes -w 1 -V 1
```

```
[htb3hg@xmm analysis]$ region eventset=mos1S001-clean.fits operationstyle=global
srclisttab=emllist_extra.fits:SRCLIST bkgregionset=mos1S001-bkg_region-sky_extra.fits
energyfraction=0.85 radiusstyle=enfrac outunit=xy verbosity=1

region:- Executing (routine): region eventset=mos1S001-clean.fits tempset=tempset.ds usersrcid=1
srcidcol=dummy_default operationstyle=global srclisttab=emllist_extra.fits:SRCLIST expression=""
regionset=src_region.ds bkgregionset=mos1S001-bkg_region-sky_extra.fits shrinkconfused=yes
fixedradius=12 energyfraction=0.85 bkgratecol=BG_MAP bkgratekwdset=kwd_set.ds
bkgrateimgset=bkg_rate_img.ds bkgrateuser=1 bkgratestyle=col bkgfraction=1 nosrcellipse=no
radiusstyle=enfrac fovbkgannulus=no nobkgellipse=no outunit=xy withboresightfudge=yes -w 1 -V 1

[htb3hg@xmm analysis]$ region eventset=mos2S002-clean.fits operationstyle=global
srclisttab=emllist_extra.fits:SRCLIST bkgregionset=mos2S002-bkg_region-det_extra.fits
energyfraction=0.85 radiusstyle=enfrac outunit=detxy verbosity=1

region:- Executing (routine): region eventset=mos2S002-clean.fits tempset=tempset.ds usersrcid=1
srcidcol=dummy_default operationstyle=global srclisttab=emllist_extra.fits:SRCLIST expression=""
regionset=src_region.ds bkgregionset=mos2S002-bkg_region-det_extra.fits shrinkconfused=yes
fixedradius=12 energyfraction=0.85 bkgratecol=BG_MAP bkgratekwdset=kwd_set.ds
bkgrateimgset=bkg_rate_img.ds bkgrateuser=1 bkgratestyle=col bkgfraction=1 nosrcellipse=no
radiusstyle=enfrac fovbkgannulus=no nobkgellipse=no outunit=detxy withboresightfudge=yes -w 1 -V 1

[htb3hg@xmm analysis]$ region eventset=mos2S002-clean.fits operationstyle=global
srclisttab=emllist_extra.fits:SRCLIST bkgregionset=mos2S002-bkg_region-sky_extra.fits
energyfraction=0.85 radiusstyle=enfrac outunit=xy verbosity=1

region:- Executing (routine): region eventset=mos2S002-clean.fits tempset=tempset.ds usersrcid=1
srcidcol=dummy_default operationstyle=global srclisttab=emllist_extra.fits:SRCLIST expression=""
regionset=src_region.ds bkgregionset=mos2S002-bkg_region-sky_extra.fits shrinkconfused=yes
fixedradius=12 energyfraction=0.85 bkgratecol=BG_MAP bkgratekwdset=kwd_set.ds
bkgrateimgset=bkg_rate_img.ds bkgrateuser=1 bkgratestyle=col bkgfraction=1 nosrcellipse=no
radiusstyle=enfrac fovbkgannulus=no nobkgellipse=no outunit=xy withboresightfudge=yes -w 1 -V 1

[htb3hg@xmm analysis]$ region eventset=pnS003-clean.fits operationstyle=global
srclisttab=emllist_extra.fits:SRCLIST bkgregionset=pnS003-bkg_region-sky_extra.fits
energyfraction=0.85 radiusstyle=enfrac outunit=xy verbosity=1

region:- Executing (routine): region eventset=pnS003-clean.fits tempset=tempset.ds usersrcid=1
srcidcol=dummy_default operationstyle=global srclisttab=emllist_extra.fits:SRCLIST expression=""
regionset=src_region.ds bkgregionset=pnS003-bkg_region-sky_extra.fits shrinkconfused=yes
fixedradius=12 energyfraction=0.85 bkgratecol=BG_MAP bkgratekwdset=kwd_set.ds
bkgrateimgset=bkg_rate_img.ds bkgrateuser=1 bkgratestyle=col bkgfraction=1 nosrcellipse=no
radiusstyle=enfrac fovbkgannulus=no nobkgellipse=no outunit=xy withboresightfudge=yes -w 1 -V 1

** region: warning (srcThetaTooLarge), The off-axis angle (theta) for source 1 was outside the allowed
range for the PSF ( 9.00000E+02 arcsec). The maximum valid value will be substituted.

[htb3hg@xmm analysis]$ region eventset=pnS003-clean.fits operationstyle=global
srclisttab=emllist_extra.fits:SRCLIST bkgregionset=pnS003-bkg_region-det_extra.fits
energyfraction=0.85 radiusstyle=enfrac outunit=detxy verbosity=1
```

```
region:- Executing (routine): region eventset=pnS003-clean.fits tempset=tempset.ds usersrcid=1
srcidcol=dummy_default operationstyle=global srclisttab=emllist_extra.fits:SRCLIST expression="
regionset=src_region.ds bkgregionset=bnS003-bkg_region-det_extra.fits shrinkconfused=yes
fixedradius=12 energyfraction=0.85 bkgratecol=BG_MAP bkgratekwdset=kwd_set.ds
bkgrateimgset=bkg_rate_img.ds bkgrateuser=1 bkgratestyle=col bkgfraction=1 nosrcellipse=no
radiusstyle=enfrac fovbkgannulus=no nobkgellipse=no outunit=detxy withboresightfudge=yes -w 1 -V 1

** region: warning (srcThetaTooLarge), The off-axis angle (theta) for source 1 was outside the allowed
range for the PSF ( 9.00000E+02 arcsec). The maximum valid value will be substituted.
```

[htb3hg@xmm analysis]\$ ds9 mos1S001-obj-im.fits &

[6] 20594

[htb3hg@xmm analysis]\$

[6] Done /XMMShared/Software/ciao-4.10/ots/bin/ds9 mos1S001-obj-im.fits

[htb3hg@xmm analysis]\$ edit mos1

```
mos1_falsesources.reg      mos1S001-gti.txt
mos1_falsesources_wcs.reg   mos1S001-hist.ps
mos1_missedsources.reg     mos1S001-hist.qdp
mos1_missedsources_wcs.reg  mos1S001-mask-im.fits
mos1S001-bkg_region-det_extra.fits  mos1S001-obj-image-det.fits
mos1S001-bkg_region-det_orig.fits  mos1S001-obj-image-det-soft.fits
mos1S001-bkg_region-sky_extra.fits  mos1S001-obj-image-det-unfilt.fits
mos1S001-bkg_region-sky_orig.fits  mos1S001-obj-image-sky.fits
mos1S001-cheese_orig.fits    mos1S001-obj-im.fits
mos1S001-clean.fits        mos1S001-ori.fits
mos1S001-corn.fits         mos1S001-ratec.fits
mos1S001-corn-image.fits   mos1S001-rate.fits
mos1S001-gti.fits          mos1_src_orig.reg
```

[htb3hg@xmm analysis]\$ edit mos1_src_orig.reg

CORRECT>gedit mos1_src_orig.reg (y|n|e|a)? yes

[htb3hg@xmm analysis]\$

** (gedit:27745): WARNING **: 17:18:33.629: Set document metadata failed: Setting attribute
metadata::gedit-spell-language not supported

** (gedit:27745): WARNING **: 17:18:33.629: Set document metadata failed: Setting attribute metadata::gedit-encoding not supported

[htb3hg@xmm analysis]\$ /XMMShared/Software/Chandra_Greg/number_regions.pl
mos1_src_orig.reg mos1_src_orig_num.reg

[htb3hg@xmm analysis]\$ ds9 mos1S001-obj-im.fits &

[6] 21716

[htb3hg@xmm analysis]\$

** (gedit:27745): WARNING **: 17:22:15.106: Set document metadata failed: Setting attribute metadata::gedit-spell-language not supported

** (gedit:27745): WARNING **: 17:22:15.116: Set document metadata failed: Setting attribute metadata::gedit-encoding not supported

[6] Done /XMMShared/Software/ciao-4.10/ots/bin/ds9 mos1S001-obj-im.fits

[htb3hg@xmm analysis]\$ ds9 mos1S001-obj-im.fits &

[6] 22387

[htb3hg@xmm analysis]\$

[6] Done /XMMShared/Software/ciao-4.10/ots/bin/ds9 mos1S001-obj-im.fits

[htb3hg@xmm analysis]\$ ds9 mos1S001-obj-im.fits &

[6] 22502

[htb3hg@xmm analysis]\$

[6] Done /XMMShared/Software/ciao-4.10/ots/bin/ds9 mos1S001-obj-im.fits

[htb3hg@xmm analysis]\$ ftmerge foo.fits,mos1S001-bkg_region-sky_extra.fits mos1S001-bkg_region-sky.fits

Dumping CFITSIO error stack:

failed to find or open the following file: (ffopen)

foo.fits

CFITSIO error stack dump complete.

```
Unable to open first FITS table: foo.fits. (at ftmerge.c: 208)
CFITSIO ERROR FILE_NOT_OPENED: could not open the named file
Task ftmerge 2.20 terminating with status 104
[htb3hg@xmm analysis]$ ftmerge mos1S001-bkg_region-sky_extra.fits mos1S001-bkg_region-sky.fits
[htb3hg@xmm analysis]$ rm foo.fits
rm: cannot remove '\u2018foo.fits\u2019: No such file or directory
[htb3hg@xmm analysis]$ ftmerge mos1S001-bkg_region-det_extra.fits mos1S001-bkg_region-det.fits
[htb3hg@xmm analysis]$ make_mask inimage=mos1S001-obj-im.fits \\ inmask=mos1S001-mask-im.fits \\ outmask=mos1S001-cheese.fits \\ reglist=mos1S001-bkg_region-sky.fits
** make_mask: error (invalidOption), invalid option '\'
[htb3hg@xmm analysis]$ make_mask inimage=mos1S001-obj-im.fits inmask=mos1S001-mask-im.fits outmask=mos1S001-cheese.fits reglist=mos1S001-bkg_region-sky.fits
make_mask:- Executing (routine): make_mask inimage=mos1S001-obj-im.fits inmask=mos1S001-mask-im.fits outmask=mos1S001-cheese.fits reglist=mos1S001-bkg_region-sky.fits clobber=yes -w 1 -V 4
make_mask:- make_mask (esas-0.9.40) [xmmsas_20170719_1539-16.1.0] started: 2020-04-12T21:30:13.000
Event Image: mos1S001-obj-im.fits
Input Mask: mos1S001-mask-im.fits
Output Cheese Image: mos1S001-cheese.fits
Region File: mos1S001-bkg_region-sky.fits
Input Image: mos1S001-obj-im.fits
Input Mask: mos1S001-mask-im.fits
Template File
mos1S001-mask-im.fits
Template image coordinate system: -TAN
Template image coordinate ID: RA---TAN DEC--TAN
Template image central coordinates: 120.2604583333301 36.0463333333301
Template image reference pixel: 450.91000000000003 450.91000000000003
Template image pixel sizes: -6.94444444444501E-004 6.94444444444501E-004
Template image NAXES, NAXIS: 2 900 900
```

mos1S001-bkg_region-sky.fits
Number of excluded sources: 25
Output image coordinate system: -TAN
Output image coordinate ID: RA---TAN DEC---TAN
Output image central coordinates: 120.2604583333301 36.0463333333301
Output image reference pixel: 450.91000000000003 450.91000000000003
Output image pixel sizes: -6.944444444444501E-004 6.944444444444501E-004
Output image NAXES, NAXIS: 2 900 900
make_mask:- make_mask (esas-0.9.40) [xmmsas_20170719_1539-16.1.0] ended: 2020-04-12T21:30:13.000

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```
[htb3hg@xmm analysis]$ fv mos1S001-bkg_region-det_extra.fits &  
[6] 6310  
[htb3hg@xmm analysis]$  
[6] Done fv mos1S001-bkg_region-det_extra.fits  
[htb3hg@xmm analysis]$ ds9 mos1S001-cheese.fits &  
[6] 7760  
[htb3hg@xmm analysis]$  
[6] Done /XMMShared/Software/ciao-4.10/ots/bin/ds9 mos1S001-cheese.fits  
[htb3hg@xmm analysis]$ ftmerge mos1S001-bkg_region-sky_extra.fits mos1S001-bkg_region-sky.fits
```

Dumping CFITSIO error stack:

failed to create new file (already exists?):

mos1S001-bkg_region-sky.fits

CFITSIO error stack dump complete.

