

SQUV

user's manual

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SQUV in 9 steps

Introduction

SQUV means Stokes **Q**Uick **V**iewer and it is a code developed for the retrieval of the Stokes parameters from raw THÉMIS data. It can do it automatically and correctly if the header information is right, the polarimetric states are more than four and they are different. In other cases, SQUV just cleans data.

The aim of this manual is to show how to use the *SQUV Graphic User Interface*, hereafter SQUV GUI. It is a *step by step* document, if the user follows it s/he should be able to reduce easily any kind of MTR THÉMIS data.

The figure 1 shows SQUV GUI and the steps that the user must follow.

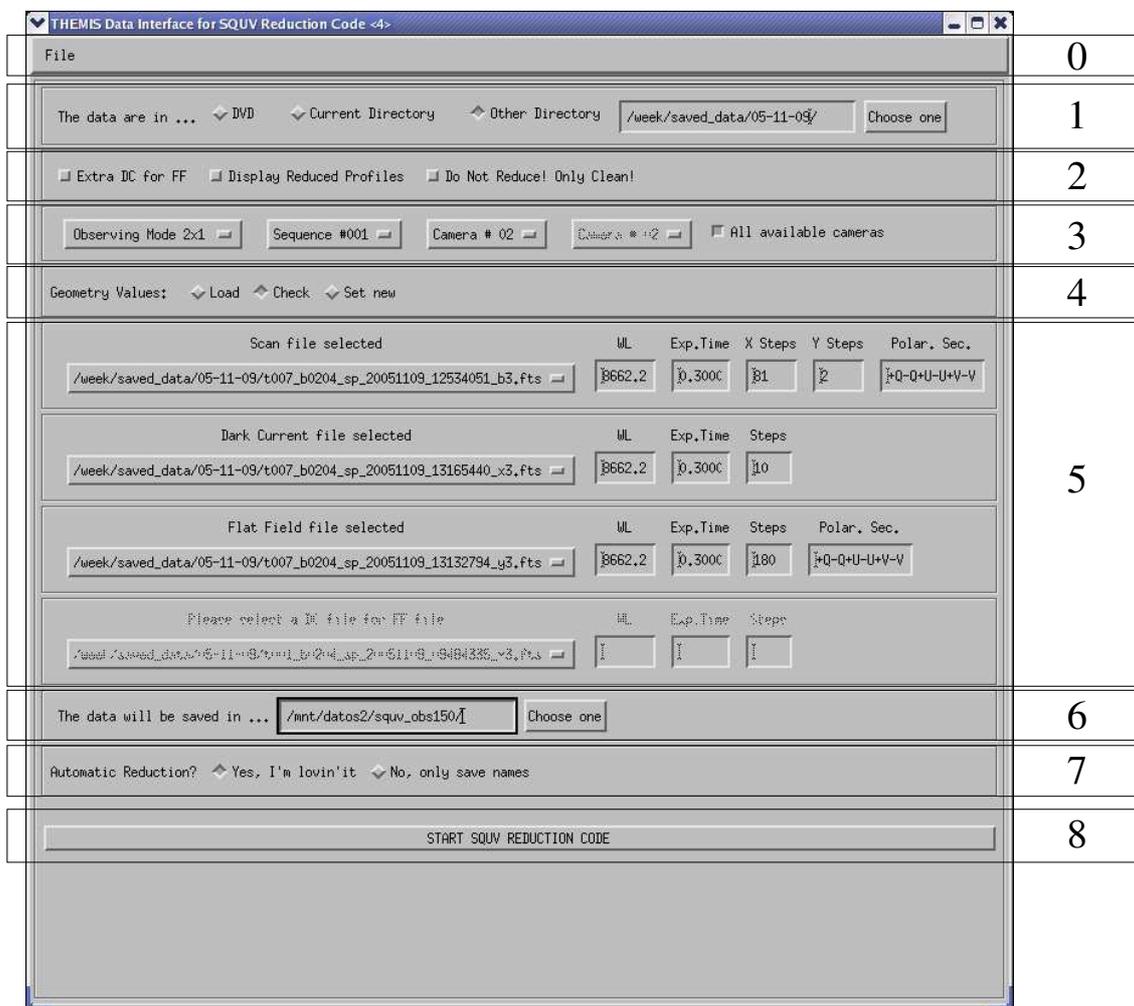


Figure 1: follow the steps and the treasure will be yours.

