



SARG: The Graphical User Interface Manual

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1 INTRODUCTION

1.1 SCOPE

This document describes the GUI of the SARG instrument. The document is intended as a guide for the general observer.

1.2 REFERENCE DOCUMENTS

- [RD1]:

1.3 ACRONYMS

- ADU – Analog to Digital Units
- CCD – Charge Coupled Device
- FWHM – Full Width Half Maximum
- GUI – Graphical User Interface
- SARG – Spettrografo ad Alta Risoluzione Galileo
- TBC – To Be Confirmed
- TBD – To Be Done
- TBW – To Be Written
- TNG – Telescopio Nazionale Galileo

2 THE SARG USER INTERFACE MAIN PANEL

The SARG user interface main panel contains all the tools that allow the user to manage the instrument and to assess quickly the quality of the spectra obtained. When starting an observing session with the SARG spectrograph the user interface main window will appear as shown in Figure 1.



Figure 1. The SARG user interface main panel as it appears when starting an observing session

The top part of the window contains several scroll down menu whose function are clearly identified by their label. Below that there is a panel (Utilities Panel) containing information on the observing session and few informative icons. The GUI main window can be divided into three main groups of panels or windows that from left to right are: the **Quick Look Area**, the **Exposure Control Panels Area** and the **SARG Control Panels Area**.

The Quick Look Area allows the user to get information on the last image acquired by the instrument or on the one loaded through the file menu. Several tools are available to analyze the image.

The Exposure control panel contains panels to manage the exposure and to set up different CCD configurations.

Finally the SARG control panel area basically controls the spectrograph allowing the observer to select the appropriate instrumental configurations to make the observations.

The description and the functions of the different panels are given in details in the following sections.

Finally Figure 2 shows how the GUI looks like during an observing session.

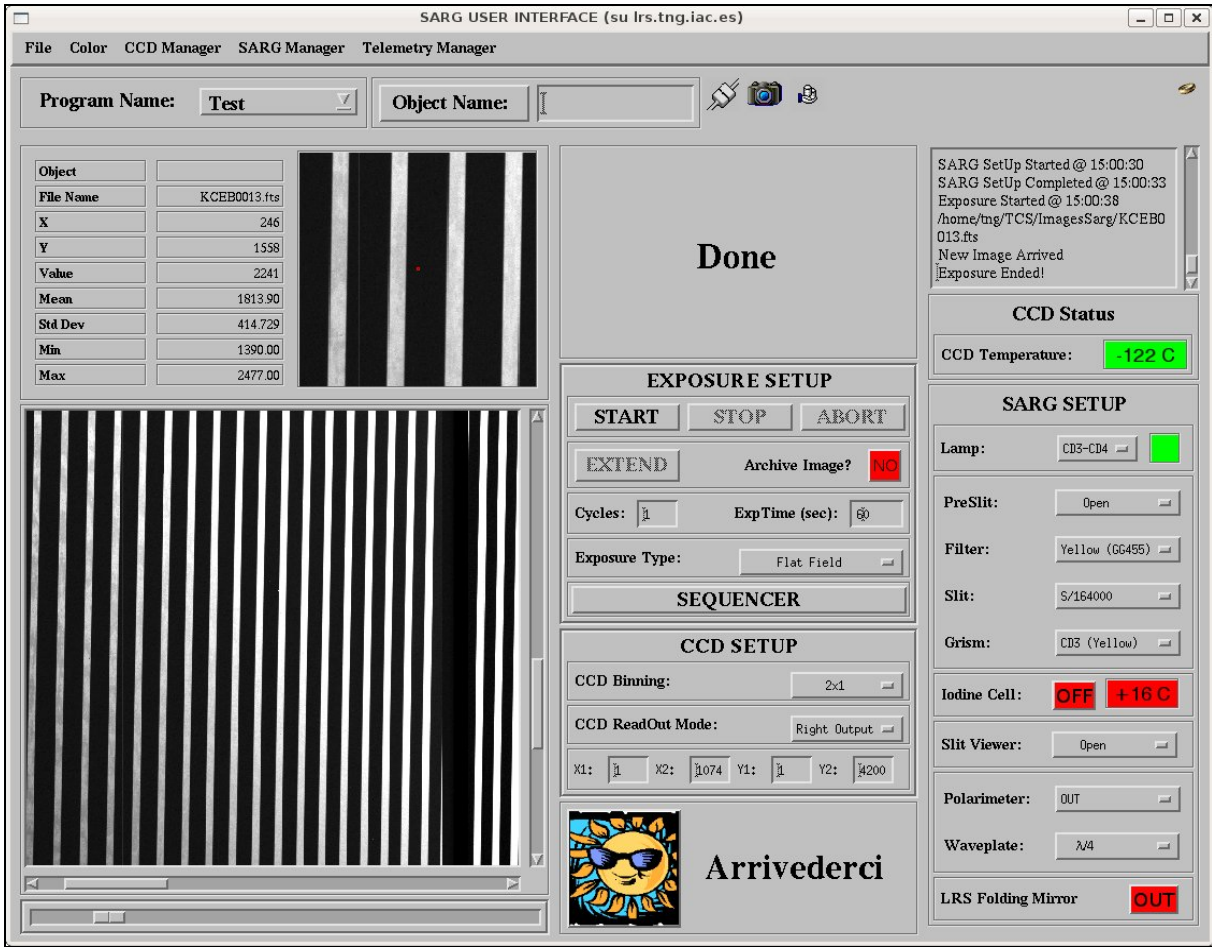


Figure 2. The SARG user interface main panel as it appears during an observing session



3 THE SCROLL DOWN MENUS

3.1 File Menu

The File menu (Figure 3) allows the user to open a file, to display the FITS header of the image currently displayed and finally to exit from the GUI.

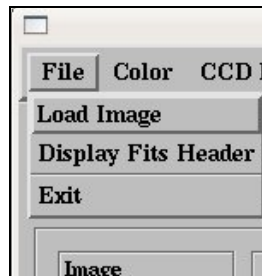


Figure 3. File Menu

3.1.1 Load Image

This button opens a dialog window to load a FITS image into the display.

3.1.2 Display fits header

This button opens a window which contains the FITS header of the image shown in the display. The window has on the top left corner a "DONE" button that closes it.

3.1.3 Exit

This button exits the SARG observing session. Note that is possible to close the SARG observing session also through the window manager and through the button in the exit panel (sect. 5.4).

3.2 Color Menu

The color menu (Figure 4) allows the user to change the colour table used to display the image.

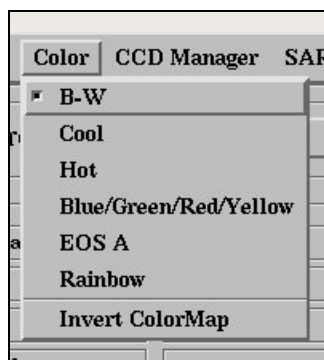


Figure 4. Colour Menu

3.2.1 Colour tables

There are five colour tables that can be selected: Black and White, Blue and White, Red Temperature, Rainbow and EOS A. When a particular color table is chosen, aside the corresponding menu entry a highlighted selection box appears. The default colour table is Black and White.