Unable to create output file: mos1S001-bkg_region-sky.fits. (at ftmerge.c: 217)

CFITSIO ERROR FILE_NOT_CREATED: couldn't create the named file

Task ftmerge 2.20 terminating with status 105

```
[htb3hg@xmm analysis]$ ftmerge mos1S001-bkg_region-det_extra.fits mos1S001-bkg_region-det.fits  
Dumping CFITSIO error stack:
```

```
-----  
failed to create new file (already exists?):
```

```
mos1S001-bkg_region-det.fits  
-----
```

```
CFITSIO error stack dump complete.
```

```
Unable to create output file: mos1S001-bkg_region-det.fits. (at ftmerge.c: 217)
```

```
CFITSIO ERROR FILE_NOT_CREATED: couldn't create the named file
```

```
Task ftmerge 2.20 terminating with status 105
```

```
[htb3hg@xmm analysis]$ make_mask inimage=mos1S001-obj-im.fits inmask=mos1S001-mask-im.fits  
outmask=mos1S001-cheese.fits reglist=mos1S001-bkg_region-sky.fits
```

```
make_mask:- Executing (routine): make_mask inimage=mos1S001-obj-im.fits inmask=mos1S001-mask-im.fits  
outmask=mos1S001-cheese.fits reglist=mos1S001-bkg_region-sky.fits clobber=yes -w 1 -V 4
```

```
make_mask:- make_mask (esas-0.9.40) [xmmsas_20170719_1539-16.1.0] started: 2020-04-13T21:42:40.000
```

```
Event Image: mos1S001-obj-im.fits
```

```
Input Mask: mos1S001-mask-im.fits
```

```
Output Cheese Image: mos1S001-cheese.fits
```

```
Region File: mos1S001-bkg_region-sky.fits
```

```
Input Image: mos1S001-obj-im.fits
```

```
Input Mask: mos1S001-mask-im.fits
```

```
Template File
```

```
mos1S001-mask-im.fits
```

```
Template image coordinate system: -TAN
```

```
Template image coordinate ID: RA---TAN DEC--TAN
```

```
Template image central coordinates: 120.2604583333301 36.0463333333301
```

```
Template image reference pixel: 450.9100000000003 450.9100000000003
```

```
Template image pixel sizes: -6.94444444444501E-004 6.94444444444501E-004
```

```
Template image NAXES, NAXIS: 2 900 900
```

```
mos1S001-bkg_region-sky.fits
```

```
Number of excluded sources: 25
```

```
File exists with output file name
```

```
mos1S001-cheese.fits
```

Clobber the file and continue

Output image coordinate system: -TAN

Output image coordinate ID: RA---TAN DEC--TAN

Output image central coordinates: 120.2604583333301 36.0463333333301

Output image reference pixel: 450.9100000000003 450.9100000000003

Output image pixel sizes: -6.944444444444501E-004 6.944444444444501E-004

Output image NAXES, NAXIS: 2 900 900

make_mask:- make_mask (esas-0.9.40) [xmmsas_20170719_1539-16.1.0] ended: 2020-04-13T21:42:40.000

[htb3hg@xmm analysis]\$ ds9 mos1S001-cheese.fits &

[6] 8178

[htb3hg@xmm analysis]\$

[6] Done /XMMShared/Software/ciao-4.10/ots/bin/ds9 mos1S001-cheese.fits

[htb3hg@xmm analysis]\$ fv mos2S002-bkg_region-det_extra.fits &

[6] 8341

[htb3hg@xmm analysis]\$ ftmerge mos2S002-bkg_region-det_extra.fits mos2S002-bkg_region-det.fits

[htb3hg@xmm analysis]\$ ftmerge mos2S002-bkg_region-sky_extra.fits mos2S002-bkg_region-sky.fits

[htb3hg@xmm analysis]\$ make_mask inimage=mos2S002-obj-im.fits inmask=mos2S002-mask-im.fits
outmask=mos2S002-cheese.fits reglist=mos2S002-bkg_region-sky.fits

make_mask:- Executing (routine): make_mask inimage=mos2S002-obj-im.fits inmask=mos2S002-mask-im.fits
outmask=mos2S002-cheese.fits reglist=mos2S002-bkg_region-sky.fits clobber=yes -w 1 -V 4

make_mask:- make_mask (esas-0.9.40) [xmmsas_20170719_1539-16.1.0] started: 2020-04-13T21:47:19.000

Event Image: mos2S002-obj-im.fits

Input Mask: mos2S002-mask-im.fits

Output Cheese Image: mos2S002-cheese.fits

Region File: mos2S002-bkg_region-sky.fits

Input Image: mos2S002-obj-im.fits

Input Mask: mos2S002-mask-im.fits

Template File

mos2S002-mask-im.fits

Template image coordinate system: -TAN

Template image coordinate ID: RA---TAN DEC--TAN

Template image central coordinates: 120.2604583333301 36.0463333333301

```
Template image reference pixel: 450.91000000000003 450.91000000000003
Template image pixel sizes: -6.94444444444501E-004 6.94444444444501E-004
Template image NAXES, NAXIS: 2 900 900
mos2S002-bkg_region-sky.fits
Number of excluded sources: 25
Output image coordinate system: -TAN
Output image coordinate ID: RA---TAN DEC--TAN
Output image central coordinates: 120.2604583333301 36.0463333333301
Output image reference pixel: 450.91000000000003 450.91000000000003
Output image pixel sizes: -6.94444444444501E-004 6.94444444444501E-004
Output image NAXES, NAXIS: 2 900 900
make_mask:- make_mask (esas-0.9.40) [xmmsas_20170719_1539-16.1.0] ended: 2020-04-13T21:47:19.000
[htb3hg@xmm analysis]$ ds9 mos2S002-cheese.fits &
[7] 9173
[htb3hg@xmm analysis]$
[7] Done /XMMShared/Software/ciao-4.10/ots/bin/ds9 mos2S002-cheese.fits
[htb3hg@xmm analysis]$ fv pnS003-bkg_region-det_extra.fits &
[7] 9499
[htb3hg@xmm analysis]$
[7] Done fv pnS003-bkg_region-det_extra.fits
[htb3hg@xmm analysis]$ ftmerge pnS003-bkg_region-sky_extra.fits pnS003-bkg_region-sky.fits
[htb3hg@xmm analysis]$ ftmerge pnS003-bkg_region-det_extra.fits pnS003-bkg_region-det.fits
[htb3hg@xmm analysis]$ make_mask inimage=pnS003-obj-im.fits inmask=pnS003-mask-im.fits
outmask=pnS003-cheese.fits reglist=pnS003-bkg_region-sky.fits
make_mask:- Executing (routine): make_mask inimage=pnS003-obj-im.fits inmask=pnS003-mask-im.fits
outmask=pnS003-cheese.fits reglist=pnS003-bkg_region-sky.fits clobber=yes -w 1 -V 4
make_mask:- make_mask (esas-0.9.40) [xmmsas_20170719_1539-16.1.0] started: 2020-04-13T21:52:36.000
Event Image: pnS003-obj-im.fits
Input Mask: pnS003-mask-im.fits
Output Cheese Image: pnS003-cheese.fits
Region File: pnS003-bkg_region-sky.fits
Input Image: pnS003-obj-im.fits
```

Input Mask: pnS003-mask-im.fits

Template File

pnS003-mask-im.fits

Template image coordinate system: -TAN

Template image coordinate ID: RA---TAN DEC--TAN

Template image central coordinates: 120.2604583333301 36.0463333333301

Template image reference pixel: 450.9100000000003 450.9100000000003

Template image pixel sizes: -6.944444444444501E-004 6.944444444444501E-004

Template image NAXES, NAXIS: 2 900 900

pnS003-bkg_region-sky.fits

Number of excluded sources: 25

File exists with output file name

pnS003-cheese.fits

Clobber the file and continue

Output image coordinate system: -TAN

Output image coordinate ID: RA---TAN DEC--TAN

Output image central coordinates: 120.2604583333301 36.0463333333301

Output image reference pixel: 450.9100000000003 450.9100000000003

Output image pixel sizes: -6.944444444444501E-004 6.944444444444501E-004

Output image NAXES, NAXIS: 2 900 900

make_mask:- make_mask (esas-0.9.40) [xmmsas_20170719_1539-16.1.0] ended: 2020-04-13T21:52:36.000

[htb3hg@xmm analysis]\$ ds9 pnS003-cheese.fits &

[7] 10275

[htb3hg@xmm analysis]\$

[7] Done /XMMShared/Software/ciao-4.10/ots/bin/ds9 pnS003-cheese.fits

[htb3hg@xmm analysis]\$ ds9 pnS003-cheese.fits &

[7] 10880

[htb3hg@xmm analysis]\$

[7] Done /XMMShared/Software/ciao-4.10/ots/bin/ds9 pnS003-cheese.fits

[htb3hg@xmm analysis]\$ ds9 pnS003-cheese.fits &

[7] 11214

[htb3hg@xmm analysis]\$

```
[7] Done          /XMMShared/Software/ciao-4.10/ots/bin/ds9 pnS003-cheese.fits
[htb3hg@xmm analysis]$ fv mos1S001-bkg_region-det_extra.fits &
[7] 26652
[htb3hg@xmm analysis]$ fv mos1S001-bkg_region-det_extra.fits &
[8] 28413
[htb3hg@xmm analysis]$
[8] Done          fv mos1S001-bkg_region-det_extra.fits
[htb3hg@xmm analysis]$ fv mos1S001-bkg_region-det_extra.fits &
[8] 28475
[htb3hg@xmm analysis]$
[8] Done          fv mos1S001-bkg_region-det_extra.fits
[htb3hg@xmm analysis]$ ftmerge mos1S001-bkg_region-sky_extra.fits mos1S001-bkg_region-sky.fits
Dumping CFITSIO error stack:
-----
failed to create new file (already exists?):
mos1S001-bkg_region-sky.fits
-----
CFITSIO error stack dump complete.

Unable to create output file: mos1S001-bkg_region-sky.fits. (at ftmerge.c: 217)
CFITSIO ERROR FILE_NOT_CREATED: couldn't create the named file
Task ftmerge 2.20 terminating with status 105
[htb3hg@xmm analysis]$ ds9 mos1S001-cheese.fits &
[8] 29697
[htb3hg@xmm analysis]$
[8] Done          /XMMShared/Software/ciao-4.10/ots/bin/ds9 mos1S001-cheese.fits
[htb3hg@xmm analysis]$ ftmerge mos1S001-bkg_region-det_extra.fits mos1S001-bkg_region-det.fits
Dumping CFITSIO error stack:
-----
failed to create new file (already exists?):
mos1S001-bkg_region-det.fits
-----
CFITSIO error stack dump complete.
```

Unable to create output file: mos1S001-bkg_region-det.fits. (at ftmerge.c: 217)

CFITSIO ERROR FILE_NOT_CREATED: couldn't create the named file

Task ftmerge 2.20 terminating with status 105

[htb3hg@xmm analysis]\$ ds9 mos1S001-cheese.fits &

[8] 29913

[htb3hg@xmm analysis]\$

[8] Done /XMMShared/Software/ciao-4.10/ots/bin/ds9 mos1S001-cheese.fits

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[htb3hg@xmm analysis]\$

[htb3hg@xmm analysis]\$ gedit background_WCS.reg

[htb3hg@xmm analysis]\$

** (gedit:27745): WARNING **: 02:48:15.002: Set document metadata failed: Setting attribute metadata::gedit-position not supported

[htb3hg@xmm analysis]\$ cd ..

[htb3hg@xmm 0781590201]\$ ls

analysis/ ODF/ PPS/ setup

[htb3hg@xmm 0781590201]\$ cd PPS

[htb3hg@xmm PPS]\$ gedit background_WCS.reg

[htb3hg@xmm PPS]\$

** (gedit:27745): WARNING **: 02:48:54.170: Set document metadata failed: Setting attribute metadata::gedit-position not supported

[htb3hg@xmm PPS]\$ gedit background_WCS.reg

[htb3hg@xmm PPS]\$ ecoordconv imageset=mos1S001-obj-image-sky.fits coordtype=eqpos
x=8:00:57.2174 y=+36:03:16.415

** ecoordconv: error (ParamWrongType), Real expected at '8:00:57.2174'

Parameter 'x'

[htb3hg@xmm PPS]\$ ecoordconv imageset=mos1S001-obj-image-sky.fits coordtype=eqpos x=RA
y=DEC

** ecoordconv: error (ParamWrongType), Real expected at 'RA'

Parameter 'x'

```
[htb3hg@xmm PPS]$ ecoordconv imageset=mos1S001-obj-image-sky.fits coordtype=eqpos \
x=8:00:57.2174 y=+36:03:16.415
```

** ecoordconv: error (ParamWrongType), Real expected at '8:00:57.2174'

Parameter 'x'

```
[htb3hg@xmm PPS]$
```

```
[htb3hg@xmm PPS]$
```

```
[htb3hg@xmm PPS]$ ecoordconv imageset=mos1S001-obj-image-sky.fits coordtype=eqpos \
x=120.238405833333 y=36.0545597222222
```

ecoordconv:- Executing (routine): ecoordconv imageset=mos1S001-obj-image-sky.fits srcexp="
x=120.238405833 y=36.0545597222 pos2eqpos=no coordtype=eqpos withcoords=yes ccdno=0
withccd=no theta_out=0 phi_out=0 posx_out=0 posy_out=0 detx_out=0 dety_out=0 rawx_out=0
rawy_out=0 ra_out=0 dec_out=0 ccd_out=0 -w 1 -V 4

ecoordconv:- ecoordconv (especget-1.48.2) [xmmsas_20170719_1539-16.1.0] started: 2020-04-
20T06:58:13.000

** ecoordconv: error (datasetCouldNotBeRead), The dataset with name 'mos1S001-obj-image-sky.fits'
could not be read; either it does not exist or it is in an unrecognised format

```
[htb3hg@xmm PPS]$ cd ..
```

```
[htb3hg@xmm 0781590201]$ ls
```

analysis/ ODF/ PPS/ setup

```
[htb3hg@xmm 0781590201]$ cd analysis
```

```
[htb3hg@xmm analysis]$ ecoordconv imageset=mos1S001-obj-image-sky.fits coordtype=eqpos \
x=120.238405833333 y=36.0545597222222
```

ecoordconv:- Executing (routine): ecoordconv imageset=mos1S001-obj-image-sky.fits srcexp="
x=120.238405833 y=36.0545597222 pos2eqpos=no coordtype=eqpos withcoords=yes ccdno=0
withccd=no theta_out=0 phi_out=0 posx_out=0 posy_out=0 detx_out=0 dety_out=0 rawx_out=0
rawy_out=0 ra_out=0 dec_out=0 ccd_out=0 -w 1 -V 4

ecoordconv:- ecoordconv (especget-1.48.2) [xmmsas_20170719_1539-16.1.0] started: 2020-04-
20T06:59:18.000

ecoordconv:- Region Centre:

