omgsource

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Abstract

Interactive program that allows the user to select and process spectra from a modulo-8 corrected, rotated and undistorted grism image.

1 Instruments/Modes

Instrument	Mode
OM	IMAGING

2 Use

pipeline processing	no
interactive analysis	yes

3 Description

Omgsource is an interactive SAS task which enables the user to reprocess an OSW rotated grism-image produced by the SAS task **omgchain**. A couple of examples where the user will find **omgsource** useful are:

- The user notices that a spectrum on an image has not been identified and processed.
- A processed spectrum is seen to lie close to another spectrum and the background region may thus be contaminated by its neighbour.

The task allows the user to interactively select spectra from the input image: the width and height of the central spectrum extraction region, the widths and offsets (from the central extraction region) of the two background regions (one either side of the central region) can be varied. The selected spectra are processed using the SAS task **omgrism**. A new source-list and spectrum-list fits file are produced, together with a spectrum-plot postcript file. These output files have the same format as those produced by the SAS task **omgchain**. The spectrum plot file is produced using the SAS task **omgrismplot**.

4 Running the program

The various command lines for running the program are:

- **omgsource imageset=... newsrclistset=... newspectrumset=... spectrumplotset=...** For creating new source and spectrum list files (no parameters **oldsrclistset oldspectrumset** specified). The image stored in the image file specified by the parameter **imageset** is displayed without any source regions overlayed. The user can either select spectra manually, or run the **SAS task omdetect** to detect sources.
- **omgsource imageset=... oldsrclistset=... oldspectrumset=... newsrclistset=... newspectrumset=...** The sources and spectra stored in the fits files corresponding to the parameters **oldsrclistset** and **oldspectrumset**, respectively, are loaded. The image stored in the fits file specified by the parameter **imageset** is displayed with the source regions overlayed. Each source and spectrum is numbered.
- **omgsource** In this case the program will display a file-dialog box to get the name of the **imageset**.
- **omgsource oldsrclistset=... oldspectrumset=...** As before, except that the user wishes to modify an existing source and spectrum list file.

4.1 The Main window

The task starts up by displaying a small progress-dialog box whilst it is doing some initialisation work. If the parameter **imageset** was omitted on the command-line, a menu will appear prompting the user to select an image-file, either from a list of the last ten image-files assessed, or from a directory. Various checks are carried out on the selected file to ascertain that it contains a modulo-8 corrected, distortion-corrected and rotated image. If a check fails a warning message is displayed and the user is prompted to enter another file name. The selected image is then displayed using **ds9** and shortly afterwards the main window appears **(see Figure 1)**.

4.2 Main window buttons

The function of the various buttons are described below. **Information about a particular button or table, can be obtained by positioning the cursor over that particular item, whereupon a text message will appear.**

Source list operations

- **Delete** Delete the contents of the drop-down list- all the sources will be deleted.

Image operations

- **View all** Displays the whole image, with the source regions overlayed.
- **Select spectra** Allows the user to select new spectra from the image. A new window is displayed **see section 7)**.

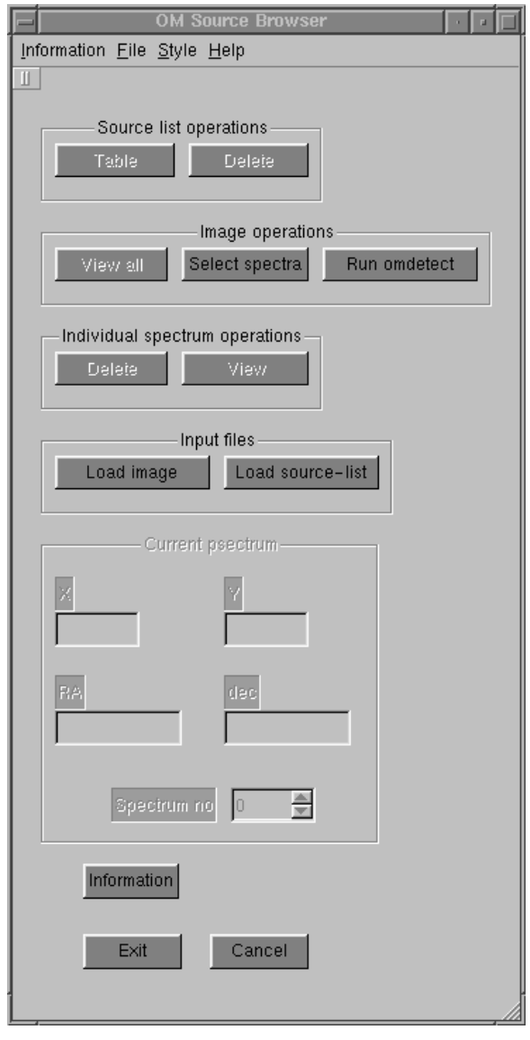

Figure 1: The main window

- **Run omdetect** Runs the **SAS task omdetect**. A dialog-box is displayed which allows the user to change some of the input parameter to **omdetect**. The button is disabled if the source-list is not empty- The source-list can be deleted using the Delete button, allowing **omdetect** to be run.