3.2.2 Invert colour map

This button allows inverting the selected colour table. When the colour map inversion is applied a highlighted selection box aside the menu entry appears.

3.3 CCD Manager Menu

The CCD Manager Menu (Figure 5) allows modifying some of the CCD working parameters (e.g. temperature, biases, etc.). For this reason this menu is then intended only for maintenance purposes and all the buttons can be activated only when using the GUI in super user mode (sect. 3.3.6).

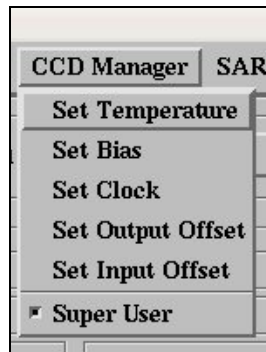


Figure 5. CCD Manager scroll down menu with all buttons activated.

3.3.1 Set Temperature

Disabled in normal user mode. In super user mode allows to set the CCD temperature. Once selected a dialog box will pop up. Write down the desired temperature and then press OK.

3.3.2 Set Bias

Disabled in normal user mode. In super user mode allows to change the values of the CCD biases. Once selected a dialog box will pop up. Write down the number (1 to 8) of the bias voltage you want to change, the new voltage value and then press OK.

3.3.3 Set Clock

Disabled in normal user mode. In super user mode allows to change the values of the CCD clock voltages. Once selected a dialog box will pop up. Write down the number (1 to 16) of the clock voltage you want to change, the new voltage value and then press OK.

3.3.4 Set Output Offset

Disabled in normal user mode. In super user mode allows to change the CCD output offset voltages. Once selected a dialog box will pop up. Write down the number (1 to 4) of the output offset voltage you want to change, the new voltage value and then press OK.

3.3.5 Set Input Offset

Disabled in normal user mode. In super user mode allows to change the CCD input offset voltages. Once selected a dialog box will pop up. Write down the number (1 to 4) of the input offset voltage you want to change, the new voltage value and then press OK.

3.3.6 Super User button

All the buttons listed above are usually inactive. This is because the general observer does not need to change any of the CCD working parameters during an observing session. They can be activated through the Super User button. This button is not active until the system has not gone through the start up procedure (in particular the booting of the CCD controller). When the user press the button after its activation a window will pop up asking for a password. Once the correct password has been given all the other buttons will be activated.



3.4 SARG Manager Menu

The SARG Manager menu (Figure 6) allows the user to perform the SARG control system start up procedure and the initialization of SARG mechanisms.

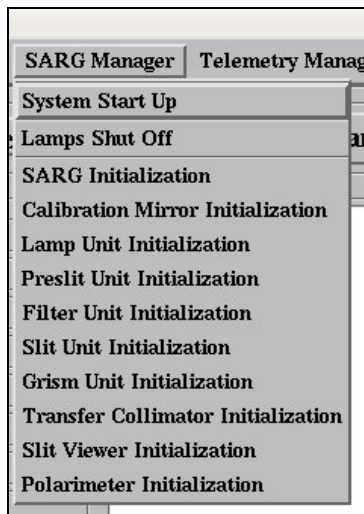


Figure 6. SARG Manager menu

3.4.1 System Start Up

The System Start up button performs several operations.

- Open the CCD socket to the computer that controls the CCD detector.
- Boot the CCD controller.
- Check the positions of all the SARG mechanisms
- Check the position of the mirror inside LRS used to fold the light coming from the telescope into SARG.

Any error that occurs during the system start up procedure is intercepted and displayed as text in a pop up window. In few cases limited diagnostic is also shown.

3.4.2 Lamps Shut Off

The Lamps Shut Off button allows to shut off directly all the calibration lamps on board SARG. An indirect way to carry out the same action is to expose the CCD selecting any exposure type that does not use lamps (bias, dark, object).

3.4.3 Initialization Buttons

All the other buttons are used to initialize all the SARG mechanisms (there are nine of them) either all at once (SARG Initialization button) or one at a time.

3.5 Telemetry Manager Menu

The last scroll down menu allows the user to check the CCD and iodine cell temperature, the CCD parameters and the global SARG configuration.

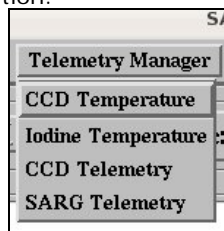


Figure 7. Telemetry Manager menu

3.5.1 CCD Temperature

The CCD Temperature button updates the temperature measured on the CCD cold finger by a PT100 sensor. The temperature is displayed in a panel located in the SARG control panel area on a coloured background. Green colour indicates that the CCD temperature is within the nominal range. Instead yellow and red colours are used when the temperature is outside that range. In particular the yellow is used either when the CCD is too cold, which usually happens when the CCD temperature controller is not operating, or when the LN2 inside the cryostat is exhausted so the temperature is higher than it should be. Finally the red is also used when the temperature is too high indicating again the exhaustion of LN2.

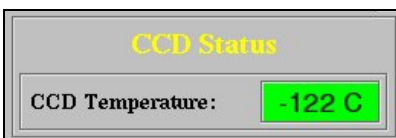


Figure 8. The CCD temperature status panel.

3.5.2 Iodine Cell Temperature

The Iodine temperature button updates the temperature measured on the iodine cell by a dedicated sensor. The temperature is displayed in a panel located in the SARG control panel area on a coloured background. Green colour indicates that the iodine cell has reached the correct working temperature (i.e. +59.8 °C TBC). The red colour of course means the opposite. Any attempt to start an exposure using the iodine cell when it is not at its working temperature will result in a warning message displayed in a pop up window. If the observer decide to ignore the warning the exposure will be started (TBC).



Figure 9. The Iodine status panel.

3.5.3 CCD Telemetry

The CCD telemetry button opens a new window with the title "SARG CCD Telemetry" where all the relevant CCD parameters, except its temperature, are displayed. In particular, as shown in Figure 10, biases voltages, horizontal and vertical clock voltages, input and output offset voltages, gain, filter, horizontal and vertical binning, number of readouts, number of CCD, CCD area and the box selected are listed. All voltages are in volt.