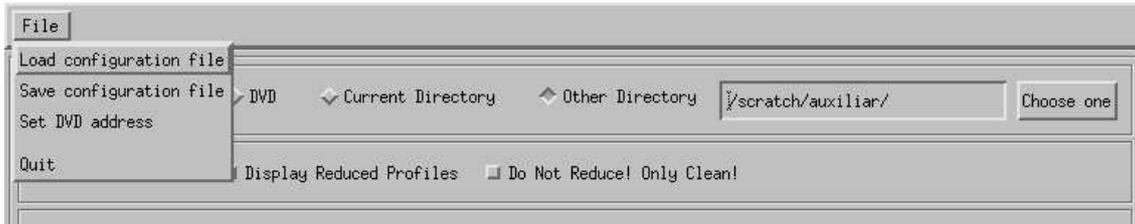


Figure 2: the file menu.

Step 0: the File Menu

You can save or load your SQUV GUI configuration for several sessions. With this option an IDL *sav* file is saved/loaded with the following information:

- Where the data are (directory or device)
- The reduction options
- The observing mode
- The reduction mode (automatic or ‘only names’)

When a SQUV GUI configuration file is loaded/saved the information on the selected sequences, cameras and data files is ALWAYS removed. In fact, these values are ALWAYS retrieved anew every time that this option is done. Why? Because, the data files, therefore the sequences and cameras, can be changed in a directory, DVD or device.

Furthermore, the user can set the address of any kind of device. It will be mounted when the user selects the so-called ‘DVD’ option (see the next section).

The configuration file will be saved/loaded in/from the directory where SQUV was launched.

Figure 2 shows the File menu open, in the foreground, with its options.

Step 1: The Data Location

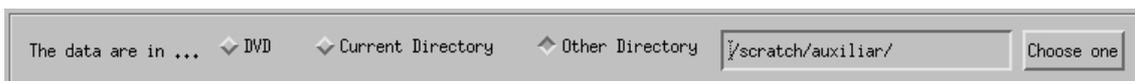


Figure 3: where are the data?

DVD: this option allows to mount a device and take into account the data on it. The address of this device can be set in the ‘Set DVD address’ of the file menu.

Current Directory: by default, the option given is the current directory, i.e. the directory where IDL started SQUV.

Other: the user can take the data from any directory, typing the full path or selecting this by the browser clicking on the button ‘Choose One’. In any case the path should ALWAYS end by ‘/’. In figure 3 the path is */scratch/auxiliar/*. Every time a directory or device is selected the search of data files is started (see Step 3).

Step 2: Reduction Options

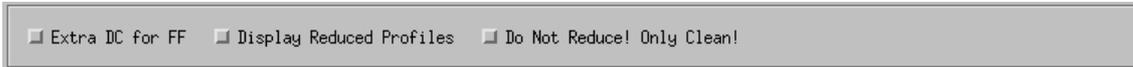


Figure 4: what do you want?

Extra DC for FF: sometimes, the observer takes an extra Dark Current file for the Flat Field file. In this case, the FF is reduced taking into account the extra DC. For that, a new selector file field is activated in the SQUV GUI (see Step 5).

Display reduced profiles: the user can display the Stokes profiles one by one while the reduction is done. In this way the user can check how the reduction works. The data are being written in a *fits* file with the same name of the scan but changing the suffix *_b3.fits* by *_r3.fits*

Do not reduce! Only clean!: if the number of polarization states is less than 4 the demodulation cannot be done. For these cases SQUV offers the possibility to just clean the data and leave them ready for subtraction and/or addition.

Step 3: Selection Options

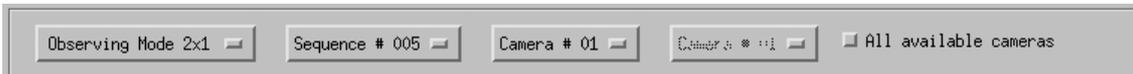


Figure 5: some help is always welcome.