Theta: Phi: 57.659823 1.4275371

X: Y: 27204.652 26513.445

DETX: DETY: -1042.2776 -44.468458

IM_X: IM_Y: 476.58304 462.75891

RA: DEC: 120.23841 36.05456

RAWX: RAWY: 253.15522 298.47848

CCD(s): 1 centred on CCD: 1

ecoordconv:- ecoordconv (especget-1.48.2) [xmmsas_20170719_1539-16.1.0] ended: 2020-04-20T06:59:18.000

[htb3hg@xmm analysis]\$ gedit mos1_bkg_reg.txt

[htb3hg@xmm analysis]\$

[htb3hg@xmm analysis]\$

** (gedit:27745): WARNING **: 03:02:20.887: Set document metadata failed: Setting attribute metadata::gedit-spell-language not supported

** (gedit:27745): WARNING **: 03:02:20.887: Set document metadata failed: Setting attribute metadata::gedit-encoding not supported

gedit mos1_bkg_reg.txt

[htb3hg@xmm analysis]\$

[htb3hg@xmm analysis]\$

[htb3hg@xmm analysis]\$ ecoordconv imageset=mos2S002-obj-image-sky.fits coordtype=eqpos x=120.238405833333 y=36.0545597222222

ecoordconv:- Executing (routine): ecoordconv imageset=mos2S002-obj-image-sky.fits srcexp="x=120.238405833 y=36.0545597222 pos2eqpos=no coordtype=eqpos withcoords=yes ccdno=0 withccd=no theta_out=0 phi_out=0 posx_out=0 posy_out=0 detx_out=0 dety_out=0 rawx_out=0 rawy_out=0 ra_out=0 dec_out=0 ccd_out=0 -w 1 -V 4

ecoordconv:- ecoordconv (especget-1.48.2) [xmmsas_20170719_1539-16.1.0] started: 2020-04-20T07:02:59.000

ecoordconv:- Region Centre:

Theta: Phi: 33.533645 6.2725774

X: Y: 27204.652 26513.445

DETX: DETY: -131.2219 -1258.7345

IM_X: IM_Y: 476.58304 462.75891

RA: DEC: 120.23841 36.05456

RAWX: RAWY: 294.53789 243.32315

CCD(s): 1 centred on CCD: 1

ecoordconv:- ecoordconv (especget-1.48.2) [xmmsas_20170719_1539-16.1.0] ended: 2020-04-20T07:02:59.000

[htb3hg@xmm analysis]\$ gedit mos2_bkg_reg.txt

[htb3hg@xmm analysis]\$

** (gedit:27745): WARNING **: 03:04:03.684: Set document metadata failed: Setting attribute metadata::gedit-spell-language not supported

** (gedit:27745): WARNING **: 03:04:03.685: Set document metadata failed: Setting attribute metadata::gedit-encoding not supported

[htb3hg@xmm analysis]\$ ecoordconv imageset=pnS003-obj-image-sky.fits coordtype=eqpos x=120.238405833333 y=36.0545597222222

ecoordconv:- Executing (routine): ecoordconv imageset=pnS003-obj-image-sky.fits srcexp="" x=120.238405833 y=36.05455972222 pos2eqpos=no coordtype=eqpos withcoords=yes ccdno=0 withccd=no theta_out=0 phi_out=0 posx_out=0 posy_out=0 detx_out=0 dety_out=0 rawx_out=0 rawy_out=0 ra_out=0 dec_out=0 ccd_out=0 -w 1 -V 4

ecoordconv:- ecoordconv (especget-1.48.2) [xmmsas_20170719_1539-16.1.0] started: 2020-04-20T07:04:32.000

ecoordconv:- Region Centre:

Theta: Phi: 62.663458 2.5174664

X: Y: 27204.652 26513.445

DETX: DETY: 266.54906 1115.2027

IM_X: IM_Y: 476.58304 462.75891

RA: DEC: 120.23841 36.05456

RAWX: RAWY: 35.318151 173.98412

CCD(s): 4 centred on CCD: 4

ecoordconv:- ecoordconv (especget-1.48.2) [xmmsas_20170719_1539-16.1.0] ended: 2020-04-20T07:04:32.000

[htb3hg@xmm analysis]\$ gedit pn_bkg_reg.txt

[htb3hg@xmm analysis]\$

[htb3hg@xmm analysis]\$

** (gedit:27745): WARNING **: 03:05:42.371: Set document metadata failed: Setting attribute metadata::gedit-spell-language not supported

** (gedit:27745): WARNING **: 03:05:42.371: Set document metadata failed: Setting attribute metadata::gedit-encoding not supported

[htb3hg@xmm analysis]\$

[htb3hg@xmm analysis]\$ mos-spectra prefix=1S001 caldb=/XMMSHared/Software/ccf \

?

atthk.fits	P0781590201M1X000HK_GTI0000.FIT
ccf.cif	P0781590201M2S002-corimgfilt.FIT
command.csh	P0781590201M2S002FBKTSR0000.FIT
eboxlist_l.fits	P0781590201M2S002-objimgfilt.FIT
eboxlist_m.fits	P0781590201M2S002-objimg.FIT
emllist_extra.fits~	P0781590201M2X000HK_GTI0000.FIT
emllist_extra.fits	P0781590201OBX000ATTSR0000.FIT
emllist.fits	P0781590201PNS003BPXHMK0001.FIT
emllist_orig.fits	P0781590201PNS003BPXHMK0002.FIT
mos1_bkg_reg.txt	P0781590201PNS003BPXHMK0003.FIT
mos1_falsesources.reg	P0781590201PNS003BPXHMK0004.FIT
mos1_falsesources_wcs.reg	P0781590201PNS003BPXHMK0005.FIT
mos1_missedsources.reg	P0781590201PNS003BPXHMK0006.FIT
mos1_missedsources_wcs.reg	P0781590201PNS003BPXHMK0007.FIT
mos1S001-bkg_region-det_extra.fits~	P0781590201PNS003BPXHMK0008.FIT
mos1S001-bkg_region-det_extra.fits	P0781590201PNS003BPXHMK0009.FIT
mos1S001-bkg_region-det.fits	P0781590201PNS003BPXHMK0010.FIT
mos1S001-bkg_region-det_orig.fits~	P0781590201PNS003BPXHMK0011.FIT
mos1S001-bkg_region-det_orig.fits	P0781590201PNS003BPXHMK0012.FIT
mos1S001-bkg_region-sky_extra.fits~	P0781590201PNS003BPXMSK0001.FIT
mos1S001-bkg_region-sky_extra.fits	P0781590201PNS003BPXMSK0002.FIT

mos1S001-bkg_region-sky.fits~ P0781590201PNS003BPXMSK0003.FIT
mos1S001-bkg_region-sky.fits P0781590201PNS003BPXMSK0004.FIT
mos1S001-bkg_region-sky_orig.fits~ P0781590201PNS003BPXMSK0005.FIT
mos1S001-bkg_region-sky_orig.fits P0781590201PNS003BPXMSK0006.FIT
mos1S001-cheese.fits P0781590201PNS003BPXMSK0007.FIT
mos1S001-cheese_orig.fits P0781590201PNS003BPXMSK0008.FIT
mos1S001-clean.fits P0781590201PNS003BPXMSK0009.FIT
mos1S001-corn.fits P0781590201PNS003BPXMSK0010.FIT
mos1S001-corn-image.fits P0781590201PNS003BPXMSK0011.FIT
mos1S001-gti.fits P0781590201PNS003BPXMSK0012.FIT
mos1S001-gti.txt P0781590201PNS003FBKGTI0000.FIT
mos1S001-hist.ps P0781590201PNS003FBKSPC0000.FIT
mos1S001-hist.qdp P0781590201PNS003FBKTSR0000.FIT
mos1S001-mask-im.fits P0781590201PNS003-objimgfilt.FIT
mos1S001-obj-image-det.fits P0781590201PNS003-objimg.FIT
mos1S001-obj-image-det-soft.fits pn_bkg_reg.txt
mos1S001-obj-image-det-unfilt.fits pn_falsesources.reg
mos1S001-obj-image-sky.fits pn_falsesources_wcs.reg
mos1S001-obj-im.fits pn_missedsources.reg
mos1S001-ori.fits pn_missedsources_wcs.reg
mos1S001-ratec.fits pnS003-bkg_region-det_extra.fits~~
mos1S001-rate.fits pnS003-bkg_region-det_extra.fits~
mos1_src_orig_num.reg pnS003-bkg_region-det_extra.fits
mos1_src_orig.reg pnS003-bkg_region-det.fits
mos2_bkg_reg.txt pnS003-bkg_region-det_orig.fits~
mos2_falsesources.reg pnS003-bkg_region-det_orig.fits
mos2_falsesources_wcs.reg pnS003-bkg_region-sky_extra.fits~
mos2_missedsources.reg pnS003-bkg_region-sky_extra.fits
mos2_missedsources_wcs.reg pnS003-bkg_region-sky.fits
mos2S002-bkg_region-det_extra.fits~ pnS003-bkg_region-sky_orig.fits~

mos2S002-bkg_region-det_extra.fits pnS003-bkg_region-sky_orig.fits
mos2S002-bkg_region-det.fits pnS003-cheese.fits
mos2S002-bkg_region-det_orig.fits pnS003-clean.fits
mos2S002-bkg_region-sky_extra.fits~ pnS003-clean-oot.fits
mos2S002-bkg_region-sky_extra.fits pnS003_falsesources.reg
mos2S002-bkg_region-sky.fits pnS003_falsesources_wcs.reg
mos2S002-bkg_region-sky_orig.fits pnS003-gti.fits
mos2S002-cheese.fits pnS003-gti-oot.fits
mos2S002-cheese_orig.fits pnS003-gti-oot.txt
mos2S002-clean.fits pnS003-gti.txt
mos2S002-corn.fits pnS003-hist-oot.qdp
mos2S002-corn-image.fits pnS003-hist.ps
mos2S002-gti.fits pnS003-hist.qdp
mos2S002-gti.txt pnS003-mask-im.fits
mos2S002-hist.ps pnS003_missedsources.reg
mos2S002-hist.qdp pnS003_missedsources_wcs.reg
mos2S002-mask-im.fits pnS003-obj-image-det.fits
mos2S002-obj-image-det.fits pnS003-obj-image-det-oot.fits
mos2S002-obj-image-det-soft.fits pnS003-obj-image-det-unfilt.fits
mos2S002-obj-image-det-unfilt.fits pnS003-obj-image-det-unfilt-oot.fits
mos2S002-obj-image-sky.fits pnS003-obj-image-sky.fits
mos2S002-obj-im.fits pnS003-obj-image-sky-oot.fits
mos2S002-ori.fits pnS003-obj-im.fits
mos2S002-ratec.fits pnS003-oot.fits
mos2S002-rate.fits pnS003-ori.fits
P0781590201EMX000FBKGTI0000.FIT pnS003-rate.fits
P0781590201EMX000FBKTSR0000.FIT pnS003-rate-oot.fits
P0781590201M1S001-corimgfilt.FIT pps_srcs_num.reg
P0781590201M1S001FBKTSR0000.FIT pps_srcs.reg
P0781590201M1S001-objimgfilt.FIT temp_events.fits

P0781590201M1S001-objimg.FIT

?

atthk.fits	P0781590201M1X000HK_GTI0000.FIT
ccf.cif	P0781590201M2S002-corimgfilt.FIT
command.csh	P0781590201M2S002FBKTSR0000.FIT
eboxlist_l.fits	P0781590201M2S002-objimgfilt.FIT
eboxlist_m.fits	P0781590201M2S002-objimg.FIT
emllist_extra.fits~	P0781590201M2X000HK_GTI0000.FIT
emllist_extra.fits	P0781590201OBX000ATTSR0000.FIT
emllist.fits	P0781590201PNS003BPXHMK0001.FIT
emllist_orig.fits	P0781590201PNS003BPXHMK0002.FIT
mos1_bkg_reg.txt	P0781590201PNS003BPXHMK0003.FIT
mos1_falsesources.reg	P0781590201PNS003BPXHMK0004.FIT
mos1_falsesources_wcs.reg	P0781590201PNS003BPXHMK0005.FIT
mos1_missedsources.reg	P0781590201PNS003BPXHMK0006.FIT
mos1_missedsources_wcs.reg	P0781590201PNS003BPXHMK0007.FIT
mos1S001-bkg_region-det_extra.fits~	P0781590201PNS003BPXHMK0008.FIT
mos1S001-bkg_region-det_extra.fits	P0781590201PNS003BPXHMK0009.FIT
mos1S001-bkg_region-det.fits	P0781590201PNS003BPXHMK0010.FIT
mos1S001-bkg_region-det_orig.fits~	P0781590201PNS003BPXHMK0011.FIT
mos1S001-bkg_region-det_orig.fits	P0781590201PNS003BPXHMK0012.FIT
mos1S001-bkg_region-sky_extra.fits~	P0781590201PNS003BPXMSK0001.FIT
mos1S001-bkg_region-sky_extra.fits	P0781590201PNS003BPXMSK0002.FIT
mos1S001-bkg_region-sky.fits~	P0781590201PNS003BPXMSK0003.FIT
mos1S001-bkg_region-sky.fits	P0781590201PNS003BPXMSK0004.FIT
mos1S001-bkg_region-sky_orig.fits~	P0781590201PNS003BPXMSK0005.FIT
mos1S001-bkg_region-sky_orig.fits	P0781590201PNS003BPXMSK0006.FIT
mos1S001-cheese.fits	P0781590201PNS003BPXMSK0007.FIT
mos1S001-cheese_orig.fits	P0781590201PNS003BPXMSK0008.FIT
mos1S001-clean.fits	P0781590201PNS003BPXMSK0009.FIT

