sppartial

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Abstract

This task uses information from the spectral fit of a limited region of the detector and from the full field-of-view to scale the fitted SP normalization of the limited region to be appropriate for the full FOV. This is useful for the case where bright diffuse emission in part of the FOV may be affecting the SP spectral fit, in many clusters of galaxies for example. This task was originally a subtask of the SAS *esas* task named *sp_partial* prior to SAS-21 and retains all of its functionality.

1 Instruments/Modes

Instrument	Mode
EPIC	Imaging

2 Use

pipeline processing	no
interactive analysis	yes

3 Description

sppartial uses information from the spectral fit of a limited region of the detector and from the full field-of-view to scale the fitted SP normalization of the limited region to be appropriate for the full FOV. This is useful for the case where bright diffuse emission in part of the FOV may be affecting the SP spectral fit, in many clusters of galaxies for example.

Warning and requirements: *sppartial* is part of the *esas* package integrated into SAS, but it is limited to work within the *esas* data reduction scheme. This is specially true wrt the structure and names of the input files. In particular, *sppartial* assumes that other tasks from the package, *mosspectra* or *pnspectra* have been successfully run twice, once for the full field of view, once for a limited source-free region. This requires a number of files to be renamed or else they will be overwritten (the spectra and soft proton template files).

4 Parameters

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

Parameter	Mand	Type	Default	Constraints
fullimage	yes	dataset	mos1S001-sp-ps.fits	

Image from the full field of view.

fullspec	yes	string	mos1S001-obj-ps.pi	

Spectrum from the full field of view.

regimage	yes	string	mos1S001-sp-nps.fits	

Image from the selected region.

regspec	yes	string	mos1S001-obj-nps.pi	

Spectrum from the selected region.

regnorm	yes	real	0.5	

Xspec normalization of the SP component.

5 Errors

This section documents warnings and errors generated by this task (if any). Note that warnings and errors can also be generated in the SAS infrastructure libraries, in which case they would not be documented here. Refer to the index of all errors and warnings available in the HTML version of the SAS documentation.

notSAMEobsid *(error)*
Full image and Full spectrum have different obsids

notSAMEfilter *(error)*
Region image and region spectrum have different FILTER

6 Input Files

The detector map, product from running `mosspectra`, following the particular nomenclature used in the esas package.

7 Output Files

None: only scaled value for the Soft Proton normalization.

8 Algorithm

```
Read parameters
Open and read full FOV image FITS file (780x780 I32 array plus attributes).
Open and read full FOV spectum FITS file, extract BACKSCALE.

call CAL_spdetmap to get Soft Proton DETMAP for inst and filter.
Loop through both image array and SPDETMAP array to find SP contribution
    n = 0
    spfull = 0.
    do i=0,fimgXsize-1
       do ii=0,fimgYsize-1
          if (fimage_IP(i,ii) .gt. 0) then
             n = n + 1
             spfull = spfull + spdetmap_RP(i,ii)
          endif
       enddo
    enddo
    spfull = spfull / real(n)

Repeat for user-selected region image and spectrum
    n = 0
    spregion = 0.
    do i=0,rimgXsize-1
       do ii=0,rimgYsize-1
          if (rimage_IP(i,ii) .gt. 0) then
             n = n + 1
             spregion = spregion + spdetmap_RP(i,ii)
          endif
       enddo
    enddo
    spregion = spregion / real(n)

    rrnorm = rnorm * (backFOV/backREG) * (spfull/spregion)

Print rrnorm, backscale values
```

9 Comments

The original code for this task appeared in the *esas* task 2009-2021 as the subtask *sp_partial*. It was removed from the task *esas*, and modularized as a single task for SAS-21. The *esas* task was removed in SAS-21.

References