SARG CCD Telemetry							
BIAS1	18.1192	CKHRH1	9.75397	CKVRH1	9.71504	INOFFSET1	2.100000
BIAS2	18.2675	CKHRH2	9.66461	CKVRH2	9.62502	INOFFSET2	2.220000
BIAS3	20.9800	CKHRH3	9.61485	CKVRH3	9.61839	INOFFSET3	1.900000
BIAS4	30.0000	CKHRH4	9.68231	CKVRH4	9.64780	INOFFSET4	1.950000
BIAS5	9.20846	CKHRH5	9.65709	CKVRH5	9.74070	OUTOFFSET1	4.877000
BIAS6	5.00751	CKHRH6	9.68961	CKVRH6	9.73959	OUTOFFSET2	5.000000
BIAS7	5.00897	CKHRH7	9.72853	CKVRH7	9.69668	OUTOFFSET3	4.993000
BIAS8	5.00900	CKHRH8	9.69757	CKVRH8	9.64272	OUTOFFSET4	4.842000
BIAS9	4.20451	CKHRL9	-0.500084	CKVRL9	-0.435279	CDSGAIN	2.000000
BIAS10	3.20572	CKHRL10	-0.477967	CKVRL10	-0.525078	CDSFILTER	2.000000
BIAS11	0.00826800	CKHRL11	-0.532376	CKVRL11	-0.579709	BINNING	1x1
BIAS12	0.00807800	CKHRL12	-0.493449	CKVRL12	-0.525078	READOUT	Both
BIAS13	0.00661000	CKHRL13	-0.504287	CKVRL13	-0.408959	NO. CCD	2
BIAS14	0.00469400	CKHRL14	-0.578382	CKVRL14	-0.516894	AREA	2148x4200
BIAS15	0.00503900	CKHRL15	-0.460051	CKVRL15	-0.520212	BOX	1 1 1074 4200
BIAS16	0.00638000	CKHRL16	-0.541445	CKVRL16	-0.552504		
QUIT							

Figure 10. CCD Telemetry window

3.5.4 SARG Telemetry

The SARG telemetry button opens a new window with the title "SARG Telemetry" giving a snapshot of the instrument status. In particular (see Figure 11) the logical position of the various mechanisms (the values read by the encoders are shown in the maintenance GUI, the status (ON/OFF) of the lamps, the temperature in the various parts of the spectrograph and inside the cryostat and, when available, the pressure inside the cryostat are displayed. Temperatures are in degree Celsius and pressure in mbar.



Figure 11. The SARG Telemetry window

3.6 THE UTILITIES PANEL

Just below the scroll down menus area there is a panel containing a scroll down menu that contains the list of the active observing programs. Then there is a button to retrieve the name of the observed object from the tracking system and an editable text field to modify it if necessary (e.g. if the observer wants to specify which star, between the two components of a binary system, is observing).

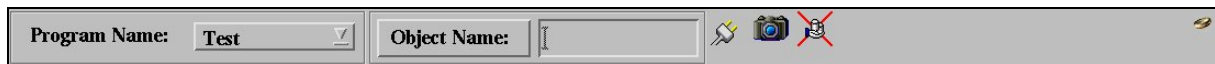


Figure 12. The status area as it appears at the beginning of a SARG observing session.

Finally three icons giving a snapshot of the status of the system are displayed. Starting from left to right there is the icon showing the status of the socket connection to the PC managing the CCD, the one showing the status of the CCD camera, and that of the database connection (see Figure 13 – Figure 15).



Figure 13. The icons showing the status of the socket connection. Left icon corresponds to no socket connection. Right icon corresponds to socket connected.



Figure 14. The icons showing the status of the CCD camera. Left icon is used when the CCD camera is in idle status. Right icon is used when the CCD is exposing.



Figure 15. The icons showing the status of the socket connection with the Oracle database. Left icon corresponds to no connection to the database. Right icon is used when the connection to the Oracle database is open.



4 QUICK LOOK PANEL

The Quick Look panel is used to display the images obtained through the CCD camera and to give the user the possibility to perform a quick look analysis. It can be divided in 4 different subareas. Starting from left to right and from top to bottom:

1. Image statistics area
2. Zoomed image area
3. Main display area
4. Scrollbar

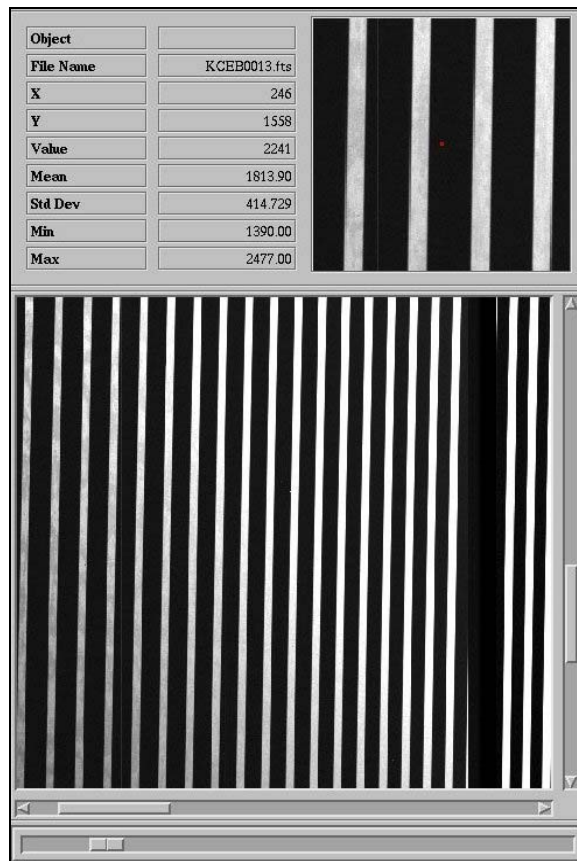


Figure 16. The quick look panel area.

In the *Image Statistics Area* (Figure 16) the information about the current image are listed below:

- The name of the object
- The name of the image
- The X coordinate of the cursor
- The Y coordinate of the cursor
- The image value below the cursor
- The average value in a 20x20 box centred on the cursor
- The standard deviation in a 20x20 box centred on the cursor
- The minimum value in a 20x20 box centred on the cursor
- The maximum value in a 20x20 box centred on the cursor

This information are updated by moving the cursor inside the *Main Display Area*.

In the *Zoomed Image Area* an area of 100x100 pixels around the cursor position, magnified by a factor of two, is displayed. The refresh of the displayed zoomed area is done only by clicking with the left mouse button on the main display area.

In the *Main Display Area* the last acquired CCD image or the one loaded through the file menu is displayed. Only a fraction of about ~450x450 pixels of the full image is visible on the screen. Two scroll bars on the bottom and to the left of the image area allow to examine the other parts of the image.



Limited data analysis is available on line (quick look). A list of the implemented functions is given below. To start the analysis place the cursor on the *Main Display Area* click the left mouse button and then press one of the keys given below. After pressing the key a graphic window is drawn displaying the results of the analysis.

- c – Plot the image column corresponding to the cursor position
- l – Plot the image line corresponding to the cursor position
- e – Draw a contour plot of an image subarea centred on the current cursor position.
- s – Draw a surface plot of the box centred on the current cursor position.
- h – Draw an histogram plot of the box centred around the current cursor position
- k – Perform a Gaussian fit along the CCD columns around the current cursor position. This key works when the cursor is in the Zoomed Image Area.
- j – Perform a Gaussian fit along the CCD rows around the current cursor position. This key works when the cursor is in the Zoomed Image Area.
- x – Extract an echelle order (see Appendix A)
- q – Delete the graphic window.