mos1S001-corn.fits	P0781590201PNS003BPXMSK0010.FIT
mos1S001-corn-image.fits	P0781590201PNS003BPXMSK0011.FIT
mos1S001-gti.fits	P0781590201PNS003BPXMSK0012.FIT
mos1S001-gti.txt	P0781590201PNS003FBKGTI0000.FIT
mos1S001-hist.ps	P0781590201PNS003FBKSPC0000.FIT
mos1S001-hist.qdp	P0781590201PNS003FBKTSR0000.FIT
mos1S001-mask-im.fits	P0781590201PNS003-objimgfilt.FIT
mos1S001-obj-image-det.fits	P0781590201PNS003-objimg.FIT
mos1S001-obj-image-det-soft.fits	pn_bkg_reg.txt
mos1S001-obj-image-det-unfilt.fits	pn_falsesources.reg
mos1S001-obj-image-sky.fits	pn_falsesources_wcs.reg
mos1S001-obj-im.fits	pn_missedsources.reg
mos1S001-ori.fits	pn_missedsources_wcs.reg
mos1S001-ratec.fits	pnS003-bkg_region-det_extra.fits~~
mos1S001-rate.fits	pnS003-bkg_region-det_extra.fits~
mos1_src_orig_num.reg	pnS003-bkg_region-det_extra.fits
mos1_src_orig.reg	pnS003-bkg_region-det.fits
mos2_bkg_reg.txt	pnS003-bkg_region-det_orig.fits~
mos2_falsesources.reg	pnS003-bkg_region-det_orig.fits
mos2_falsesources_wcs.reg	pnS003-bkg_region-sky_extra.fits~
mos2_missedsources.reg	pnS003-bkg_region-sky_extra.fits
mos2_missedsources_wcs.reg	pnS003-bkg_region-sky.fits
mos2S002-bkg_region-det_extra.fits~	pnS003-bkg_region-sky_orig.fits~
mos2S002-bkg_region-det_extra.fits	pnS003-bkg_region-sky_orig.fits
mos2S002-bkg_region-det.fits	pnS003-cheese.fits
mos2S002-bkg_region-det_orig.fits	pnS003-clean.fits
mos2S002-bkg_region-sky_extra.fits~	pnS003-clean-oot.fits
mos2S002-bkg_region-sky_extra.fits	pnS003_falsesources.reg
mos2S002-bkg_region-sky.fits	pnS003_falsesources_wcs.reg
mos2S002-bkg_region-sky_orig.fits	pnS003-gti.fits

mos2S002-cheese.fits pnS003-gti-oot.fits
mos2S002-cheese_orig.fits pnS003-gti-oot.txt
mos2S002-clean.fits pnS003-gti.txt
mos2S002-corn.fits pnS003-hist-oot.qdp
mos2S002-corn-image.fits pnS003-hist.ps
mos2S002-gti.fits pnS003-hist.qdp
mos2S002-gti.txt pnS003-mask-im.fits
mos2S002-hist.ps pnS003_missedsources.reg
mos2S002-hist.qdp pnS003_missedsources_wcs.reg
mos2S002-mask-im.fits pnS003-obj-image-det.fits
mos2S002-obj-image-det.fits pnS003-obj-image-det-oot.fits
mos2S002-obj-image-det-soft.fits pnS003-obj-image-det-unfilt.fits
mos2S002-obj-image-det-unfilt.fits pnS003-obj-image-det-unfilt-oot.fits
mos2S002-obj-image-sky.fits pnS003-obj-image-sky.fits
mos2S002-obj-im.fits pnS003-obj-image-sky-oot.fits
mos2S002-ori.fits pnS003-obj-im.fits
mos2S002-ratec.fits pnS003-oot.fits
mos2S002-rate.fits pnS003-ori.fits
P0781590201EMX000FBKGTI0000.FIT pnS003-rate.fits
P0781590201EMX000FBKTSR0000.FIT pnS003-rate-oot.fits
P0781590201M1S001-corimgfilt.FIT pps_srcs_num.reg
P0781590201M1S001FBKTSR0000.FIT pps_srcs.reg
P0781590201M1S001-objimgfilt.FIT temp_events.fits
P0781590201M1S001-objimg.FIT
? region=mos1_bkg_reg.txt elow=0 ehigh=0 ccd1=1 \?
atthk.fits P0781590201M1X000HK_GTI0000.FIT
ccf.cif P0781590201M2S002-corimgfilt.FIT
command.csh P0781590201M2S002FBKTSR0000.FIT
eboxlist_l.fits P0781590201M2S002-objimgfilt.FIT

eboxlist_m.fits	P0781590201M2S002-objimg.FIT
emllist_extra.fits~	P0781590201M2X000HK_GTI0000.FIT
emllist_extra.fits	P0781590201OBX000ATTSR0000.FIT
emllist.fits	P0781590201PNS003BPXHMK0001.FIT
emllist_orig.fits	P0781590201PNS003BPXHMK0002.FIT
mos1_bkg_reg.txt	P0781590201PNS003BPXHMK0003.FIT
mos1_falsesources.reg	P0781590201PNS003BPXHMK0004.FIT
mos1_falsesources_wcs.reg	P0781590201PNS003BPXHMK0005.FIT
mos1_missedsources.reg	P0781590201PNS003BPXHMK0006.FIT
mos1_missedsources_wcs.reg	P0781590201PNS003BPXHMK0007.FIT
mos1S001-bkg_region-det_extra.fits~	P0781590201PNS003BPXHMK0008.FIT
mos1S001-bkg_region-det_extra.fits	P0781590201PNS003BPXHMK0009.FIT
mos1S001-bkg_region-det.fits	P0781590201PNS003BPXHMK0010.FIT
mos1S001-bkg_region-det_orig.fits~	P0781590201PNS003BPXHMK0011.FIT
mos1S001-bkg_region-det_orig.fits	P0781590201PNS003BPXHMK0012.FIT
mos1S001-bkg_region-sky_extra.fits~	P0781590201PNS003BPXMSK0001.FIT
mos1S001-bkg_region-sky_extra.fits	P0781590201PNS003BPXMSK0002.FIT
mos1S001-bkg_region-sky.fits~	P0781590201PNS003BPXMSK0003.FIT
mos1S001-bkg_region-sky.fits	P0781590201PNS003BPXMSK0004.FIT
mos1S001-bkg_region-sky_orig.fits~	P0781590201PNS003BPXMSK0005.FIT
mos1S001-bkg_region-sky_orig.fits	P0781590201PNS003BPXMSK0006.FIT
mos1S001-cheese.fits	P0781590201PNS003BPXMSK0007.FIT
mos1S001-cheese_orig.fits	P0781590201PNS003BPXMSK0008.FIT
mos1S001-clean.fits	P0781590201PNS003BPXMSK0009.FIT
mos1S001-corn.fits	P0781590201PNS003BPXMSK0010.FIT
mos1S001-corn-image.fits	P0781590201PNS003BPXMSK0011.FIT
mos1S001-gti.fits	P0781590201PNS003BPXMSK0012.FIT
mos1S001-gti.txt	P0781590201PNS003FBKGTI0000.FIT
mos1S001-hist.ps	P0781590201PNS003FBKSPC0000.FIT
mos1S001-hist.qdp	P0781590201PNS003FBKTSR0000.FIT

mos1S001-mask-im.fits P0781590201PNS003-objimgfilt.FIT
mos1S001-obj-image-det.fits P0781590201PNS003-objimg.FIT
mos1S001-obj-image-det-soft.fits pn_bkg_reg.txt
mos1S001-obj-image-det-unfilt.fits pn_falsesources.reg
mos1S001-obj-image-sky.fits pn_falsesources_wcs.reg
mos1S001-obj-im.fits pn_missedsources.reg
mos1S001-ori.fits pn_missedsources_wcs.reg
mos1S001-ratec.fits pnS003-bkg_region-det_extra.fits~~
mos1S001-rate.fits pnS003-bkg_region-det_extra.fits~
mos1_src_orig_num.reg pnS003-bkg_region-det_extra.fits
mos1_src_orig.reg pnS003-bkg_region-det.fits
mos2_bkg_reg.txt pnS003-bkg_region-det_orig.fits~
mos2_falsesources.reg pnS003-bkg_region-det_orig.fits
mos2_falsesources_wcs.reg pnS003-bkg_region-sky_extra.fits~
mos2_missedsources.reg pnS003-bkg_region-sky_extra.fits
mos2_missedsources_wcs.reg pnS003-bkg_region-sky.fits
mos2S002-bkg_region-det_extra.fits~ pnS003-bkg_region-sky_orig.fits~
mos2S002-bkg_region-det_extra.fits pnS003-bkg_region-sky_orig.fits
mos2S002-bkg_region-det.fits pnS003-cheese.fits
mos2S002-bkg_region-det_orig.fits pnS003-clean.fits
mos2S002-bkg_region-sky_extra.fits~ pnS003-clean-oot.fits
mos2S002-bkg_region-sky_extra.fits pnS003_falsesources.reg
mos2S002-bkg_region-sky.fits pnS003_falsesources_wcs.reg
mos2S002-bkg_region-sky_orig.fits pnS003-gti.fits
mos2S002-cheese.fits pnS003-gti-oot.fits
mos2S002-cheese_orig.fits pnS003-gti-oot.txt
mos2S002-clean.fits pnS003-gti.txt
mos2S002-corn.fits pnS003-hist-oot.qdp
mos2S002-corn-image.fits pnS003-hist.ps
mos2S002-gti.fits pnS003-hist.qdp

mos2S002-gti.txt pnS003-mask-im.fits
mos2S002-hist.ps pnS003_missedsources.reg
mos2S002-hist.qdp pnS003_missedsources_wcs.reg
mos2S002-mask-im.fits pnS003-obj-image-det.fits
mos2S002-obj-image-det.fits pnS003-obj-image-det-oot.fits
mos2S002-obj-image-det-soft.fits pnS003-obj-image-det-unfilt.fits
mos2S002-obj-image-det-unfilt.fits pnS003-obj-image-det-unfilt-oot.fits
mos2S002-obj-image-sky.fits pnS003-obj-image-sky.fits
mos2S002-obj-im.fits pnS003-obj-image-sky-oot.fits
mos2S002-ori.fits pnS003-obj-im.fits
mos2S002-ratec.fits pnS003-oot.fits
mos2S002-rate.fits pnS003-ori.fits
P0781590201EMX000FBKGTI0000.FIT pnS003-rate.fits
P0781590201EMX000FBKTSR0000.FIT pnS003-rate-oot.fits
P0781590201M1S001-corimgfilt.FIT pps_srcs_num.reg
P0781590201M1S001FBKTSR0000.FIT pps_srcs.reg
P0781590201M1S001-objimgfilt.FIT temp_events.fits
P0781590201M1S001-objimg.FIT
?
atthk.fits P0781590201M1X000HK_GTI0000.FIT
ccf.cif P0781590201M2S002-corimgfilt.FIT
command.csh P0781590201M2S002FBKTSR0000.FIT
eboxlist_l.fits P0781590201M2S002-objimgfilt.FIT
eboxlist_m.fits P0781590201M2S002-objimg.FIT
emllist_extra.fits~ P0781590201M2X000HK_GTI0000.FIT
emllist_extra.fits P0781590201OBX000ATTSR0000.FIT
emllist.fits P0781590201PNS003BPXHMK0001.FIT
emllist_orig.fits P0781590201PNS003BPXHMK0002.FIT
mos1_bkg_reg.txt P0781590201PNS003BPXHMK0003.FIT
mos1_falsesources.reg P0781590201PNS003BPXHMK0004.FIT

mos1_falsesources_wcs.reg	P0781590201PNS003BPXHMK0005.FIT
mos1_missedsources.reg	P0781590201PNS003BPXHMK0006.FIT
mos1_missedsources_wcs.reg	P0781590201PNS003BPXHMK0007.FIT
mos1S001-bkg_region-det_extra.fits~	P0781590201PNS003BPXHMK0008.FIT
mos1S001-bkg_region-det_extra.fits	P0781590201PNS003BPXHMK0009.FIT
mos1S001-bkg_region-det.fits	P0781590201PNS003BPXHMK0010.FIT
mos1S001-bkg_region-det_orig.fits~	P0781590201PNS003BPXHMK0011.FIT
mos1S001-bkg_region-det_orig.fits	P0781590201PNS003BPXHMK0012.FIT
mos1S001-bkg_region-sky_extra.fits~	P0781590201PNS003BPXMSK0001.FIT
mos1S001-bkg_region-sky_extra.fits	P0781590201PNS003BPXMSK0002.FIT
mos1S001-bkg_region-sky.fits~	P0781590201PNS003BPXMSK0003.FIT
mos1S001-bkg_region-sky.fits	P0781590201PNS003BPXMSK0004.FIT
mos1S001-bkg_region-sky_orig.fits~	P0781590201PNS003BPXMSK0005.FIT
mos1S001-bkg_region-sky_orig.fits	P0781590201PNS003BPXMSK0006.FIT
mos1S001-cheese.fits	P0781590201PNS003BPXMSK0007.FIT
mos1S001-cheese_orig.fits	P0781590201PNS003BPXMSK0008.FIT
mos1S001-clean.fits	P0781590201PNS003BPXMSK0009.FIT
mos1S001-corn.fits	P0781590201PNS003BPXMSK0010.FIT
mos1S001-corn-image.fits	P0781590201PNS003BPXMSK0011.FIT
mos1S001-gti.fits	P0781590201PNS003BPXMSK0012.FIT
mos1S001-gti.txt	P0781590201PNS003FBKGTI0000.FIT
mos1S001-hist.ps	P0781590201PNS003FBKSPC0000.FIT
mos1S001-hist.qdp	P0781590201PNS003FBKTSR0000.FIT
mos1S001-mask-im.fits	P0781590201PNS003-objimgfilt.FIT
mos1S001-obj-image-det.fits	P0781590201PNS003-objimg.FIT
mos1S001-obj-image-det-soft.fits	pn_bkg_reg.txt
mos1S001-obj-image-det-unfilt.fits	pn_falsesources.reg
mos1S001-obj-image-sky.fits	pn_falsesources_wcs.reg
mos1S001-obj-im.fits	pn_missedsources.reg
mos1S001-ori.fits	pn_missedsources_wcs.reg