Individual source operations

- **Delete** Deletes the currently selected source from the list.
- **View** Displays the spectrum of the currently selected source **(see Source selection below)**.

Input files

- **Load image** Allows the user to select another image file, which is then loaded.

- **Load source-list** Allows the user to select another source-list file. Various checks are made to ensure that it has the same format as that produced by the SAS task **omgrism**. If a check fails, the user is prompted for another file name.
- **Information** Allows the user to display information about either the program, exposure or image details. On clicking this button, a menu appears and the user should click the relevant menu button.

Stopping/restarting the program

- **Exit** Exits the program. A new source-list, source-spectrum-list and spectrum-plot file are created containing the current sources and spectra. These files have the same format as those produced by the SAS task **omgchain**.
- **Cancel** Exits the program without creating any output files.
- **Restart** Restarts the program using the original input files and discarding all modifications to the source-list.

4.3 summary of window tables

- **Source list table** Stores information about each source in the current source-list. The source number corresponds to the number on the image.

4.4 Source selection

The **source no spin box control (the control to the right of the Source no text)** sets the number of the source in the source-list to that which will be displayed when the user clicks the **View button**. The coordinates of the selected source are displayed.

5 The spectrum-selection window

This window is shown in **Figure 2**.

When the cursor is moved across the image **(using the left-mouse button)** a profile, from the cursor-position upwards to the height of the spectrum extraction-region height, is drawn at the bottom of the image. A new spectrum is selected by centering the cursor (either by moving the mouse or by using the arrow keys on the right of the key-board) over the approximate centre of the corresponding zeroth-order feature and either clicking the left-mouse button or hitting the return key. Please note that if any of the centroiding buttons are enabled, the extraction region coordinates will differ from those initially selected (these buttons are initially disabled.) The extraction region is plotted below the image and its position and dimensions are stored in the table in the upper-left corner of the window. A selected extraction region can be discarded by placing the cursor within the spectrum-extraction region and either pressing the right mouse-button or hitting the Delete key.

The user can change the width and height of the extraction rectangle and the widths and offsets of the left and right background-extraction rectangles (within certain limits). **The left and right background extraction offsets are the distances (pixels) from the left and right sides of the inner spectrum extraction-region, respectively**.