Observing mode (droplist): first of all, the user has to say what kind of MTR data s/he wishes to reduce, i.e. whether they belong to one of the so-called *2x1*, *2x2* or *Grid* observing modes. This information is taken from the headers but it is strictly necessary to give it here for the *2x2* case.

Selection by sequence (droplist): all sequences inside the selected directory at Step 1 are automatically loaded in this list. The user can select the data by the sequence number.

Selection by camera (droplist): all cameras inside the selected directory at Step 1 are automatically loaded in this list. The user can select the data by camera number. When the selected observing mode is *2x2* a new droplist will be activated for the second camera of the original setup.

All available cameras: when this option is selected the reduction will be done for all cameras taking into account the time and date of the selection done for one of them.

Step 4: Setting the Geometry



Figure 6: the geometry of the data on the CCD is essential.

Load: when this option is selected the geometry is loaded from *sav* files. These files are taken from the directory where the data will be saved (see Step 8) and are called *pos_wavelength_default.sav*, e.g *pos_6302_default.sav*. If the geometry file does not exist then the geometry GUI (see figure 7) will be opened showing the found values and giving the option to change them.

Check: the geometry GUI is opened (see figure 7). The user can select the positions of the image on the CCD, i.e. the horizontal and vertical edges, one spectral line to computed the curvature of the spectra, and two spectral positions for a continuum map and for Stokes maps (Q, U, V). Of course, the so-called continuum map could be done from a line core position or from any other one.

Set new: the geometry GUI (see figure 7) is opened showing the new values found. They can be changed and saved.

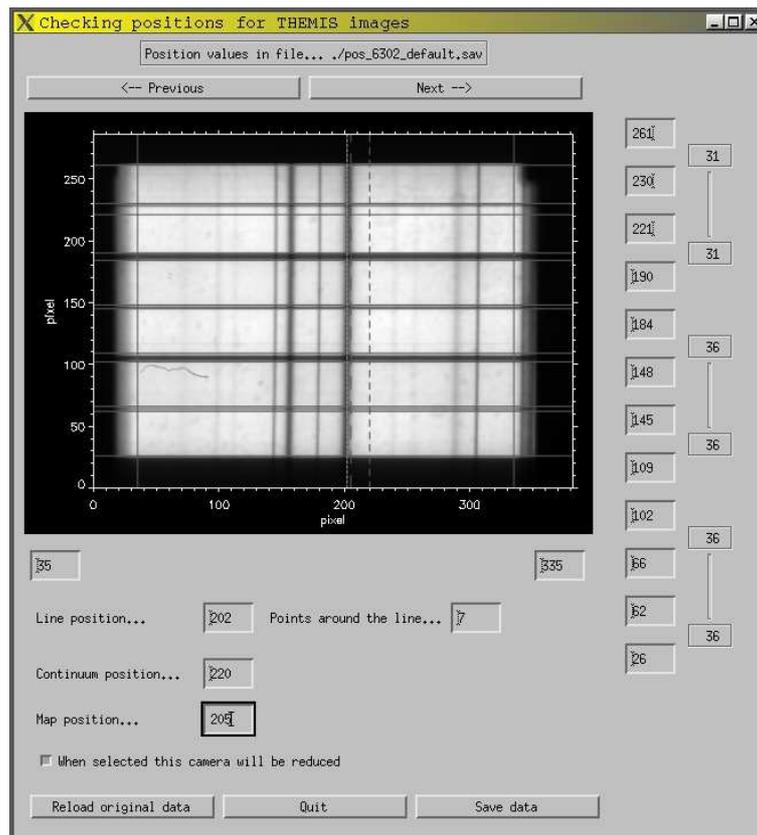


Figure 7: the geometry GUI.