mos1S001-ratec.fits pnS003-bkg_region-det_extra.fits~~
mos1S001-rate.fits pnS003-bkg_region-det_extra.fits~
mos1_src_orig_num.reg pnS003-bkg_region-det_extra.fits
mos1_src_orig.reg pnS003-bkg_region-det.fits
mos2_bkg_reg.txt pnS003-bkg_region-det_orig.fits~
mos2_falsesources.reg pnS003-bkg_region-det_orig.fits
mos2_falsesources_wcs.reg pnS003-bkg_region-sky_extra.fits~
mos2_missedsources.reg pnS003-bkg_region-sky_extra.fits
mos2_missedsources_wcs.reg pnS003-bkg_region-sky.fits
mos2S002-bkg_region-det_extra.fits~ pnS003-bkg_region-sky_orig.fits~
mos2S002-bkg_region-det_extra.fits pnS003-bkg_region-sky_orig.fits
mos2S002-bkg_region-det.fits pnS003-cheese.fits
mos2S002-bkg_region-det_orig.fits pnS003-clean.fits
mos2S002-bkg_region-sky_extra.fits~ pnS003-clean-oot.fits
mos2S002-bkg_region-sky_extra.fits pnS003_falsesources.reg
mos2S002-bkg_region-sky.fits pnS003_falsesources_wcs.reg
mos2S002-bkg_region-sky_orig.fits pnS003-gti.fits
mos2S002-cheese.fits pnS003-gti-oot.fits
mos2S002-cheese_orig.fits pnS003-gti-oot.txt
mos2S002-clean.fits pnS003-gti.txt
mos2S002-corn.fits pnS003-hist-oot.qdp
mos2S002-corn-image.fits pnS003-hist.ps
mos2S002-gti.fits pnS003-hist.qdp
mos2S002-gti.txt pnS003-mask-im.fits
mos2S002-hist.ps pnS003_missedsources.reg
mos2S002-hist.qdp pnS003_missedsources_wcs.reg
mos2S002-mask-im.fits pnS003-obj-image-det.fits
mos2S002-obj-image-det.fits pnS003-obj-image-det-oot.fits
mos2S002-obj-image-det-soft.fits pnS003-obj-image-det-unfilt.fits
mos2S002-obj-image-det-unfilt.fits pnS003-obj-image-det-unfilt-oot.fits

```
mos2S002-obj-image-sky.fits      pnS003-obj-image-sky.fits
mos2S002-obj-im.fits            pnS003-obj-image-sky-oot.fits
mos2S002-ori.fits              pnS003-obj-im.fits
mos2S002-ratec.fits            pnS003-oot.fits
mos2S002-rate.fits             pnS003-ori.fits
P0781590201EMX000FBKGTI0000.FIT  pnS003-rate.fits
P0781590201EMX000FBKTSR0000.FIT  pnS003-rate-oot.fits
P0781590201M1S001-corimgfilt.FIT  pps_srcs_num.reg
P0781590201M1S001FBKTSR0000.FIT  pps_srcs.reg
P0781590201M1S001-objimgfilt.FIT  temp_events.fits
P0781590201M1S001-objimg.FIT
? ccd2=1 ccd3=0 ccd4=1 ccd5=1 ccd6=0 ccd7=1 mask=1
```

Task: mos-spectra

Version: 4.0

Date: 2011-06-29

Author: S. L. Snowden, based on code from K. D. Kuntz

prefix: 1S001

caldb: /XMMShared/Software/ccf

region: mos1_bkg_reg.txt

mask: 1

elow: 0

ehigh: 0

det: mos1

ccds: 1 1 0 1 1 0 1

cflim: 6400

detpref: mos1S001-clean.fits

ObsID: '0781590201'

Revolution Number: 3180

Observation took place after MOS1 CCD6 was lost

Observation took place after MOS1 CCD3 was lost

cflim, xfave, delxf: 6400 9790 3390

mos1S001-bkg_region-sky.fits

mos1S001-bkg_region-det.fits

SKY region file exists. Proceed with source exclusion.

maskitsky: &®ion(mos1S001-bkg_region-sky.fits)

DET region file exists. Proceed with source exclusion.

maskitdet: &®ion(mos1S001-bkg_region-det.fits)

ccdddef: &&!((DETX,DETY) in BOX(13280,-306,6610,6599,0))&&!((DETX,DETY) in BOX(-13169,-105,6599,6599,0))

ccdddefa: &&((CCDNR == 1)||(CCDNR == 2)||(CCDNR == 4)||(CCDNR == 5)||(CCDNR == 7))

Area Selection: &&((DETX,DETY) IN annulus(-1042.2776,-44.468458,6369.2, 12738.4))

corner event file already exists: mos1S001-corn.fits

image file already exists: mos1S001-obj-im.fits

```
evselect table=mos1S001-clean.fits:EVENTS withfilteredset=yes  
expression='(PATTERN<=12)&&(FLAG == 0)&&((DETX,DETY) IN box(-2683.5,-  
15917,2780.5,1340,0))||(DETX,DETY) IN box(2743.5,-16051,2579.5,1340,0))||(DETX,DETY) IN  
circle(97,-172,17152))&&!((DETX,DETY) in BOX(13280,-306,6610,6599,0))&&!((DETX,DETY) in  
BOX(-13169,-105,6599,6599,0))&&region(mos1S001-bkg_region-det.fits)&&((DETX,DETY) IN  
annulus(-1042.2776,-44.468458,6369.2, 12738.4))' filtertype=expression imagebinning='imageSize'  
imagedatatype='Int32' imageset=mos1S001-obj-im-sp-det.fits squarepixels=yes ignorelegallimits=yes  
withxranges=yes withyranges=yes xcolumn='DETX' ximagesize=780 ximagemax=19500 ximagemin=-  
19499 ycolumn='DETY' yimagesize=780 yimagemax=19500 yimagemin=-19499 updateexposure=yes  
filterexposure=yes
```

```
evselect:- Executing (routine): evselect table=mos1S001-clean.fits:EVENTS filteredset=filtered.fits
withfilteredset=yes keepfilteroutput=yes flagcolumn=EVFLAG flagbit=-1 destruct=yes dssblock=""
expression='(PATTERN<=12)&&(FLAG == 0)&&((DETX,DETY) IN box(-2683.5,-15917,2780.5,1340,0))||(DETX,DETY) IN box(2743.5,-16051,2579.5,1340,0))||(DETX,DETY) IN circle(97,-172,17152))&&!((DETX,DETY) in BOX(13280,-306,6610,6599,0))&&!((DETX,DETY) in BOX(-13169,-105,6599,6599,0))&&region(mos1S001-bkg_region-det.fits)&&((DETX,DETY) IN annulus(-1042.2776,-44.468458,6369.2, 12738.4))' filtertype=expression cleandss=no
updateexposure=yes filterexposure=yes writedss=yes blockstocopy=" attributestocopy="
energycolumn=PHA zcolumn=WEIGHT zerrorcolumn=EWEIGHT withzerrorcolumn=no
withzcolumn=no ignorelegallimits=yes imageset=mos1S001-obj-im-sp-det.fits xcolumn=DETX
ycolumn=DETY ximagebinsize=1 yimagebinsize=1 squarepixels=yes ximagesize=780 yimagesize=780
imagebinning=imageSize ximagemin=-19499 ximagemax=19500 withxranges=yes yimagemin=-19499
yimagemax=19500 withyranges=yes imagedatatype=Int32 withimagedatatype=yes rimagecenter=0
decimagecenter=0 withcelestialcenter=no withimageset=yes spectrumset=spectrum.fits spectralbinsize=5
specchannelmin=0 specchannelmax=11999 withspecranges=no withspectrumset=no rateset=rate.fits
timecolumn=TIME timebinsize=1 timemin=0 timemax=1000 withtimeranges=no maketimecolumn=no
makeratecolumn=no withrateset=no histogramset=histo.fits histogramcolumn=TIME histogrambinsize=1
histogrammin=0 histogrammax=1000 withhistoranges=no withhistogramset=no -w 1 -V 4
```

```
evselect:- evselect (evselect-3.62) [xmmsas_20170719_1539-16.1.0] started: 2020-04-20T22:11:27.000
evselect:- selected 11118 rows from the input table.
```

```
evselect:- evselect (evselect-3.62) [xmmsas_20170719_1539-16.1.0] ended: 2020-04-20T22:11:28.000
```

