



omgrismplot

January 27, 2025

Abstract

omgrismplot produces plots of the grism spectrum and background for a FITS file produced by **omgrism** for Optical Monitor observations made with grism-filters.

1 Instruments/Modes

| Instrument | Mode |
|------------|---------|
| OM | IMAGING |

2 Use

| | |
|----------------------|-----|
| pipeline processing | yes |
| interactive analysis | yes |

3 Description

omgrismplotplot produces plots of grism spectra extracted from the OM images taken with the Grism-1 or Grism-2 filters. These plots show spectra (either count rates or flux) and the background count rates. **omgrismplotplot** can be used to display a single spectrum or multiple spectra, produced by **omgrism**.

The input FITS files must contain net count rates, background count rates and the associated errors. The spectra must follow a regular binning scheme (i.e. equispaced wavelength bins).

omgrismplot allows the user to select the output format (e.g. pdf, Xwindow, Postscript) for output. For Postscript output the `plotfile` should be specified with the extension ".ps". A PDF format file is also generated. If `plotfile` is set with the extension ".pdf" then the Postscript file will not be generated. The y-scale of the background counts can be forced to be the same as the source counts by setting the parameter 'bkgdyscale' to 'yes'. Otherwise the y-axis is scaled to the most appropriate value for the background counts.

The spectra curves can be rebinned if necessary in order to limit the number of plotted data points to 500.



4 Parameters

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

| Parameter | Mand | Type | Default | Constraints |
|-----------|------|------|---------|-------------|
|-----------|------|------|---------|-------------|

| | | | | |
|------------|-----|---------|------------|--|
| set | yes | dataset | No default | |
|------------|-----|---------|------------|--|

Name of the FITS file containing the spectral data. Case sensitive.

| | | | | |
|-------------------|----|--------|-------|--------------------------------|
| plotdevice | no | String | "/PS" | Constraint : valid device type |
|-------------------|----|--------|-------|--------------------------------|

Not case sensitive.

| | | | | |
|-----------------|----|--------|-----------------|----------------------|
| plotfile | no | String | "grismplot.pdf" | less than 1024 char. |
|-----------------|----|--------|-----------------|----------------------|

Name of the output file containing the plot. Case sensitive.

| | | | | |
|----------------|----|---------|---|-----------------------------|
| binsize | no | Integer | 5 | Constraint : positive value |
|----------------|----|---------|---|-----------------------------|

| | | | | |
|---------------------|----|---------|----|--------|
| scalebkgplot | no | boolean | no | yes/no |
|---------------------|----|---------|----|--------|

To scale the y-axis of the background counts plot to be the same as the y-axis of the plot of the source counts

| | | | | |
|-----------------|----|---------|---|--------|
| plotflux | no | Integer | 2 | 0 to 2 |
|-----------------|----|---------|---|--------|

Option for plotting spectra as fluxes (in erg/sec/cm²Å) or countrates (in counts/sec/Å)

| | | |
|--|-----------------------|----|
| ; 0: plots only countrates, 1: plots only fluxes, 2: plots both coutrates and fluxes | regionplotfile | no |
|--|-----------------------|----|

Name of the output PostScript file showing the spectra extraction regions. Case sensitive.

| | | | | |
|--------------------------|----|--------|------|----------------------|
| spectraregionfile | no | String | None | less than 1024 char. |
|--------------------------|----|--------|------|----------------------|

Name of the input ASCII-file containing the spectra regions.

| | | | | |
|------------------------|----|--------|------|----------------------|
| rotatedimageset | no | String | None | less than 1024 char. |
|------------------------|----|--------|------|----------------------|

Name of the input file with the grism rotated image to be plotted with the spectra extraction regions overlaid

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.

Incorrect RATE extension (*error*)

Incorrect RATE extensions (see Developer's notes for more details)

Existing output file cannot be overwritten (*error*)

The output file exists, and cannot be overwritten because the SAS_CLOBBER variable is set to 0



Unavailable default device type and/or output file (*error*)

Unavailable default device type and/or output file

Invalid input file (*error*)

Invalid input column dimensions

Unavailable device type and/or output file (*warning*)

corrective action: The device type and output file are set to the defaults.

Number of data points to plot is higher than 500 (*warning*)

corrective action: Increase binsize value until the number of points to plot is lower than 500.

Keywords are missing from the input file (*warning*)

Some header keywords are missing or inconsistent

corrective action: A warning is raised and the task proceeds

6 Input Files

1. OM FITS grism spectra (generated by **omgrism**).

7 Output Files

1. OM output spectra plot (Deliverable PPS product)

8 Algorithm

Subroutine omgrismplot

Recover parameters (File names, Device type, Binning factor, Ouput file)

Read FITS file :

 Get dataset and table.

 Check important keyword consistency.

 Call a warning or error if necessary.

Recover all spectra included in table :

 Net spectra rates and errors & background rates and errors are recorded in arrays of dimension Nspectra * Nbins.

Open plot : create view surface in specified device format (check its validity).

For each spectrum :



Delete gaps in data (when the IEEE NaN constant is found).

Increase binsize if necessary to limit the number of points to 500.

Rebin rate and error columns by binsize

Create a labelled plot page separated into two panels in which wavelengths are graduated on X-axis (see Comments), and count rates (or fluxes) on Y-axis

Draw net spectrum and background counts on different panels.

End for

Release memory.

Close plot.

End subroutine omgrismplot

9 Comments

- Error rates are rebinned following a quadratic scheme (Central limit theorem).
- Wavelength intervals all have the same length.
- The output devices are those of the PGPLOT library. The device list is governed by the drivers available to PGPLOT.

10 Future developments

The parameter `plotflux` to be activated

10.1 CAL usage

- None

References