Finally the scrollbar below the *Main Display Area* allows to change intensity and contrast of the images displayed.

4.1 The Graphic Keys

This appendix describes use and function of the graphic keys available in the SARG user interface. To use the keys click with the mouse in some cases on the image display in other cases on zoomed image display and then press the corresponding letter without moving the mouse. All the keys (except the “q” key) will open a window, the SARG Graphic Window, that will be used afterwards to draw all the graphs created through them. To use the key again just move the mouse in a new position in the same image area and then press the key again (no mouse clicking necessary).

The c, l, e, s, h keys work when the mouse in the Main Display Area. The k, j, x keys work when the mouse is in zoomed area.

The keys are always disabled during the CCD readout and during the SARG setup.

C : The image column corresponding to the current cursor position will be plotted in the SARG Graphic Window. The line plotted will be shown on the top of the graph (Figure 17).

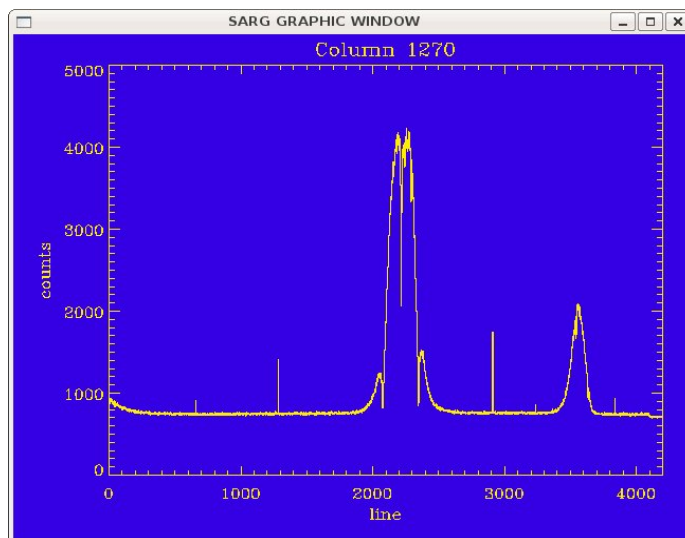


Figure 17. Column plot

l : The image line corresponding to the cursor position will be plotted in the Graphic Window. The line plotted will be shown on the top of the graph (Figure 18).

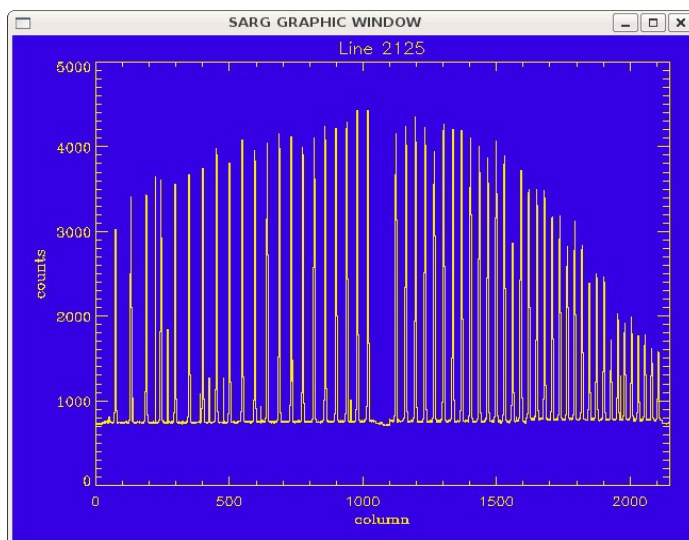


Figure 18. Line plot

e : A contour plot of the image region centred on the current box cursor position is made in the Graphic Window. The size of the contoured region is 20x20 pixels.

s : A surface plot of the image region centred on the current box cursor position is made in the Graphic Window. The size of the surfaced region is 20x20 pixels.

h : A histogram plot of the image region centred on the current box cursor position will be drawn in the Graphic Window. The size of the region is 20x20 pixels.

k : A Gaussian fit along the CCD columns around the current line cursor position in the **Zoomed Image Area** will be performed. A cut of the image along the columns 40 pixels long, centred around the current cursor position, will be plotted on the Graphic Window and, superimposed on it the result of the Gaussian fit. On the top left of the graph will be shown also some parameters of the fit. In particular the centre of the Gaussian along the line, its height above the background, its FWHM and the value of the background (Figure 19).

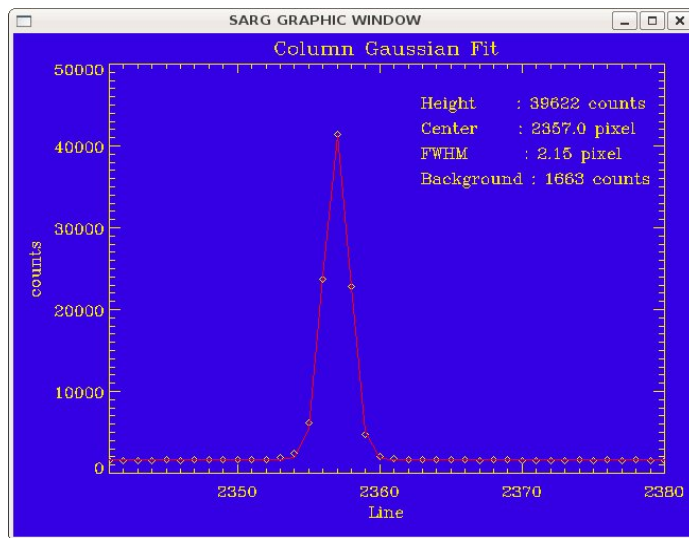


Figure 19. Gaussian fit along a column

j : A Gaussian fit along the CCD lines around the current column cursor position in the **Zoomed Image Area** will be performed. A cut of the image along the columns 40 pixels long, centred around the current cursor position, will be plotted on the Graphic Window and, superimposed on it the result of the Gaussian fit. On the top left of the graph will be shown also some parameters of the fit. In particular the centre of



the Gaussian along the selected column, its height above the background, its FWHM and the value of the background (Figure 20).