attitude file already exists

```
eexpmap attitudeset=atthk.fits eventset=mos1S001-clean.fits:EVENTS expimageset=mos1S001-exp-im.fits imageset=mos1S001-obj-im.fits pimax=8000 pimin=300 withdetcoords=no
```

```
eexpmap:- Executing (routine): eexpmap imageset=mos1S001-obj-im.fits attitudeset=atthk.fits
eventset=mos1S001-clean.fits:EVENTS expimageset=mos1S001-exp-im.fits withdetcoords=no
withvignetting=yes usefastpixelization=no usedlimap=no attrebin=4 pimin=300 pimax=8000 -w 1 -V 4
```

```
eexpmap:- eexpmap (eexpmap-4.11.2) [xmmsas_20170719_1539-16.1.0] started: 2020-04-20T22:11:28.000
```

```
** eexpmap: warning (NoExpoExt), Exposure extension not found
```

```
eexpmap:- CCF constituents accessed by the calibration server:
```

```
CifEntry{EMOS1, LINCOORD, 18, /XMMShared/cls7i/Software/ccf/EMOS1_LINCOORD_0018.CCF, 1998-01-01T00:00:00.000}
```

```
CifEntry{EPN, LINCOORD, 9, /XMMShared/cls7i/Software/ccf/EPN_LINCOORD_0009.CCF, 1998-01-01T00:00:00.000}
```

```
CifEntry{RGS1, LINCOORD, 8, /XMMShared/cls7i/Software/ccf/RGS1_LINCOORD_0008.CCF,  
1998-01-01T00:00:00.000}  
  
CifEntry{XMM, BORESIGHT, 27, /XMMShared/cls7i/Software/ccf/XMM_BORESIGHT_0027.CCF,  
2000-01-01T00:00:00.000}  
  
CifEntry{XMM, MISCDATA, 22, /XMMShared/cls7i/Software/ccf/XMM_MISCDATA_0022.CCF,  
1999-01-01T00:00:00.000}  
  
CifEntry{XRT1, XAREAEF, 9, /XMMShared/cls7i/Software/ccf/XRT1_XAREAEF_0009.CCF, 2000-  
01-13T00:00:00.000}
```

```
eexpmap:- eexpmap (eexpmap-4.11.2) [xmmsas_20170719_1539-16.1.0] ended: 2020-04-  
20T22:12:17.000
```

```
** eexpmap: warning (SummaryOfWarnings),  
warning NoExpoExt silently occurred 1 times
```

```
emask detmaskset=mos1S001-mask-im.fits expimageset=mos1S001-exp-im.fits threshold1=0.01  
threshold2=0.5
```

```
emask:- Executing (routine): emask expimageset=mos1S001-exp-im.fits detmaskset=mos1S001-mask-  
im.fits threshold1=0.01 threshold2=0.5 regionset=region.fits withregionset=no -w 1 -V 4
```

```
emask:- emask (emask-2.14) [xmmsas_20170719_1539-16.1.0] started: 2020-04-20T22:12:17.000
```

```
emask:- emask (emask-2.14) [xmmsas_20170719_1539-16.1.0] ended: 2020-04-20T22:12:18.000
```

```
evselect table=mos1S001-clean.fits:EVENTS withfilteredset=yes  
expression='(PATTERN<=12)&&(FLAG == 0)&&((DETX,DETY) IN annulus(-1042.2776,-  
44.468458,6369.2, 12738.4))&&!((DETX,DETY) in BOX(13280,-  
306,6610,6599,0))&&!((DETX,DETY) in BOX(-13169,-105,6599,6599,0))&&region(mos1S001-  
bkg_region-det.fits)&&(((DETX,DETY) IN box(-2683.5,-15917,2780.5,1340,0))||(DETX,DETY) IN  
box(2743.5,-16051,2579.5,1340,0))||(DETX,DETY) IN circle(97,-172,17152)))' filtertype=expression  
keepfilteroutput=no updateexposure=yes filterexposure=yes withspectrumset=yes  
spectrumset=mos1S001-obj.pi energycolumn=PI spectralbinsize=5 withspecranges=yes  
specchannelmin=0 specchannelmax=11999
```

```
evselect:- Executing (routine): evselect table=mos1S001-clean.fits:EVENTS filteredset=filtered.fits  
withfilteredset=yes keepfilteroutput=no flagcolumn=EVFLAG flagbit=-1 destruct=yes dssblock="  
expression='(PATTERN<=12)&&(FLAG == 0)&&((DETX,DETY) IN annulus(-1042.2776,-
```

```
44.468458,6369.2, 12738.4))&&!((DETX,DETY) in BOX(13280,-  
306,6610,6599,0))&&!((DETX,DETY) in BOX(-13169,-105,6599,6599,0))&&region(mos1S001-  
bkg_region-det.fits)&&(((DETX,DETY) IN box(-2683.5,-15917,2780.5,1340,0))||(DETX,DETY) IN  
box(2743.5,-16051,2579.5,1340,0))||(DETX,DETY) IN circle(97,-172,17152)))' filtertype=expression  
cleandss=no updateexposure=yes filterexposure=yes writedss=yes blockstocopy="" attributestocopy=""  
energycolumn=PI zcolumn=WEIGHT zerrorcolumn=EWEIGHT withzerrorcolumn=no withzcolumn=no  
ignorelegallimits=no imageset=image.fits xcolumn=RAWX ycolumn=RAWY ximagebinsize=1  
yimagebinsize=1 squarepixels=no ximagesize=600 yimagesize=600 imagebinning=imageSize  
ximageemin=1 ximageemax=640 withxranges=no yimageemin=1 yimageemax=640 withyranges=no  
imagedatatype=Real64 withimagedatatype=no raimagecenter=0 decimagecenter=0 withcelestialcenter=no  
withimageset=no spectrumset=mos1S001-obj.pi spectralbinsize=5 specchannelmin=0  
specchannelmax=11999 withspecranges=yes withspectrumsset=yes rateset=rate.fits timecolumn=TIME  
timebinsize=1 timemin=0 timemax=1000 withtimeranges=no maketimecolumn=no makeratecolumn=no  
withrateset=no histogramset=histo.fits histogramcolumn=TIME histogrambinsize=1 histogrammin=0  
histogrammax=1000 withhistoranges=no withhistogramset=no -w 1 -V 4
```

```
evselect:- evselect (evselect-3.62) [xmmsas_20170719_1539-16.1.0] started: 2020-04-20T22:12:18.000
```

```
evselect:- selected 11118 rows from the input table.
```

```
evselect:- evselect (evselect-3.62) [xmmsas_20170719_1539-16.1.0] ended: 2020-04-20T22:12:18.000
```

```
backscale spectrumset=mos1S001-obj.pi badpixlocation=mos1S001-clean.fits withbadpixcorr=yes
```

```
backscale:- Executing (routine): backscale spectrumset=mos1S001-obj.pi badpixlocation=mos1S001-  
clean.fits withbadpixcorr=yes useodfatt=no ignoreoutoffov=yes -w 1 -V 4
```

```
backscale:- backscale (backscale-1.4.2) [xmmsas_20170719_1539-16.1.0] started: 2020-04-  
20T22:12:18.000
```

```
backscale:- Executing (routine): arfgen spectrumset=mos1S001-obj.pi rmfset=response.ds withrmfset=no  
arfset=deletearf.ds detmaptype=flat detmaparray=detmapfile.ds: detxoffset=1200 detyoffset=1200  
withdetbounds=no detxbins=1 detybins=1 withdetbins=yes psfenergy=2 filterdss=yes  
filteredset=filteredpixellist.ds withfilteredset=no sourcecoords=eqpos sourcex=0 sourcey=0  
withsourcepos=no extendedsource=yes modeleffarea=no modelquantumeff=no modelfiltertrans=no  
modelcontamination=yes modelee=no modelootcorr=yes applyxcaladjustment=no eegridfactor=100  
withbadpixcorr=yes badpixlocation=mos1S001-clean.fits psfmodel=ELLBETA badpixelresolution=2  
withbadpixres=no setbackscale=yes keeparfset=no useodfatt=no ignoreoutoffov=yes  
crossreg_spectrumset=" crossregionarf=no -w 1 -V 4
```

```
backscale:- arfgen (arfgen-1.93.1) [xmmsas_20170719_1539-16.1.0] started: 2020-04-20T22:12:18.000
```

```
backscale::arfgen:- Opening spectrumset mos1S001-obj.pi...
```

```
backscale::arfgen:- Closing spectrumset mos1S001-obj.pi.
```

```
backscale::arfgen:- Computing source position from region extent..
```

```
backscale::arfgen:- CCF constituents accessed by the calibration server:
```

```
CifEntry{EMOS1, CONTAMINATION, 1,
/XMMShared/cls7i/Software/ccf/EMOS1_CONTAMINATION_0001.CCF, 2000-01-01T00:00:00.000}

CifEntry{EMOS1, FILTERTRANSX, 15,
/XMMShared/cls7i/Software/ccf/EMOS1_FILTERTRANSX_0015.CCF, 1998-01-01T00:00:00.000}

CifEntry{EMOS1, LINCOORD, 18, /XMMShared/cls7i/Software/ccf/EMOS1_LINCOORD_0018.CCF,
1998-01-01T00:00:00.000}

CifEntry{EMOS1, MODEPARAM, 6,
/XMMShared/cls7i/Software/ccf/EMOS1_MODEPARAM_0006.CCF, 1998-01-01T00:00:00.000}

CifEntry{EMOS1, PATTERNLIB, 5,
/XMMShared/cls7i/Software/ccf/EMOS1_PATTERNLIB_0005.CCF, 1998-01-01T00:00:00.000}

CifEntry{EMOS1, QUANTUMEF, 21,
/XMMShared/cls7i/Software/ccf/EMOS1_QUANTUMEF_0021.CCF, 2002-11-08T00:00:01.000}

CifEntry{EMOS1, TIMECORR, 3, /XMMShared/cls7i/Software/ccf/EMOS1_TIMECORR_0003.CCF,
1998-01-01T00:00:00.000}

CifEntry{RGS1, LINCOORD, 8, /XMMShared/cls7i/Software/ccf/RGS1_LINCOORD_0008.CCF,
1998-01-01T00:00:00.000}

CifEntry{XMM, ABSCOEFS, 4, /XMMShared/cls7i/Software/ccf/XMM_ABSCOEFS_0004.CCF, 1999-
01-01T00:00:00.000}

CifEntry{XRT1, XAREAEF, 9, /XMMShared/cls7i/Software/ccf/XRT1_XAREAEF_0009.CCF, 2000-
01-13T00:00:00.000}
```

```
backscale::arfgen:- Using a source position in DET coordinates of x=59.5 y=-1012
backscale::arfgen:- The source position in focal plane coords is theta=40.1927 phi=3.0923
backscale::arfgen:- Computing detector map bounds from the region selection information stored in the
spectrum ...
backscale::arfgen:- detector map binning will be: xbins: 1 ybins: 1
backscale::arfgen:- Constructing a flat detector map with xmin=-22502 xmax=22621 xbins=1 ymin=-
19004 ymax=16980 ybins=1
backscale::arfgen:- Opening arfset deletearf.ds...
backscale::arfgen:- WCS info for the columns temp_badcol_arfgen.del:BADPIX01:RAWX and
temp_badcol_arfgen.del:BADPIX01:RAWX is either non-existent or incomplete. Assuming a 1:1
mapping
```

backscale::arfgen:- WCS info for the columns temp_badcol_arfgen.del:BADPIX02:RAWX and temp_badcol_arfgen.del:BADPIX02:RAWX is either non-existent or incomplete. Assuming a 1:1 mapping

backscale::arfgen:- WCS info for the columns temp_badcol_arfgen.del:BADPIX04:RAWX and temp_badcol_arfgen.del:BADPIX04:RAWX is either non-existent or incomplete. Assuming a 1:1 mapping

backscale::arfgen:- WCS info for the columns temp_badcol_arfgen.del:BADPIX05:RAWX and temp_badcol_arfgen.del:BADPIX05:RAWX is either non-existent or incomplete. Assuming a 1:1 mapping

backscale::arfgen:- WCS info for the columns temp_badcol_arfgen.del:BADPIX07:RAWX and temp_badcol_arfgen.del:BADPIX07:RAWX is either non-existent or incomplete. Assuming a 1:1 mapping

backscale::arfgen:- Writing energy data into dataset ..

backscale::arfgen:- Calculating Area curve ...

backscale::arfgen:- Calculating Area curve ...2.5 2400 11997.5

** backscale::arfgen: warning (zeroSumDetmap), The filtered detector map has a zero normalisation - returning zero area. Try using a flat detector map and/or more bins

backscale::arfgen:- Bad pixel & chip gap fraction: ~10.74321448 %

backscale::arfgen:- Writing area data into dataset ..

backscale::arfgen:- Closing arfset deletearf.ds.

backscale::arfgen:- Opening spectrumset mos1S001-obj.pi...

backscale::arfgen:- Opened spectrumset mos1S001-obj.pi...

backscale::arfgen:- Opened table mos1S001-obj.pi...

backscale::arfgen:- current backscale value is: 1

backscale::arfgen:- deleted attmos1S001-obj.pi...

backscale::arfgen:- Backscale value is: 211400624

backscale::arfgen:- added attmos1S001-obj.pi...

backscale::arfgen:- closed specmos1S001-obj.pi...

backscale:- arfgen (arfgen-1.93.1) [xmmsas_20170719_1539-16.1.0] ended: 2020-04-20T22:13:52.000

backscale:- backscale (backscale-1.4.2) [xmmsas_20170719_1539-16.1.0] ended: 2020-04-20T22:13:52.000

