rgsspecplot

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Abstract

Produces annotated display of RGS spectra

1 Instruments/Modes

RGS	Spectroscopy

2 Use

pipeline processing	yes
interactive analysis	yes

3 Description

This task plots the first and second order spectra (Counts/channel versus BETA CHANNEL) for an RGS source, overlaying the source dependent energy and wavelength scales if the data are provided in radians or counts/channel against wavelength if the data are provided in wavelength space. The data can be represented in original format, or rebinned, to contain a minimum number of counts (specified by the user) per bin. In this case, the counts/channel for each bin are plotted verses the centre of that bin, as a histogram. The error values are plotted in gray and are always the square root of the counts. Details of the observation and source are also plotted. Any valid PGPLOT graphics device may be specified for the output.

3.1 Examples

To create a postscript plot, called plot.ps, which contains the first and second order spectra for source 1, where the spectra have been rebinned to contain at least 10 counts per bin, a command such as,

```
rgsspecplot spectrumsets="SPECTRUM0101.FIT SPECTRUM0102.FIT" sourcelistset=rgssources.ds
sourceid=1 plotfile=plot.ps device=/VCPS rebin=yes mincounts=10
```

can be used.

4 Parameters

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

Parameter	Mand	Type	Default	Constraints
spectrumsets	yes	string		

Input spectrum files list to be plotted. These are output from the **evselect** or **rgsproc** List: first_order.fits second_order.fits (until DSS procedures are implemented).

sourcelistset	yes	string		

Input RGS source list file (required until DSS procedures are implemented).

sourceid	no	integer	1	constraints

source number in sourcelist to be used for wavelength/energy scales (until DSS procedures are implemented).

group	no	Boolean	False	constraints

Should the spectrum be grouped according to the existing grouping column?

device	no	string	/XW	

A valid PGPLOT graphics device for the output (e.g /XSERVE, /VCPS)

plotfile	no	string		

Name of hardcopy plot filename

rebin	no	Boolean	False	constraints

Rebin the data to contain mincounts/bin?

mincounts	no	integer		constraints

Minimum number of counts per bin

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 docu-

mented here. Refer to the index of all errors and warnings available in the HTML version of the SAS documentation.

badDevice *(error)*
Unrecognized PGPLOT device

Incorrect number of spectrum sets given *(error)*
Has to be either 1 or 2

No plot file supplied *(error)*
Hard copy device selected

Plot file already exists *(error)*
SAS-CLOBBER set

Surplus filename *(warning)*
plotfile parameter value ignored
corrective action: -

Rebin requested to be less than 1 *(warning)*
No rebinning will take place
corrective action: -

Rebinning results in less than 5 bins *(warning)*
Replacing minimum counts per bin by a smaller number
corrective action: -

Keyword HDUCLAS2 missing *(warning)*

corrective action: -

Keyword TCUNI1 missing *(warning)*

corrective action: -

Average counts per bin less than 1 *(warning)*
Replacing minimum counts per bin by (counts specified)
corrective action: -

6 Input Files

1. RGS order/source specific spectrum files (output of **evselect** or **rgsproc**)

1. RGS source list file (output of **rgsregion**)

7 Output Files

1. Hardcopy plot (optional)

8 Algorithm

```
subroutine rgsspecplot


  For each spectrum

     Get observation details from KEYWORDS
     Get source details from KEYWORDS

     Get a handle on CHANNELS, COUNTS/RATE and GROUPING columns

     if (group) then group CHANNELS

     if (rebin) then rebin to a minimum counts/bin, specified by the user

     Plot spectrum
     Plot chip boundaries
     Plot source dependent energy and wavelength scales using RGSLIB call lambda2beta (if spectrum p

       betaCor = lambda2Beta(wavelength, order, offaxis(1))

 end loop

end subroutine  rgsspecplot
```

9 Comments

Error checking for file consistency also required until DSS implemented.

10 Future developments

Once the DataSubSpace has been implemented the code should access the following source-dependent data from the extraction region file stored in the DSS of the spectrum file. The required keywords will be/are added by **rgsregion**.