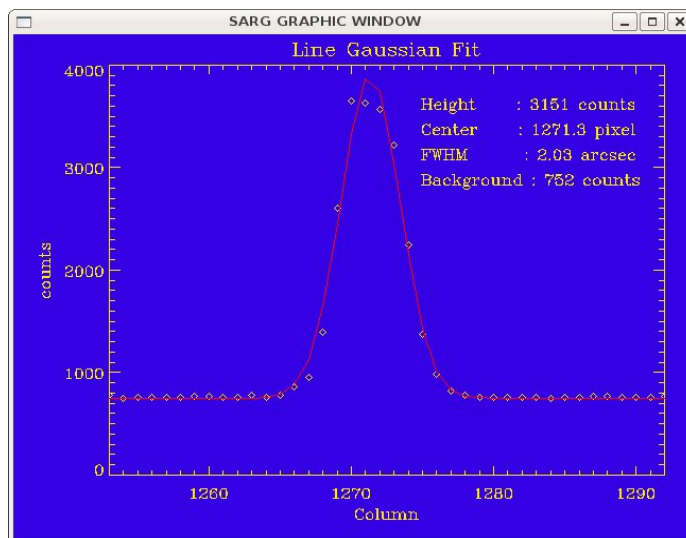


Figure 20. Gaussian fit along a line

X : This key performs the extraction of the echelle order.

4.1.1 Extraction of an Echelle Order

To start the procedure identify the order you want to extract in the main display area then click on the image with the left mouse button to display that area in zoomed image area, then click on the zoomed image area and press 'x' on the order you want to extract. After doing this a window will pop up asking if the observer want to use the extraction parameters used in the last extraction procedure. If the answer is 'yes' then the extraction is done automatically and the extracted order displayed (see Figure 22). If the answer is 'no' then the extraction procedure starts.

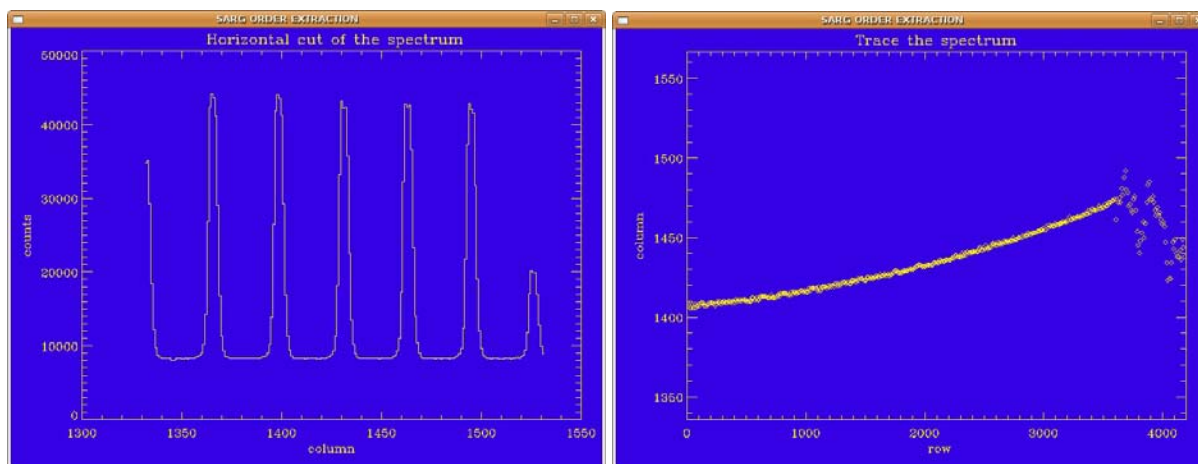


Figure 21. Left panel: horizontal cut of the echelle spectrum. Right panel the trace of the echelle order.

The steps performed by the procedure to extract the echelle order are the following:

1. Selection of the aperture corresponding to the order to extract: a graphic window showing an horizontal cut of the spectrum (across the spectral dispersion) is displayed (see Figure 21 left panel). The columns displayed are 200 and the cut is the result of adding 10 rows. The observer has to select the aperture corresponding to the order to extract by clicking first on the left side and the on the right side of it. The two x coordinates define the size of the aperture and the position of two 5 pixels wide aperture to calculate the background.
2. Trace the echelle order: the procedure trace the order throughout the CCD, then it displays the results in a graphic window (see Figure 21 right panel).



3. Fit the traced order: the observer specifies the sample of points to use to fit the traced spectrum with a polynomial function.
4. Extraction of the order: the order is extracted and the results are displayed on the graphic window (see Figure 22). Along the x axis rows are displayed while on the y axis the flux in ADU is displayed.

The graphic window where the order is displayed has few functions to extract information from the spectrum. First of all moving the cursor on the window, the values corresponding to the row and the flux are displayed on the upper left corner of the window and updated continuously. Then there are some graphic keys that can be used simply pressing them while inside the window. The list of the keys in alphabetical order and their functions is the following:

- a: allow to zoom the spectrum. Press twice the key along the rows to plot the portion of the spectrum identified by the two extremes (see Figure 23 left panel).
- e: allow to compute the equivalent width of a line. Press twice the key to define two points on the continuum (plotted then in red) to make the calculations. The results of the computation (Line centre, Equivalent width, Position of the continuum, and Flux) are displayed on the bottom of the plot (see Figure 24, left panel).
- k: allow to compute a Gaussian fit of a line. Press twice the key to define the two extremes between which perform the fit. The Gaussian fit is superimposed on the spectrum. The results (Line centre, Flux, Equivalent width, and FWHM) are then displayed on the bottom of the plot (see Figure 24, right panel).
- q: quit the SARG order extraction graphic window
- r: redraw the original extracted spectrum, no smoothing, full rows range.
- s: smooth the spectrum making an average with a box ten pixel wide.
- =: print in a PS file the plot shown in the graphic window.