evselect table=mos1S001-clean.fits:EVENTS withfilteredset=yes filtertype=expression expression='(PATTERN<=12)&&(FLAG == 0)&&((DETX,DETY) IN annulus(-1042.2776,-

```
44.468458,6369.2, 12738.4))&&(((DETX,DETY) IN box(-2683.5,-  
15917,2780.5,1340,0))||(DETX,DETY) IN box(2743.5,-16051,2579.5,1340,0))||(DETX,DETY) IN  
circle(97,-172,17152)))&&!((DETX,DETY) in BOX(13280,-306,6610,6599,0))&&!((DETX,DETY) in  
BOX(-13169,-105,6599,6599,0))&&region(mos1S001-bkg_region-det.fits)' imagebinning='imageSize'  
imagedatatype='Int32' imageset=detmap.ds squarepixels=yes ignorelegallimits=no withxranges=yes  
withyranges=yes xcolumn='DETX' ximagesize=120 ximagemax=19500 ximagegemin=-19499  
ycolumn='DETY' yimagesize=120 yimagemax=19500 yimagegemin=-19499 updateexposure=yes  
filterexposure=yes
```

```
evselect:- Executing (routine): evselect table=mos1S001-clean.fits:EVENTS filteredset=filtered.fits  
withfilteredset=yes keepfilteroutput=yes flagcolumn=EVFLAG flagbit=-1 destruct=yes dssblock=""  
expression='(PATTERN<=12)&&(FLAG == 0)&&((DETX,DETY) IN annulus(-1042.2776,-  
44.468458,6369.2, 12738.4))&&(((DETX,DETY) IN box(-2683.5,-  
15917,2780.5,1340,0))||(DETX,DETY) IN box(2743.5,-16051,2579.5,1340,0))||(DETX,DETY) IN  
circle(97,-172,17152)))&&!((DETX,DETY) in BOX(13280,-306,6610,6599,0))&&!((DETX,DETY) in  
BOX(-13169,-105,6599,6599,0))&&region(mos1S001-bkg_region-det.fits)' filtertype=expression  
cleandss=no updateexposure=yes filterexposure=yes writedss=yes blockstocopy="" attributestocopy=""  
energycolumn=PHA zcolumn=WEIGHT zerrorcolumn=EWEIGHT withzerrorcolumn=no  
withzcolumn=no ignorelegallimits=no imageset=detmap.ds xcolumn=DETX ycolumn=DETY  
ximagebinsize=1 yimagebinsize=1 squarepixels=yes ximagesize=120 yimagesize=120  
imagebinning=imageSize ximagegemin=-19499 ximagemax=19500 withxranges=yes yimagegemin=-19499  
yimagemax=19500 withyranges=yes imagedatatype=Int32 withimagedatatype=yes raimagecenter=0  
decimagecenter=0 withcelestialcenter=no withimageset=yes spectrumset=spectrum.fits spectralbinsize=5  
specchannelmin=0 specchannelmax=11999 withspecranges=no withspectrumset=no rateset=rate.fits  
timecolumn=TIME timebinsize=1 timemin=0 timemax=1000 withtimeranges=no maketimecolumn=no  
makeratecolumn=no withrateset=no histogramset=histo.fits histogramcolumn=TIME histogrambinsize=1  
histogrammin=0 histogrammax=1000 withhistoranges=no withhistogramset=no -w 1 -V 4
```

```
evselect:- evselect (evselect-3.62) [xmmsas_20170719_1539-16.1.0] started: 2020-04-20T22:13:52.000
```

```
evselect:- selected 11118 rows from the input table.
```

```
** evselect: warning (MinParamRange), Value of parameter ximagegemin outside allowed range for  
column DETX; Setting to minimum value.
```

```
** evselect: warning (MaxParamRange), Value of parameter ximagemax outside allowed range for  
column DETX; Setting to maximum value.
```

```
evselect:- evselect (evselect-3.62) [xmmsas_20170719_1539-16.1.0] ended: 2020-04-20T22:13:53.000
```

```
rmfgen format=var rmfset=mos1S001.rmf spectrumset=mos1S001-obj.pi threshold=1.0e-6  
detmaptype=dataset detmaparray=detmap.ds
```

```
rmfgen:- Executing (routine): rmfgen rmfset=mos1S001.rmf threshold=1e-06 withenergybins=no  
energymin=0 energymax=15 nenergybins=30 spectrumset=mos1S001-obj.pi format=var  
detmaptype=dataset detmaparray=detmap.ds withdetbounds=no detxoffset=1200 detyoffset=1200
```

```
detxbins=160 detybins=160 withdetbins=yes raweventfile=rawevents.ds correctforpileup=no  
filterdss=yes withfilteredset=no filteredset=filteredpixellist.ds withrmfset=no psfenergy=2  
withsourcepos=no sourcecoords=eqpos sourcex=0 sourcey=0 extendedsource=no modeleffarea=no  
modelquantumeff=no modelfiltertrans=no modelcontamination=no modelee=yes modelootcorr=no  
eegridfactor=100 withbadpixcorr=no badpixlocation=notSpecified setbackscale=no keeparfset=yes  
useodfatt=no ignoreoutoffov=yes crossreg_spectrumset=" crossregionarf=no psfmodel=notSpecified  
badpixelresolution=2 withbadpixres=no applyxcaladjustment=no acceptchanrange=no -w 1 -V 4
```

```
rmfgen:- rmfgen (rmfgen-2.5.1) [xmmsas_20170719_1539-16.1.0] started: 2020-04-20T22:13:53.000
```

```
rmfgen:- Opening spectrumset mos1S001-obj.pi...
```

```
rmfgen:- Closing spectrumset mos1S001-obj.pi.
```

```
rmfgen:- Computing source position from region extent..
```

```
rmfgen:- CCF constituents accessed by the calibration server:
```

```
CifEntry{EMOS1, CONTAMINATION, 1,  
/XMMShared/cls7i/Software/ccf/EMOS1_CONTAMINATION_0001.CCF, 2000-01-01T00:00:00.000}
```

```
CifEntry{EMOS1, FILTERTRANSX, 15,  
/XMMShared/cls7i/Software/ccf/EMOS1_FILTERTRANSX_0015.CCF, 1998-01-01T00:00:00.000}
```

```
CifEntry{EMOS1, LINCOORD, 18, /XMMShared/cls7i/Software/ccf/EMOS1_LINCOORD_0018.CCF,  
1998-01-01T00:00:00.000}
```

```
CifEntry{EMOS1, MODEPARAM, 6,  
/XMMShared/cls7i/Software/ccf/EMOS1_MODEPARAM_0006.CCF, 1998-01-01T00:00:00.000}
```

```
CifEntry{EMOS1, PATTERNLIB, 5,  
/XMMShared/cls7i/Software/ccf/EMOS1_PATTERNLIB_0005.CCF, 1998-01-01T00:00:00.000}
```

```
CifEntry{EMOS1, QUANTUMEF, 21,  
/XMMShared/cls7i/Software/ccf/EMOS1_QUANTUMEF_0021.CCF, 2002-11-08T00:00:01.000}
```

```
CifEntry{EMOS1, TIMECORR, 3, /XMMShared/cls7i/Software/ccf/EMOS1_TIMECORR_0003.CCF,  
1998-01-01T00:00:00.000}
```

```
CifEntry{RGS1, LINCOORD, 8, /XMMShared/cls7i/Software/ccf/RGS1_LINCOORD_0008.CCF,  
1998-01-01T00:00:00.000}
```

```
CifEntry{XMM, ABSCOEFS, 4, /XMMShared/cls7i/Software/ccf/XMM_ABSCOEFS_0004.CCF, 1999-  
01-01T00:00:00.000}
```

```
CifEntry{XMM, MISCDATA, 22, /XMMShared/cls7i/Software/ccf/XMM_MISCDATA_0022.CCF,  
1999-01-01T00:00:00.000}
```

```
CifEntry{XRT1, XAREAEF, 9, /XMMShared/cls7i/Software/ccf/XRT1_XAREAEF_0009.CCF, 2000-  
01-13T00:00:00.000}
```

```
rmfgen:- Using a source position in DET coordinates of x=59.5 y=-1012
rmfgen:- The source position in focal plane coords is theta=40.1927 phi=3.0923
rmfgen:- Constructing a DATASET-based detector map.
rmfgen:- The dataset-based detmap bounds corresponds to xmin=-12837.5 xmax=13812.5 xbins=82
ymin=-19337.5 ymax=19662.5 ybins=120
** rmfgen: warning (detmapXBoundsExceeded), The DSS x-axis extent [-22502,22621] exceeds the
detmap x-axis bounds [-12837.5,13812.5]. This may produce an inappropriate ARF
rmfgen:- PSF type: 5 [HIGH] will be used
rmfgen:- Creating RmfDataServer...
rmfgen:- EventGrades:5 PrimeFullWindow 303
rmfgen:- RmfDataServer created ok.
rmfgen:- Opening data set ...
rmfgen:- Opened data set.
rmfgen:- Adding MATRIX table. There will be 2400 rows in table
rmfgen:- Initialising table iterator ..
rmfgen:- Populating table ..
rmfgen:- No groups found for row 0 Will fill F_CHAN, N_CHAN and MATRIX columns with zeroes
rmfgen:- No groups found for row 1 Will fill F_CHAN, N_CHAN and MATRIX columns with zeroes
rmfgen:- No groups found for row 2 Will fill F_CHAN, N_CHAN and MATRIX columns with zeroes
rmfgen:- No groups found for row 3 Will fill F_CHAN, N_CHAN and MATRIX columns with zeroes
rmfgen:- No groups found for row 4 Will fill F_CHAN, N_CHAN and MATRIX columns with zeroes
rmfgen:- No groups found for row 5 Will fill F_CHAN, N_CHAN and MATRIX columns with zeroes
rmfgen:- Adding EBOUNDS extension ...
rmfgen:- Cleanup ...
rmfgen:- Closing data set ...
rmfgen:- Closed data set.
rmfgen:- Cleanup complete.
rmfgen:- rmfgen (rmfgen-2.5.1) [xmmsas_20170719_1539-16.1.0] ended: 2020-04-20T22:17:58.000
```

```
evselect table=mos1S001-clean.fits:EVENTS withfilteredset=yes filtertype=expression
expression='(PATTERN<=12)&&(FLAG == 0)&&((DETX,DETY) IN annulus(-1042.2776,-
```

```

44.468458,6369.2, 12738.4))&&(((DETX,DETY) IN box(-2683.5,-
15917,2780.5,1340,0))||(DETX,DETY) IN box(2743.5,-16051,2579.5,1340,0))||(DETX,DETY) IN
circle(97,-172,17152)))&&!((DETX,DETY) in BOX(13280,-306,6610,6599,0))&&!((DETX,DETY) in
BOX(-13169,-105,6599,6599,0))&&region(mos1S001-bkg_region-det.fits)' imagebinning='imageSize'
imagedatatype='Int32' imageset=detmap.ds squarepixels=yes ignorelegallimits=no withxranges=yes
withyranges=yes xcolumn='DETX' ximagesize=120 ximagemax=19500 ximagegemin=-19499
ycolumn='DETY' yimagesize=120 yimagemax=19500 yimagegemin=-19499 updateexposure=yes
filterexposure=yes

```

evselect:- Executing (routine): evselect table=mos1S001-clean.fits:EVENTS filteredset=filtered.fits withfilteredset=yes keepfilteroutput=yes flagcolumn=EVFLAG flagbit=-1 destruct=yes dssblock="" expression='(PATTERN<=12)&&(FLAG == 0)&&((DETX,DETY) IN annulus(-1042.2776,-44.468458,6369.2, 12738.4))&&(((DETX,DETY) IN box(-2683.5,-15917,2780.5,1340,0))||(DETX,DETY) IN circle(97,-172,17152)))&&!((DETX,DETY) in BOX(13280,-306,6610,6599,0))&&!((DETX,DETY) in BOX(-13169,-105,6599,6599,0))&®ion(mos1S001-bkg_region-det.fits)' filtertype=expression cleandss=no updateexposure=yes filterexposure=yes writedss=yes blockstocopy="" attributestocopy="" energycolumn=PHA zcolumn=WEIGHT zerrorcolumn=EWEIGHT withzerrorcolumn=no withzcolumn=no ignorelegallimits=no imageset=detmap.ds xcolumn=DETX ycolumn=DETY ximagebinsize=1 yimagebinsize=1 squarepixels=yes ximagesize=120 yimagesize=120 imagebinning=imageSize ximagegemin=-19499 ximagemax=19500 withxranges=yes yimagegemin=-19499 yimagemax=19500 withyranges=yes imagedatatype=Int32 withimagedatatype=yes raimagecenter=0 decimagecenter=0 withcelestialcenter=no withimageset=yes spectrumset=spectrum.fits spectralbinsize=5 specchannelmin=0 specchannelmax=11999 withspecranges=no withspectrumset=no rateset=rate.fits timecolumn=TIME timebinsize=1 timemin=0 timemax=1000 withtimeranges=no maketimecolumn=no makeratecolumn=no withrateset=no histogramset=histo.fits histogramcolumn=TIME histogrambinsize=1 histogrammin=0 histogrammax=1000 withhistoranges=no withhistogramset=no -w 1 -V 4

evselect:- evselect (evselect-3.62) [xmmsas_20170719_1539-16.1.0] started: 2020-04-20T22:17:58.000

evselect:- selected 11118 rows from the input table.

** evselect: warning (MinParamRange), Value of parameter ximagegemin outside allowed range for column DETX; Setting to minimum value.

** evselect: warning (MaxParamRange), Value of parameter ximagemax outside allowed range for column DETX; Setting to maximum value.

evselect:- evselect (evselect-3.62) [xmmsas_20170719_1539-16.1.0] ended: 2020-04-20T22:17:58.000

arfgen arfset=mos1S001.arf spectrumset=mos1S001-obj.pi withrmfset=yes rmfset=mos1S001.rmf extendedsource=yes modelee=no withbadpixcorr=no detmaptype=dataset detmaparray=detmap.ds badpixlocation=mos1S001-clean.fits modelootcorr=no

arfgen:- Executing (routine): arfgen spectrumset=mos1S001-obj.pi rmfset=mos1S001.rmf withrmfset=yes arfset=mos1S001.arf detmaptype=dataset detmaparray=detmap.ds detxoffset=1200 detyoffset=1200

```
withdetbounds=no detxbins=5 detybins=5 withdetbins=no psfenergy=2 filterdss=yes  
filteredset=filteredpixellist.ds withfilteredset=no sourcecoords=eqpos sourcex=0 sourcey=0  
withsourcepos=no extendedsource=yes modeleffarea=yes modelquantumeff=yes modelfiltertrans=yes  
modelcontamination=yes modelee=no modelootcorr=no applyxcaladjustment=no eegridfactor=100  
withbadpixcorr=no badpixlocation=mos1S001-clean.fits psfmodel=ELLBETA badpixelresolution=2  
withbadpixres=no setbackscale=no keeparfset=yes useodfatt=no ignoreoutoffov=yes  
crossreg_spectrumset=" crossregionarf=no -w 1 -V 4  
  
arfgen:- arfgen (arfgen-1.93.1) [xmmsas_20170719_1539-16.1.0] started: 2020-04-20T22:17:58.000  
  
arfgen:- Opening spectrumset mos1S001-obj.pi...  
  
arfgen:- Closing spectrumset mos1S001-obj.pi.  
  
arfgen:- Computing source position from region extent..  
  
arfgen:- CCF constituents accessed by the calibration server:  
  
CifEntry{EMOS1, CONTAMINATION, 1,  
/XMMShared/cls7i/Software/ccf/EMOS1_CONTAMINATION_0001.CCF, 2000-01-01T00:00:00.000}  
  
CifEntry{EMOS1, FILTERTRANSX, 15,  
/XMMShared/cls7i/Software/ccf/EMOS1_FILTERTRANSX_0015.CCF, 1998-01-01T00:00:00.000}  
  
CifEntry{EMOS1, LINCOORD, 18, /XMMShared/cls7i/Software/ccf/EMOS1_LINCOORD_0018.CCF,  
1998-01-01T00:00:00.000}  
  
CifEntry{EMOS1, MODEPARAM, 6,  
/XMMShared/cls7i/Software/ccf/EMOS1_MODEPARAM_0006.CCF, 1998-01-01T00:00:00.000}  
  
CifEntry{EMOS1, PATTERNLIB, 5,  
/XMMShared/cls7i/Software/ccf/EMOS1_PATTERNLIB_0005.CCF, 1998-01-01T00:00:00.000}  
  
CifEntry{EMOS1, QUANTUMEF, 21,  
/XMMShared/cls7i/Software/ccf/EMOS1_QUANTUMEF_0021.CCF, 2002-11-08T00:00:01.000}  
  
CifEntry{EMOS1, TIMECORR, 3, /XMMShared/cls7i/Software/ccf/EMOS1_TIMECORR_0003.CCF,  
1998-01-01T00:00:00.000}  
  
CifEntry{RGS1, LINCOORD, 8, /XMMShared/cls7i/Software/ccf/RGS1_LINCOORD_0008.CCF,  
1998-01-01T00:00:00.000}  
  
CifEntry{XMM, ABSCOEFS, 4, /XMMShared/cls7i/Software/ccf/XMM_ABSCOEFS_0004.CCF, 1999-  
01-01T00:00:00.000}  
  
CifEntry{XMM, MISCDATA, 22, /XMMShared/cls7i/Software/ccf/XMM_MISCDATA_0022.CCF,  
1999-01-01T00:00:00.000}  
  
CifEntry{XRT1, XAREAEF, 9, /XMMShared/cls7i/Software/ccf/XRT1_XAREAEF_0009.CCF, 2000-  
01-13T00:00:00.000}
```

arfgen:- Using a source position in DET coordinates of x=59.5 y=-1012
 arfgen:- The source position in focal plane coords is theta=40.1927 phi=3.0923
 arfgen:- Constructing a DATASET-based detector map.
 arfgen:- The dataset-based detmap bounds corresponds to xmin=-12837.5 xmax=13812.5 xbins=82
 ymin=-19337.5 ymax=19662.5 ybins=120
 ** arfgen: warning (detmapXBoundsExceeded), The DSS x-axis extent [-22502,22621] exceeds the
 detmap x-axis bounds [-12837.5,13812.5]. This may produce an inappropriate ARF
 arfgen:- Opening arfset mos1S001.arf...
 arfgen:- Writing energy data into dataset ..
 arfgen:- Calculating Area curve ...
 arfgen:- Calculating Area curve ...2.499999944 2400 11997.49994
 arfgen:- Bad pixel & chip gap fraction: ~0 %
 arfgen:- Writing area data into dataset ..
 arfgen:- Closing arfset mos1S001.arf.
 arfgen:- arfgen (arfgen-1.93.1) [xmmsas_20170719_1539-16.1.0] ended: 2020-04-20T22:21:14.000