1. off-axis angle
2. sourceID
3. orderID

The sourcelist and sourceid command line parameters will become defunct.

References

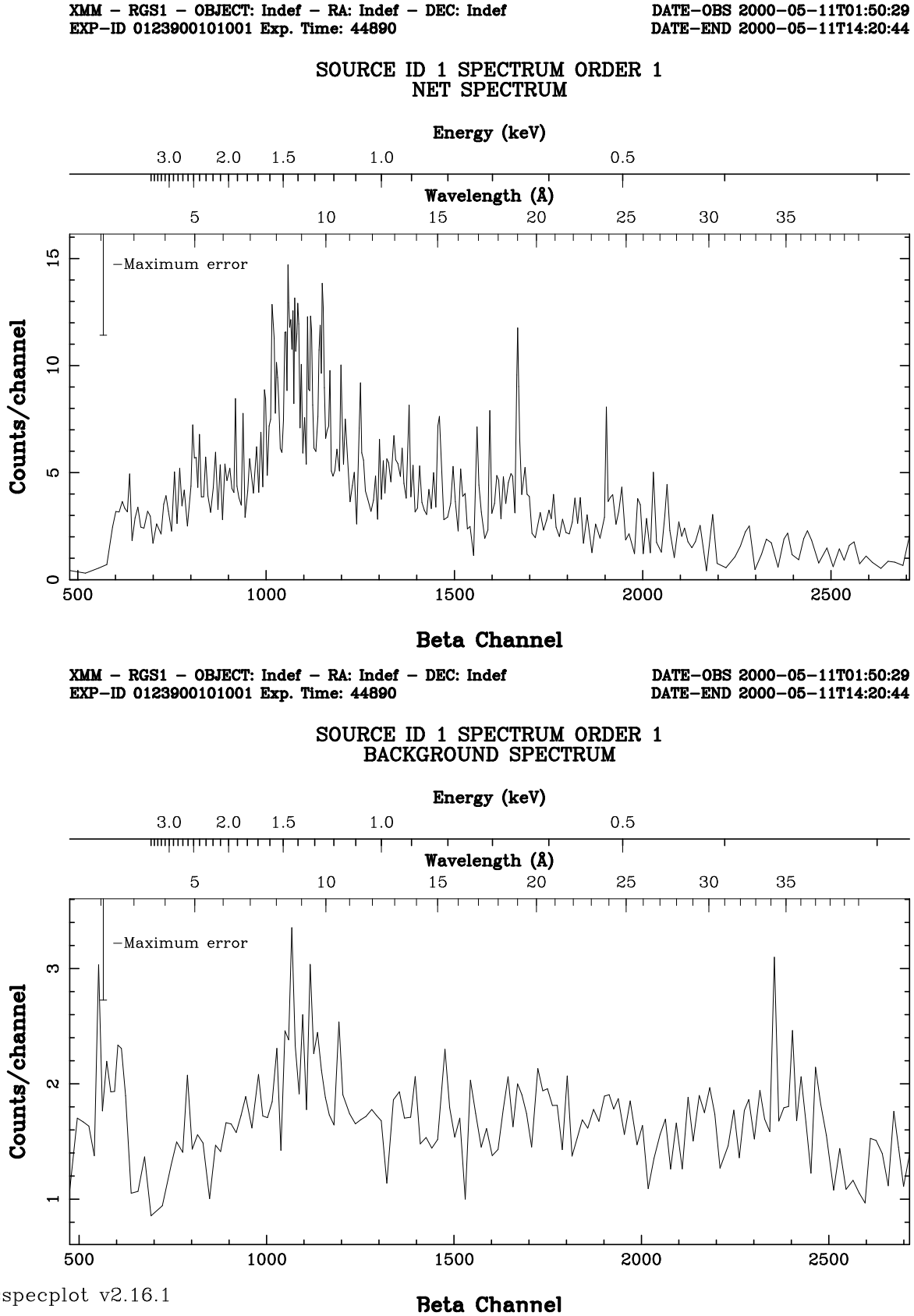

Figure 1: Examples of RGSSPECPLOT PPS product: Plot showing both spectra plots.