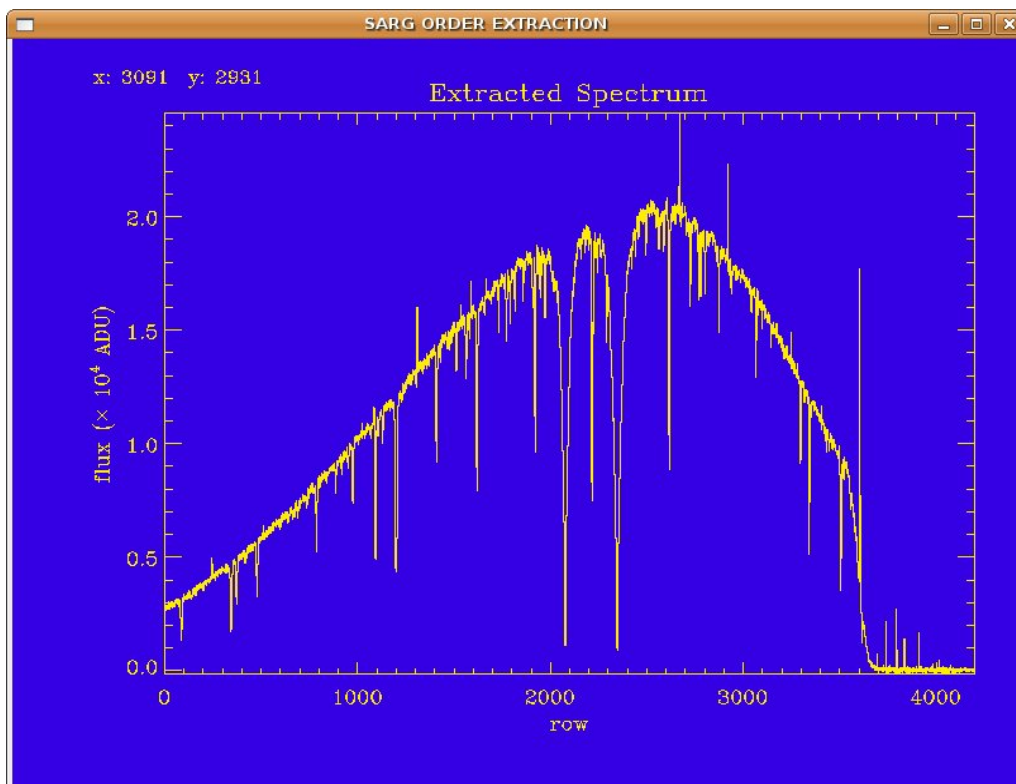


Figure 22. The extracted order

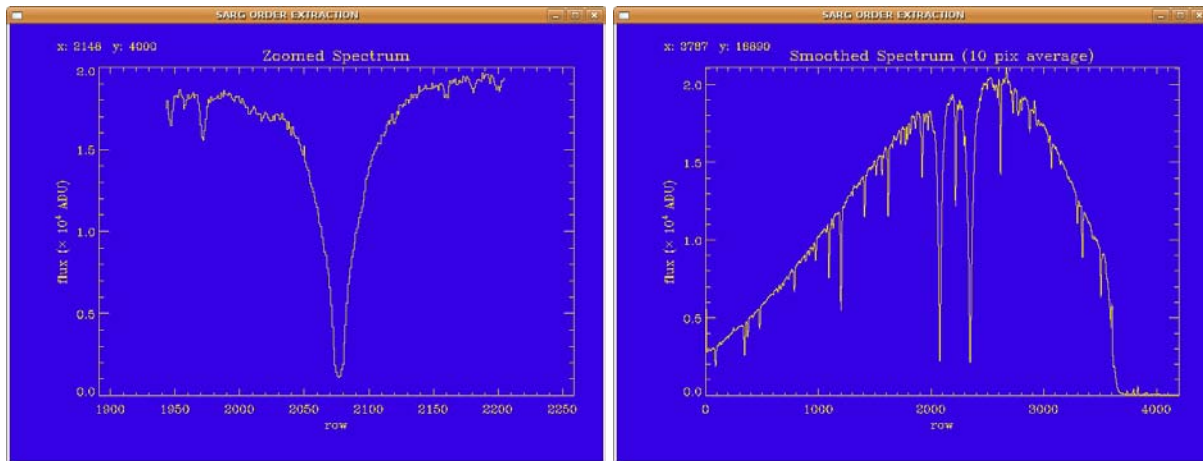


Figure 23. Left panel: a plot of a portion of the spectrum obtained with the 'a' graphic key. Right panel: a plot of the smoothed spectrum obtained with the 's' graphic key.

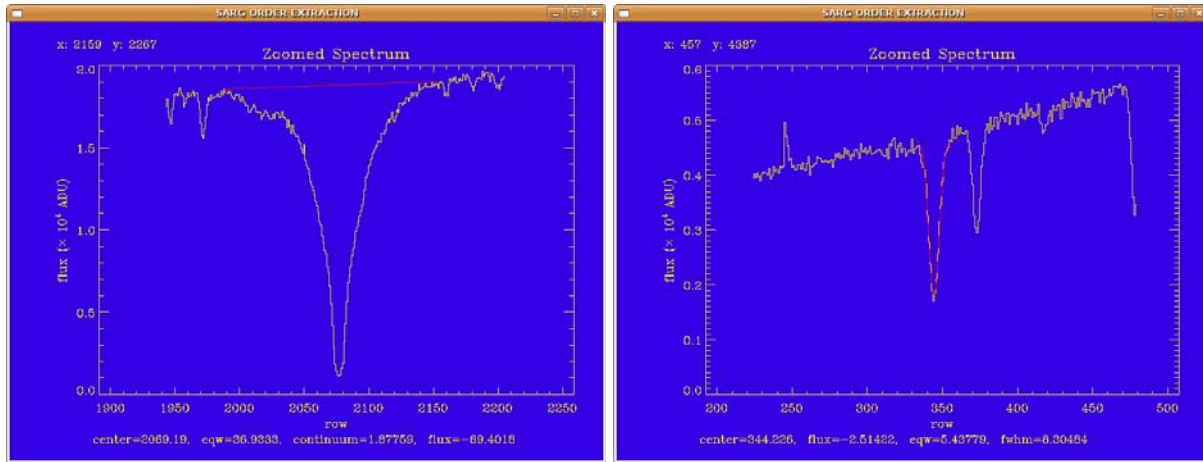


Figure 24. Left panel: Equivalent width of a line. Right panel: Gaussian fit of a line.

q : When pressed inside the image area this key deletes the Graphic Window.

5 EXPOSURE CONTROL PANELS

5.1 TIMER PANEL

This panel gives information basically on the status of the exposure. When exposing the panel will display "Exposing CCD" together with the number of the active sequence (sect. 5.2.9), the number of the active exposure within the sequence, and a timer giving the time to the end of the exposure. At the end of an exposure during the CCD readout the panel will display "Reading Image" with the time elapsed since the start of this operation. When the sequence(s) are over on the panel will be written "Done".

Also before starting an exposure if the instrument configuration is changing then the panel will display: "SARG Set Up Please Wait..." and the number of the sequence (sect. 5.2.9) to which the information is referred to.



Figure 25. Some of the information displayed in the timer panel

5.2 EXPOSURE SETUP PANEL

This panel is used to setup the exposure when the sequencer is not active. The panel contains buttons, editable fields and a scroll down menu.

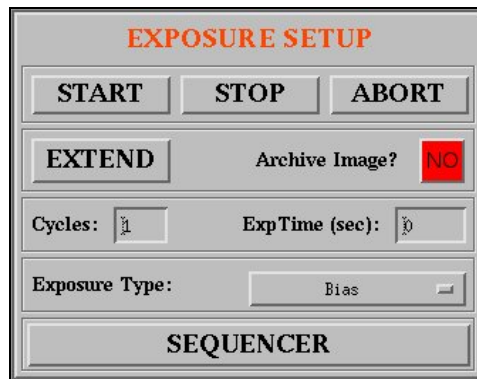


Figure 26. The Exposure Setup Panel

5.2.1 START

The *START* button initiates the exposure. Before actually starting the exposure the procedure checks the following items:

- Check if the LRS mirror feeding SARG is in position or not.
- Check if the image will be archived or not.
- Check that the instrument configuration is compatible with the selected exposure type.
- Perform CCD set up.
- Perform SARG set up.
- Start the exposure or the cycle of exposures.