1

```

evselect table=/XMMSShared/Software/ccf/mos1-fwc.fits.gz:EVENTS withfilteredset=yes
expression='(PATTERN<=12)&&(FLAG == 0)&&((DETX,DETY) in BOX(20,-
60,6610,6570,0))&&!((DETX,DETY) in BOX(13280,-306,6610,6599,0))&&!((DETX,DETY) in BOX(-
13169,-105,6599,6599,0))&&region(mos1S001-bkg_region-det.fits)&&(((DETX,DETY) IN box(-
2683.5,-15917,2780.5,1340,0))||(DETX,DETY) IN box(2743.5,-16051,2579.5,1340,0))||(DETX,DETY)
IN circle(97,-172,17152)))&&((DETX,DETY) IN annulus(-1042.2776,-44.468458,6369.2, 12738.4))'
withspectrumbset=yes spectrumset=mos1S001-1ff.pi energycolumn=PI spectralbinsize=5
withspecranges=yes specchannelmin=0 specchannelmax=11999
  
```

```

evselect:- Executing (routine): evselect table=/XMMSShared/Software/ccf/mos1-fwc.fits.gz:EVENTS
filteredset=filtered.fits withfilteredset=yes keepfilteroutput=yes flagcolumn=EVFLAG flagbit=-1
destruct=yes dssblock=" expression='(PATTERN<=12)&&(FLAG == 0)&&((DETX,DETY) in
BOX(20,-60,6610,6570,0))&&!((DETX,DETY) in BOX(13280,-306,6610,6599,0))&&!((DETX,DETY)
in BOX(-13169,-105,6599,6599,0))&&region(mos1S001-bkg_region-det.fits)&&(((DETX,DETY) IN
box(-2683.5,-15917,2780.5,1340,0))||(DETX,DETY) IN box(2743.5,-
16051,2579.5,1340,0))||(DETX,DETY) IN circle(97,-172,17152)))&&((DETX,DETY) IN annulus(-
1042.2776,-44.468458,6369.2, 12738.4))' filtertype=expression cleandss=no updateexposure=yes
filterexposure=yes writedss=yes blockscopy=" attributestocopy=" energycolumn=PI
zcolumn=WEIGHT zerrorcolumn=EWEIGHT withzerrorcolumn=no withzcolumn=no
ignorelegallimits=no imageset=image.fits xcolumn=RAWX ycolumn=RAWY ximagebinsize=1
  
```

```
yimagebinsize=1 squarepixels=no ximagesize=600 yimagesize=600 imagebinning=imageSize
ximageemin=1 ximagemax=640 withxranges=no yimageemin=1 yimagemax=640 withyranges=no
imagedatatype=Real64 withimagedatatype=no raimagecenter=0 decimagecenter=0 withcelestialcenter=no
withimageset=no spectrumset=mos1S001-1ff.pi spectralbinsize=5 specchannelmin=0
specchannelmax=11999 withspecranges=yes withspectrumset=yes rateset=rate.fits timecolumn=TIME
timebinsize=1 timemin=0 timemax=1000 withtimeranges=no maketimecolumn=no makeratecolumn=no
withrateset=no histogramset=histo.fits histogramcolumn=TIME histogrambinsize=1 histogrammin=0
histogrammax=1000 withhistoranges=no withhistogramset=no -w 1 -V 4
```

```
evselect:- evselect (evselect-3.62) [xmmsas_20170719_1539-16.1.0] started: 2020-04-20T22:21:14.000
evselect:- selected 131403 rows from the input table.
```

```
evselect:- evselect (evselect-3.62) [xmmsas_20170719_1539-16.1.0] ended: 2020-04-20T22:21:24.000
```

```
backscale spectrumset=mos1S001-1ff.pi badpixlocation=mos1S001-clean.fits withbadpixcorr=yes
```

```
backscale:- Executing (routine): backscale spectrumset=mos1S001-1ff.pi badpixlocation=mos1S001-clean.fits withbadpixcorr=yes useodfatt=no ignoreoutoffov=yes -w 1 -V 4
```

```
backscale:- backscale (backscale-1.4.2) [xmmsas_20170719_1539-16.1.0] started: 2020-04-20T22:21:24.000
```

```
backscale:- Executing (routine): arfgen spectrumset=mos1S001-1ff.pi rmfset=response.ds withrmfset=no
arfset=deletearf.ds detmaptype=flat detmaparray=detmapfile.ds: detxoffset=1200 detyoffset=1200
withdetbounds=no detxbins=1 detybins=1 withdetbins=yes psfenergy=2 filterdss=yes
filteredset=filteredpixellist.ds withfilteredset=no sourcecoords=eqpos sourcex=0 sourcey=0
withsourcepos=no extendedsource=yes modeleffarea=no modelquantumeff=no modelfiltertrans=no
modelcontamination=yes modelee=no modelootcorr=yes applyxcaladjustment=no eegridfactor=100
withbadpixcorr=yes badpixlocation=mos1S001-clean.fits psfmodel=ELLBETA badpixelresolution=2
withbadpixres=no setbackscale=yes keeparfset=no useodfatt=no ignoreoutoffov=yes
crossreg_spectrumset=" crossregionarf=no -w 1 -V 4
```

```
backscale:- arfgen (arfgen-1.93.1) [xmmsas_20170719_1539-16.1.0] started: 2020-04-20T22:21:24.000
```

```
backscale::arfgen:- Opening spectrumset mos1S001-1ff.pi...
```

```
backscale::arfgen:- Closing spectrumset mos1S001-1ff.pi.
```

```
backscale::arfgen:- Computing source position from region extent..
```

```
backscale::arfgen:- CCF constituents accessed by the calibration server:
```

```
CifEntry{EMOS1, CONTAMINATION, 1,
/XMMShared/cls7i/Software/ccf/EMOS1_CONTAMINATION_0001.CCF, 2000-01-01T00:00:00.000}
```

```
CifEntry{EMOS1, FILTERTRANSX, 15,
/XMMShared/cls7i/Software/ccf/EMOS1_FILTERTRANSX_0015.CCF, 1998-01-01T00:00:00.000}
```

CifEntry{EMOS1, LINCOORD, 18, /XMMShared/cls7i/Software/ccf/EMOS1_LINCOORD_0018.CCF, 1998-01-01T00:00:00.000}

CifEntry{EMOS1, MODEPARAM, 6, /XMMShared/cls7i/Software/ccf/EMOS1_MODEPARAM_0006.CCF, 1998-01-01T00:00:00.000}

CifEntry{EMOS1, PATTERNLIB, 5, /XMMShared/cls7i/Software/ccf/EMOS1_PATTERNLIB_0005.CCF, 1998-01-01T00:00:00.000}

CifEntry{EMOS1, QUANTUMEF, 21, /XMMShared/cls7i/Software/ccf/EMOS1_QUANTUMEF_0021.CCF, 2002-11-08T00:00:01.000}

CifEntry{EMOS1, TIMECORR, 3, /XMMShared/cls7i/Software/ccf/EMOS1_TIMECORR_0003.CCF, 1998-01-01T00:00:00.000}

CifEntry{RGS1, LINCOORD, 8, /XMMShared/cls7i/Software/ccf/RGS1_LINCOORD_0008.CCF, 1998-01-01T00:00:00.000}

CifEntry{XMM, ABSCOEFS, 4, /XMMShared/cls7i/Software/ccf/XMM_ABSCOEFS_0004.CCF, 1999-01-01T00:00:00.000}

CifEntry{XMM, MISCDATA, 22, /XMMShared/cls7i/Software/ccf/XMM_MISCDATA_0022.CCF, 1999-01-01T00:00:00.000}

CifEntry{XRT1, XAREAEF, 9, /XMMShared/cls7i/Software/ccf/XRT1_XAREAEF_0009.CCF, 2000-01-13T00:00:00.000}

backscale::arfgen:- Using a source position in DET coordinates of x=59.5 y=-1012

backscale::arfgen:- The source position in focal plane coords is theta=40.1927 phi=3.0923

backscale::arfgen:- Computing detector map bounds from the region selection information stored in the spectrum ...

backscale::arfgen:- detector map binning will be: xbins: 1 ybins: 1

backscale::arfgen:- Constructing a flat detector map with xmin=-22502 xmax=22621 xbins=1 ymin=-19004 ymax=16980 ybins=1

backscale::arfgen:- Opening arfset deletearf.ds...

backscale::arfgen:- Executing (routine): attcalc eventset=rawpixellist.ds:EVENTS fixedra=67.814833 fixeddec=18.174472 fixedposangle=264.238373 attitudelabel=fixed nominalra=67.814833 nominaldec=18.174472 refpointlabel=user atthkset=atthk.dat withatthkset=no withmedianpnt=yes calctlmax=no imagesize=0.36 -w 1 -V 4

backscale::arfgen:- attcalc (attcalc-4.37) [xmmsas_20170719_1539-16.1.0] started: 2020-04-20T22:21:26.000

** backscale::arfgen::attcalc: warning (RangeStateVariable::set), The value 396966048 for variable 'exposure duration' is not in the allowed range: 300 <= value <= 156818.7117

```
backscale::arfgen:- attcalc (attcalc-4.37) [xmmsas_20170719_1539-16.1.0] ended: 2020-04-20T22:21:26.000
backscale::arfgen:- Executing (routine): attcalc eventset=rawpixellist.ds:EVENTS fixedra=67.814833
fixeddec=18.174472 fixedposangle=264.238373 attitudelabel=fixed nominalra=67.814833
nominaldec=18.174472 refpointlabel=user atthkset=atthk.dat withatthkset=no withmedianpnt=yes
calctlmax=no imagesize=0.36 -w 1 -V 4
```

```
backscale::arfgen:- attcalc (attcalc-4.37) [xmmsas_20170719_1539-16.1.0] started: 2020-04-20T22:21:26.000
```

```
backscale::arfgen:- attcalc (attcalc-4.37) [xmmsas_20170719_1539-16.1.0] ended: 2020-04-20T22:21:27.000
```

WARNING

CCD #2 is less than 1 sigma below the threshold indicating
indicating that it is in an anomalous state. The model QPB spectrum
is of questionable validity below ~1 keV, the model above ~1 keV is valid

WARNING

CCD #4 is in an anomalous state. The model QPB spectrum
is only valid above ~1 keV

If other CCDs are in use and if data for E<1 keV are to be used
mos spectra should be rerun excluding mos1 CCD #4

WARNING

CCD #5 is in an anomalous state. The model QPB spectrum
is only valid above ~1 keV

If other CCDs are in use and if data for E<1 keV are to be used
mos spectra should be rerun excluding mos1 CCD #5

WARNING

CCD #7 is less than 1 sigma below the threshold indicating
indicating that it is in an anomalous state. The model QPB spectrum
is of questionable validity below ~1 keV, the model above ~1 keV is valid

250.952u 6.639s 4:18.99 99.4% 0+0k 5496+949728io 21pf+0w

4/27/20

[htb3hg@xmm analysis]\$ **proton_scale caldb=/XMMShared/Software/ccf mode=1 detector=1 maskfile=mos1S001-obj-im-sp-det.fits specfile=mos1S001-obj.pi**

proton_scale:- Executing (routine): proton_scale caldb=/XMMShared/Software/ccf mode=1 detector=1
maskfile=mos1S001-obj-im-sp-det.fits specfile=mos1S001-obj.pi spfile=spfile -w 1 -V 4

proton_scale:- proton_scale (esas-0.9.40) [xmmsas_20170719_1539-16.1.0] started: 2020-04-
27T23:39:21.000

xmmd: /XMMShared/Software/ccf

xmmdir: /XMMShared/Software/ccf

nam: 1

maskfile: mos1S001-obj-im-sp-det.fits

specfile: mos1S001-obj.pi

proton_scale:- Backscale: 146.805984

Area: 146.806

Ave Flux: 1.99363640E-05

Scaled Ave Flux: 292.677765

proton_scale:- proton_scale (esas-0.9.40) [xmmsas_20170719_1539-16.1.0] ended: 2020-04-
27T23:39:21.000

[htb3hg@xmm analysis]\$ **proton_scale caldb=/XMMShared/Software/ccf mode=1 detector=2 maskfile=mos2S002-obj-im-sp-det.fits specfile=mos2S002-obj.pi**

proton_scale:- Executing (routine): proton_scale caldb=/XMMShared/Software/ccf mode=1 detector=2
maskfile=mos2S002-obj-im-sp-det.fits specfile=mos2S002-obj.pi spfile=spfile -w 1 -V 4

proton_scale:- proton_scale (esas-0.9.40) [xmmsas_20170719_1539-16.1.0] started: 2020-04-
27T23:40:52.000

xmmd: /XMMShared/Software/ccf

xmmdir: /XMMShared/Software/ccf

nam: 2

maskfile: mos2S002-obj-im-sp-det.fits

specfile: mos2S002-obj.pi

proton_scale:- Backscale: 247.459335

Area: 247.459

Ave Flux: 1.95303619E-05

Scaled Ave Flux: 483.297028

proton_scale:- proton_scale (esas-0.9.40) [xmmsas_20170719_1539-16.1.0] ended: 2020-04-27T23:40:52.000

[htb3hg@xmm analysis]\$ **proton_scale caldb=/XMMShared/Software/ccf mode=1 detector=3 maskfile=pnS003-obj-im-sp-det.fits specfile=pnS003-obj.pi**

proton_scale:- Executing (routine): proton_scale caldb=/XMMShared/Software/ccf mode=1 detector=3 maskfile=pnS003-obj-im-sp-det.fits specfile=pnS003-obj.pi spfile=spfile -w 1 -V 4

proton_scale:- proton_scale (esas-0.9.40) [xmmsas_20170719_1539-16.1.0] started: 2020-04-27T23:43:52.000

xmmd: /XMMShared/Software/ccf

xmmdir: /XMMShared/Software/ccf

nam: 3

maskfile: pnS003-obj-im-sp-det.fits

specfile: pnS003-obj.pi

proton_scale:- Backscale: 235.021332

Area: 235.021

Ave Flux: 2.09487698E-05

Scaled Ave Flux: 492.340790

proton_scale:- proton_scale (esas-0.9.40) [xmmsas_20170719_1539-16.1.0] ended: 2020-04-27T23:43:52.000