The Geometry GUI: this GUI is shown after clicking the ‘Start Button’ at Step 8. With the buttons ‘Previous’ and ‘Next’ the user can change the selected camera. Two editable fields show the vertical edges values. On the right side of the

image there are the horizontal edge values fields (editable also), in this case 12 boxes for the *Grid* observing mode, and the size for each horizontal selected areas. These sizes should have the same dimensions by pairs, i.e. by orthogonal polarization beams. The spectral line, continuum and map positions are given below. There is also an option to avoid the reduction of a particular data set. In this way, when the reduction option ‘All available cameras’ (see Step 3) is selected the user can skip one or more cameras previously reduced.

Step 5: Selecting the Data Files

Scan file selected	WL	Exp.Time	X Steps	Y Steps	Polar. Sec.
/scratch/auxiliar/t005_b0104_sp_20041006_10064260_b3.fts	302.0	0.3000	451	1	+Q-Q+U-U+V-V
Dark Current file selected	WL	Exp.Time	Steps		
/scratch/auxiliar/t005_b0104_sp_20041006_11155231_x3.fts	302.0	0.3000	50		
Flat Field file selected	WL	Exp.Time	Steps	Polar. Sec.	
/scratch/auxiliar/t005_b0104_sp_20041006_11085810_y3.fts	302.0	0.3000	300	+Q-Q+U-U+V-V	
Please select a DC File for FF File	WL	Exp.Time	Steps		
/scratch/auxiliar/t005_b0104_sp_20041006_11155231_x3.fts					

Figure 8: the droplists for the data files.

The user selects the files using the **droplists** for the Scan, Dark Current, Flat Field and Extra Dark Current files (see figure 8). The values of these droplists depend on the selection done at Step 3. The original values are ALL files sorted by type, i.e.: Scan with suffix *_b3.fts*, DC and Extra DC with suffix *_x3.fts*, FF with suffix *_y3.fts*. When a file is selected the basic information about it is displayed. This information is read from the header of the file. Every time that a SQUV GUI configuration file is loaded or the data location is changed or checked the values of the droplists are found anew and any selected file is removed; the user should select them again.

Step 6: The Storage Area

The data will be saved in ...	/	Choose one
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Figure 9: the address where the reduced data will be saved.

The reduced data and the files used by SQUV, e.g. geometry files, SQUV GUI configuration files and reduced Flat Field files, are saved in the address given in this

field. Of course, the directory must exist.

Suggestion: at this point, it is a good idea to save the SQUV GUI configuration as was explained in Step 0. The configuration file will be saved in the directory where SQUV was launched. The selected file will be removed, therefore the user must select them again.

Step 7: The Reduction Modes

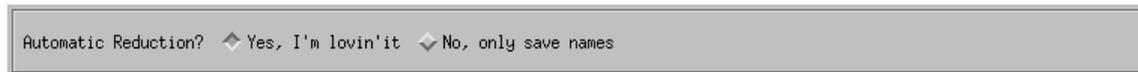


Figure 10: two reduction modes.

Automatic: the default option for SQUV.

No, only save names: with this option the user can save the necessary information to reduce the data in the IDL command line. A file called *file_YYMMDD_hhmmss.sav* is created for that, being the date information taken from the selected Scan file , e.g.:

```
t001_b1108_sp_20001203_09511877_b3.fts → files_20001203_09511877.sav.
```

In this file an IDL structure called *nombres* is saved. The user can then follow these steps in an IDL session:

```
idl > restore, 'files_20001203_09511877.sav'  
idl > auto_reduccion, nombres
```

Of course, when the option 'All available cameras' is selected, then all (selected) cameras will be reduced. This option is very useful for *batch reduction*, i.e. when the user want to reduce all data for all cameras for several sequences of a day. The next IDL commands show how to do:

```
idl > files=findfile("files_*.sav", count=n)  
idl > for j=0, n-1 do begin & restore, files(j) & auto_reduccion,  
nombres & endfor
```

Step 8: The Start Button



Figure 11: one click to the Glory.

When the user clicks the Start button (see figure 11), the SQUV GUI is locked and minimized. When the 'Automatic' reduction mode was selected then the SQUV

GUI will keep so until the reduction process has finished. In the case of 'No, only save names', it will be opened back when ever the *file_YYMMDD_hhmmss.sav* is created.