In case any incongruence is found, either a warning is issued or automatically the interface corrects it. In case of warning issue, a window displaying a message explaining the reason for the warning pops up. If the observer decides to ignore the warning, then the exposure is started, otherwise the procedure returns to allow the observer to remove the cause of the warning.

This button is NOT active when the sequencer panel is open.



5.2.2 STOP

The *STOP* button immediately stops the current exposure and the CCD image is read out. If the exposure was part of a sequence then the sequence is aborted.

This button is active ALSO when the sequencer panel is open.

5.2.3 ABORT

The *ABORT* button immediately abort the current exposure, the image is not read out. If the exposure was part of a sequence then the sequence is aborted.

This button is active ALSO when the sequencer panel is open.

5.2.4 EXTEND

The *EXTEND* button allows the user to extend the exposure time of the current observation. When the button is pressed a window will pop up. The observer will have to insert the amount of time in seconds and the press OK. The Timer counter will be updated and the count down will continue.

This button is active ALSO when the sequencer panel is open.

5.2.5 Archiving images

Image archiving is not automatic. The observer has to choose to archive an image. To do that the observer has to press the red button saying "NO". The button will turn green and "YES". Whenever the button is on the "NO" archiving status a warning is issued when starting an exposure.

This button is NOT active when the sequencer panel is open. In that case this operation can be done directly from the sequencer panel.

5.2.6 Number of Cycles

The "Cycles" field allows the user to specify how many times a given exposure has to be repeated. Its default value is 1.

This field is NOT active when the sequencer panel is open as the number of exposures with a given instrumental set up can be specified directly from the sequencer panel.

5.2.7 Exposure Time

The "Exp Time" field allows the user to set the exposure time of the current exposure or group of exposures. Exposure time has to be given in seconds.

This field is NOT active when the sequencer panel is open as the exposure time can be set directly in the sequencer panel.

5.2.8 Exposure type

There are seven different exposure types that can be selected by the observer corresponding to as many instrumental configurations. In some cases the selection of one the exposure types causes an automatic change in the instrumental configuration (e.g. if the observer select a Bias exposure type the exposure time is automatically set to zero) either when the selection is done or just before the exposure is started (i.e. after pressing the *START* button). In other cases a warning message is issued telling the observer that the exposure type and the current instrumental configuration are not perfectly compatible. The list of the exposure types together with the operations performed by the GUI is given below:

- Bias
 - Set the exposure time to zero seconds
 - Shut off all the lamps
- Dark
 - Keep the CCD shutter closed
 - Shut off all the lamps
- Flat Field
 - Insert the calibration mirror
 - Check if the selected lamp is a flat field lamp
 - Check if the selected lamp corresponds to the default for the selected grism
- Thorium
 - Insert the calibration mirror
 - Check if the selected lamp is the thorium lamp
- Object
 - Remove the calibration mirror

- Shut off all the lamps
- Flat Field (Iodine Cell)
 - Insert the calibration mirror
 - Insert the iodine cell
 - Check if the selected lamp is a flat field lamp
 - Check if the selected lamp corresponds to the default for the selected grism
 - Check if the iodine cell is at working temperature
- Object (Iodine Cell)
 - Remove the calibration mirror
 - Insert the iodine cell
 - Check if the iodine cell is at working temperature

This scroll down menu is NOT active when the sequencer panel is open as the exposure type can be selected directly from the sequencer panel.

5.2.9 The Sequencer Panel

The sequencer button is used to start the sequencer panel. When pressed it opens the window shown in Figure 27.



Figure 27. The Sequencer panel

The sequencer panel contains 10 lines and 5 buttons. Each line contains editable text fields, scroll down menus and buttons that allow to change almost completely the instrumental configuration of the SARG spectrograph. The only mechanisms that cannot be managed directly from the sequencer panel are the Pre Slit wheel, the Slit Viewer slide and all the mechanisms related to the polarimeter. To be executed a line sequence has to be activated pressing the button close the corresponding sequence number. Only activated sequences can be started. If no sequences are activated an error (TBC) message will be displayed when the START button is pressed.



5.2.9.1 START

The *START* button will execute sequentially all the activated line sequences. Before starting the sequences the GUI perform the following operations:

- Check if the LRS mirror feeding SARG is in position or not.
- Check that there are active sequences.
- Check if the sequences of images will be archived or not.
- Check that the instrument configuration of the current sequence is compatible with the selected exposure type.
- Perform CCD set up.
- Perform SARG set up.
- Start the sequence or the series of sequences.

As with the *START* button in the main panel in case any incongruence is found, either a warning is issued or automatically the interface corrects it. In case of warning issue, a window displaying a message explaining the reason for the warning pops up. If the observer decides to ignore the warning, then the sequence is started, otherwise the procedure returns to allow the observer to remove the cause of the warning.

5.2.9.2 LOAD

The *LOAD* button allows the observer to retrieve a given sequencer configuration.

5.2.9.3 SAVE

The *SAVE* button allows the observer to save a given sequencer configuration.

5.2.9.4 RESET

The *RESET* button will reset the scroll down menus and editable text fields and the buttons to their default values.

5.2.9.5 DONE

The *DONE* button closes the sequencer panel.

5.3 CCD SETUP PANEL

This panel is used to change the CCD configuration. This operation can be done only from this panel as the sequencer panel has no tools to do that.

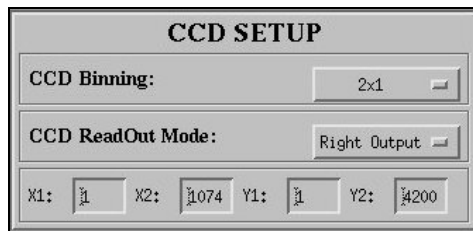


Figure 28. The CCD SETUP Panel

5.3.1 CCD Binning

There are 9 different binnings that can be selected using the CCD binning scroll down menu. The available binnings are 1x1, 1x2, 1x4, 2x1, 2x2, 2x4, 4x1, 4x2, 4x4.

5.3.2 CCD Read Out Mode

Three different read out modes are available: left, right and both output. They can be selected using the CCD ReadOut Mode scroll down menu.

5.3.3 Windowing

If windowing is necessary there are 4 editable text fields that can be used to do that. When changing binning or read out mode the 4 fields are reset to the default values which are (1,1) for the lower left corner and the maximum dimension in x and y corresponding to that binning and read out mode for the upper right corner. Note that the displayed dimensions refers to only one CCD (SARG has a mosaic of two CCDs) but when the observer selects a box actually he/she is selecting a box with that coordinates on both CCDs.

5.4 EXIT PANEL

The exit panel contains a button to exit the GUI. There are two other ways to exit the interface: one is exit button in the File Menu (sect. 3.1.3), the other one using the window manager.