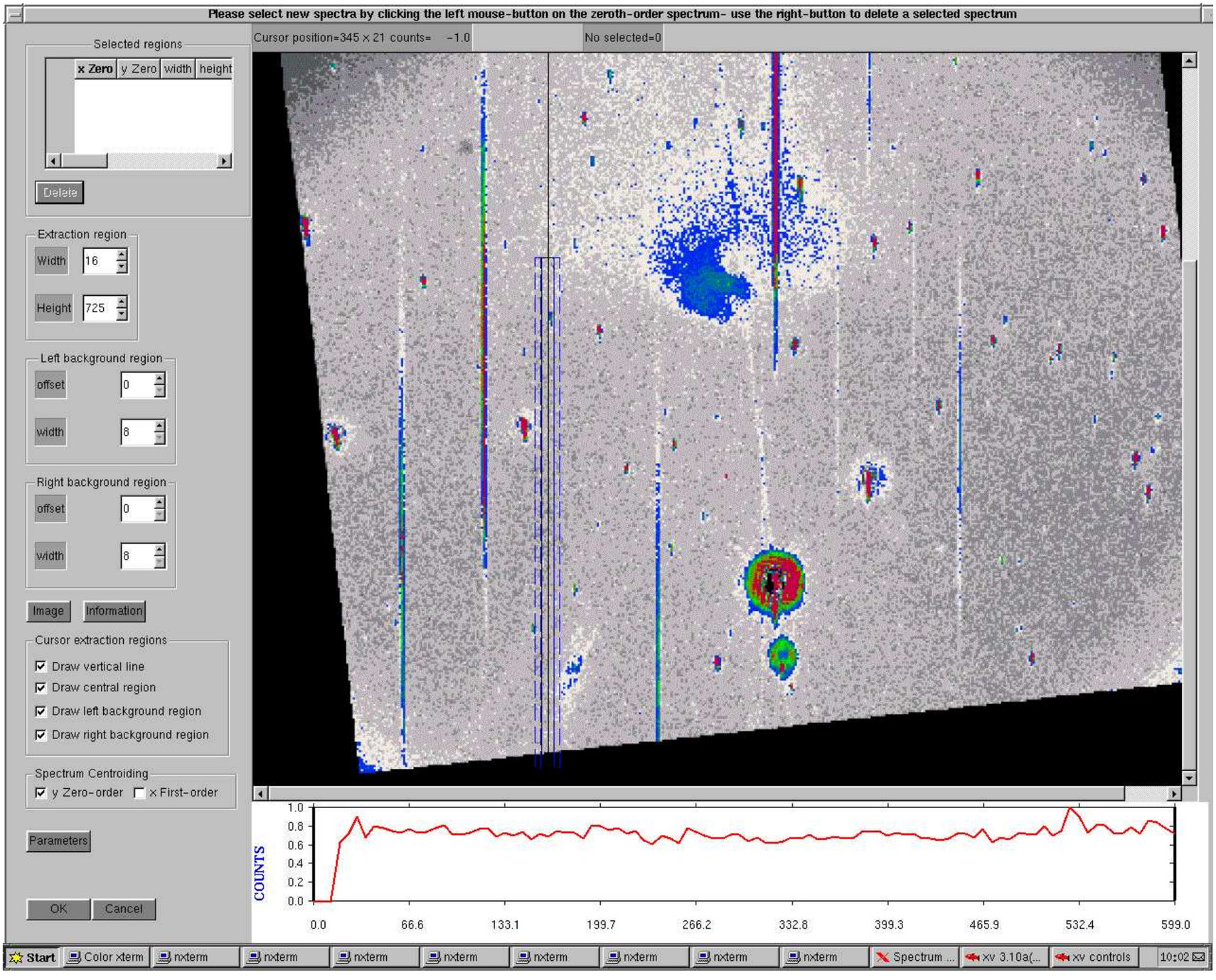

Figure 2: Spectrum-selection window

The computation of a spectrum is done using the **SAS task omgrism**, and omgsource produces a source-list file containing two sources, the zero and first order spectra, for input to omgrism. The program allows the approximate y cursor-coordinate of the zeroth-order spectrum to be either fixed at the cursor-position (**y Zero-order button unchecked**, or refined using a centroiding algorithm (**yZero-order**

button checked. Since the wavelength scale of the first-order spectrum is set using the y-coordinate of the zeroth-order spectrum, the accuracy of the scale is therefore determined by the accuracy of the y-coordinate.

Likewise, the approximate x cursor-coordinate of the first-order spectrum can be either fixed at the cursor-position (**x First-order button unchecked**, or refined using a centroiding algorithm (**x First-order button checked**. The reason why the first-order x coordinate is used instead of the zeroth-order coordinate, is that there could be a shift of several pixels between the two positions.

NOTE THAT WHEN OMGRISM ANALYSES A SOURCE-LIST PRODUCED BY OMSOURCE, NO CHECKING IS DONE ON THE SOURCE PARAMETERS- IT IS UP TO THE USER TO CHECK THE VALIDITY OF ANY SPECTRUM PRODUCED

5.1 Summary of the buttons

- **Cancel** Returns to the main window and any operations that have been performed **(such as selecting or deleting a spectrum)** are ignored.
- **OK** If any spectrum regions have been selected the regions are processed and added to the current list of spectral regions.

  Delete The list of newly selected spectra is deleted and the image is redrawn- minus the these extraction regions. **Note that any spectra that existed at the start of the selection session will not be deleted- see main Main window buttons if you wish to delete every spectrum**
- **Image** Allows the user to change the image appearance using ds9 (the only parameters that can be changed are color and scale).
- **Information** Allows the user to display information about either the program, exposure or image details. On clicking this button, a menu appears and the user should click the relevant menu button.

  x First-order If this button is "checked" then the program will refine the position of the cursor x-position by computing the centroided x position of the first-order source.

  yZero-order If this button is "checked" then the program will refine the position of the cursor y-position by computing the centroided y position of the zeroth-order source.
- **Parameters** Allows the user to change the input parameters to omgrism or omgrismplot.

6 Parameters

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

Parameter	Mand	Type	Default	Constraints
imageset	no	string	none	

name of OM OSW FITS image file

oldsrclistset	no	string	none	

name of input OM OSW source list file

oldspectrumset	no	string	none	

name of input OM OSW source-spectrum list file

newsrclistset	no	string	none	

name of new output OM OSW source list file

newspectrumset	no	string	none	

name of new output OM OSW source-spectrum list file

spectrumplotset	no	string	none	

name of new spectrum-plot file

7 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.

nothing

8 Input Files

1. Modulo-8 corrected, rotated and undistorted OSW FITS image product file (output from OMGPREP)
2. Source-list file from OMGRISM.
3. Source-spectrum list file from OMGRISM.

9 Output Files

1. OM OSW source list file.
2. OM OSW source spectrum list file
3. OM OSW spectrum-plot file
4. A source-list file called pspecli.fit, produced by omgrism.

Before any output file is created the program checks to see if it already exists- if so the program will prompt the user to enter another name for the file.

10 Algorithm

subroutine omgsource

1) Read in image and display it using ds9. 2) Display the main window allowing the user to:

- Select spectra from the image.
- Run omdetect on the image to create a source-list file which is then
- processed by omgrism.
- Load a new image file.
- Load a new source-list file.
- View a selected spectrum.
- Delete a spectrum.
- View details about the spectra.
- Delete the list of spectra.

When the user quits the program a new source-list and spectrum file are created.

end subroutine omgsource

11 Future developments

References