merge_comp_xmm

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Abstract

This task combines the images produced for individual observations into larger field mosaics. This includes the event and exposure images (output from *mos-spectra* and *pn-spectra*), QPB background images (output from *mos_back* and *pn_back*, both processed by *rot-im-det-sky*), the soft proton images (output from *proton*, and the solar wind charge exchange background (output from *swcx*), also processed by `rot-im-det-sky`). Pixel size, image size, coordinate system, and central coordinates are all user selected.

1 Instruments/Modes

Instrument	Mode
EPIC	Imaging

2 Use

pipeline processing	no
interactive analysis	yes

3 Description

This task combines the images produced for individual observations into larger field mosaics. This includes the event and exposure images (output from `mos-spectra`), QPB background images (output from *mos_back* processed by *rot-im-det-sky*), and the soft proton images (output from `proton` also processed by *rot-im-det-sky*). Pixel size, coordinate system, and central coordinates are all user selected. The output images are 2000×2000 pixels.

merge-comp-xmm compensates for the inclusion of observations with different filters in the mosaic. It uses the results of PIMMS with the assumption of a power-law spectrum with photon indecies (alpha) of 2.4, 1.7, and 1.0, and absorption of $N_H = 2{\times}10^{20}$ H I cm^{-2}. The user enters a vlaue for alpha between 1.0 and 2.4 where 1.0 will select the hard spectrum, 1.7 selects the medium spectrum, and 2.4 selects the soft spectrum. Intermediate values will produce a linear scaling between the two nearest spectra. The exposure image is then scaled by the ratio of the model count rates for the medium filter versus the thin or thick, making the resultant image appropriate for the medium filter.

Warning and requirements: *merge_comp_xmm* is part of the package *esas*, integrated into SAS, but (still) limited to work within *esas*' data reduction scheme. This is specially true wrt input files structure and names. In particular, *merge_comp_xmm* assumes that other tasks from the package, *mos-spectra* / *pn-spectra*, *proton* and *rot-im-det-sky* have been successfully run for the exposures to be used.

4 Parameters

This section documents the parameters recognized by this task (if any).

Parameter	Mand	Type	Default	Constraints
caldb	yes	string		

Directory containing all the ESAS specific calibration files

dirfile	yes	string	mydir	

File containing the list of exposures, including the directory string, for data to be merged. For instance, if the merging processing is being done in the directory */DATA/merge* and the individual observations are located in the parallel directories */DATA/obs1/proc* and */DATA/obs2/proc*, the file *dirlist* could have entries such as:

```
/DATA/obs1/proc/mos1S001
/DATA/obs1/proc/mos2S002
/DATA/obs1/proc/pnS003
/DATA/obs2/proc/mos1S001
/DATA/obs2/proc/mos2S002
/DATA/obs2/proc/pnS003
```

coord	yes	int	1	

Selects which coordinate system should be used, 1: ecliptic, 2: equatorial, 3: galactic.

crvaln1	yes	real		

Central longitude of the projection.

crvaln2	yes	real		

Central latitude of the projection.

pixelsize	yes	real		

Pixel size of the projection in decimal degrees.

component	yes	int	1	

Component to be cast, 1: count image, 2: exposure, 3: QPB counts, 4: SP counts..

alpha	yes	real	1.7	

Assumed spectral index for the filter correction scaling.

elow	yes	int	400	

Energy low limit (in eV) for the band.

ehigh	yes	int	1250	

Energy high limit (in eV) for the band.

maskcontrol	yes	int	1	

Mask control, 0: no masking, 1: point source masking using the output from `cheese`, 2: good area masking using the masks produced by `mos-spectra`, 3: mask from merged source list output from `make_mask_merge`.

xdim	yes	int	2000	

X dimension of the output image

ydim	yes	int	2000	

Y dimension of the output image

clobber	no	boolean	yes	T/F

Clobber existing files?

5 Input Files

Event and exposure images, products from running *mos-spectra* / *pn-spectra*, QPB background images (from *mos_back* / *pn_back* processed by *rot-im-det-sky*) and soft proton images (output from *proton* also processed by *rot-im-det-sky*).

6 Output Files

For the different values of `comp`, the output files are:

- 1: `obj-im-`*elow*`-`*ehigh*`.fits` – The count image
- 2: `exp-im-`*elow*`-`*ehigh*`.fits` – The exposure image
- 3: `back-im-`*elow*`-`*ehigh*`.fits` – The QPB count image
- 4: `prot-im-`*elow*`-`*ehigh*`.fits` – The SP count image

7 Algorithm

8 Comments

References