Figure 29. The Exit Panel



6 THE SARG CONTROL PANELS

6.1 CONSOLE PANEL

Each time a command or a group of commands is issued by the GUI to the CCD or mechanisms service a message, describing the type of command and the time it was started, is written to the console panel. When the command is executed a new line is written to the console stating that the command was completed and the time when that happened. Many other informative, warning, and error messages are displayed in the console as shown, for example, in Figure 30.

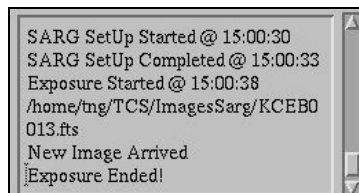


Figure 30. The console panel.

6.2 SARG SETUP PANEL

This panel allows the observer to configure completely the SARG spectrograph. It is composed by 8 scroll down menus each one controlling a mechanism. The SARG spectrograph has 9 different mechanisms. The focus mechanism that moves the collimator mirror cannot be controlled using the GUI. This mechanism has two possible positions: the first one corresponding to the focus when the Image Slicer is inserted along the optical path and the second corresponding to all other cases.

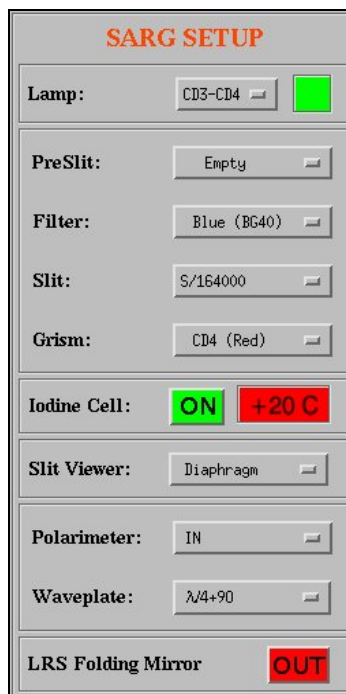


Figure 31. The SARG Setup panel

Going from top to bottom there are the following scroll down menus:

- **Lamp** : this menu is used to select one of the 3 (TBC) flat field lamps or the thorium lamps. The flat field lamps are identified by the name of the grism for which they are optimized, i.e., CD1, CD2, and CD3-CD4. Selecting one of the lamps from the menu turn on the corresponding lamp and moves the lamp selection mirror mechanism in front of the lamp. On the GUI the small square close to the menu turns green when the lamp is turned on and black when is turned off.



- **PreSlit** : There are 7 possible positions on the Pre Slit wheel. The wheel has two open positions 4 neutral density filters (ND0.7, ND2.4, ND3.4, ND4.7) and the iodine cell.
- **Filter** : There are 6 possible positions on the Filter wheel: an open position, a blue filter (BG40), a green filter (KG4), a yellow filter (GG455), a red filter (OG570) and a NaD filter. The coloured filter are used together with a grism to suppress higher orders.
- **Slit** : There are 6 different slits (S/164000, S/29000, S/57000, L/43000, S/86000, L/115000) an image slicer and an open position that can be selected using this menu.
- **Grism** : The Grism Wheel has 5 different positions. One position is an open position while the rest are occupied by the grisms: CD1 – Blue Grism, CD2 – Green Grism, CD3 – Yellow Grism, CD4 – Red Grism.
- **Slit Viewer** : In front of the slit viewer there is a linear stage containing a blue filter, a pin hole and an open position.
- **Polarimeter** : This menu is used to insert in or move out the Polarimetric module.
- **Waveplate** : The Waveplate menu allows to choose among 6 different plates (1/4, 1/4+90, 1/2, 1/2+22.5, 1/2+45, 1/2+67.5) to perform polarimetric measurements.

Finally there are two more panels. One is used to manage the switching on and the shutting off of the iodine cell. When pressing the button it changes from "OFF" to "ON" and viceversa and from "red" to "green". The Iodine Cell temperature is displayed in the same panel (see sect. 3.5.2).

The other panel allows to insert the folding mirror inside DOLORES to feed SARG. Pressing the coloured button, it changes form "OUT" to "IN" and viceversa and from "red" to "green".



7 GUI MESSAGES

Three kinds of messages will be delivered by the SARG GUI: Information messages, warning messages, error messages. These messages will be displayed in pop up windows.

The windows containing info messages are light blue in colour and either will close automatically or using the 'OK' button.

The windows containing warning messages are orange in colour and either have a 'YES' and a 'NO' button or an 'OK'. If the observer press the 'YES' or the 'OK' button the procedure will continue. If the observer press the 'NO' the procedure will return and no further action will be performed allowing the observer to take corrective actions.

The windows containing error messages are red in colour and have an 'OK' button to close them. In this case after pressing the 'OK' button the procedure always stops.

In following the complete (TBC) list of the messages generated by the SARG GUI.

7.1 Information Messages

- SARG Set Up, You are not allowed to do anything else, Please be patient...
- Moving LRS Mirror, You are not allowed to do anything else, Please be patient...

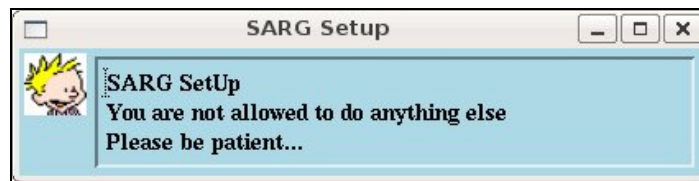


Figure 32. Example of information message window

7.2 Warning Messages

- LRS Mirror not in SARG position, is that OK?
- The image (or Sequence No. X) will not be archived, is that OK?
- You have not selected the default lamp, for this grism, Do you want to proceed anyway?
- Iodine Cell not @ working Temperature.



Figure 33. Example of warning message window

7.3 Error Messages

- LRS not Initialized.
- LRS Service Shut down
- You have selected Flat Field Exposure Type, together with the Thorium Lamp, Select the correct exposure type, or change the lamp and start again.
- You have selected Thorium Exposure Type, together with a Flat Field Lamp, Select the correct exposure type, or change the lamp and start again.
- Iodine Cell is OFF, Turn it on!!!, PLEASE.....
- Exposure Time is set to 0 sec, No exposure will be started
- Error from CCD Service (TBW)
- Error from the SARG Service (TBW)
- Error from the DOLORES Service (TBW)
- There is no active sequence selected

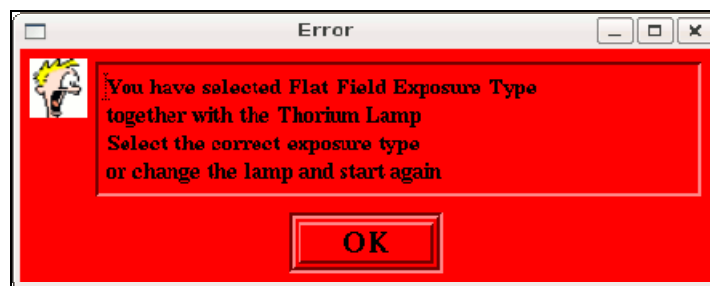


Figure 34. Example of error message window