SalsaJ
(Such a Lovely Software for Astronomy)
Practical Session


discover
the COSMOS


GALILEO
Teacher Training Program


G-HOU


NUCLIO
Núcleo Interactivo de Astronomia

Installation

Open the webpage http://www.euhou.net/ and click on software

What is SalsaJ

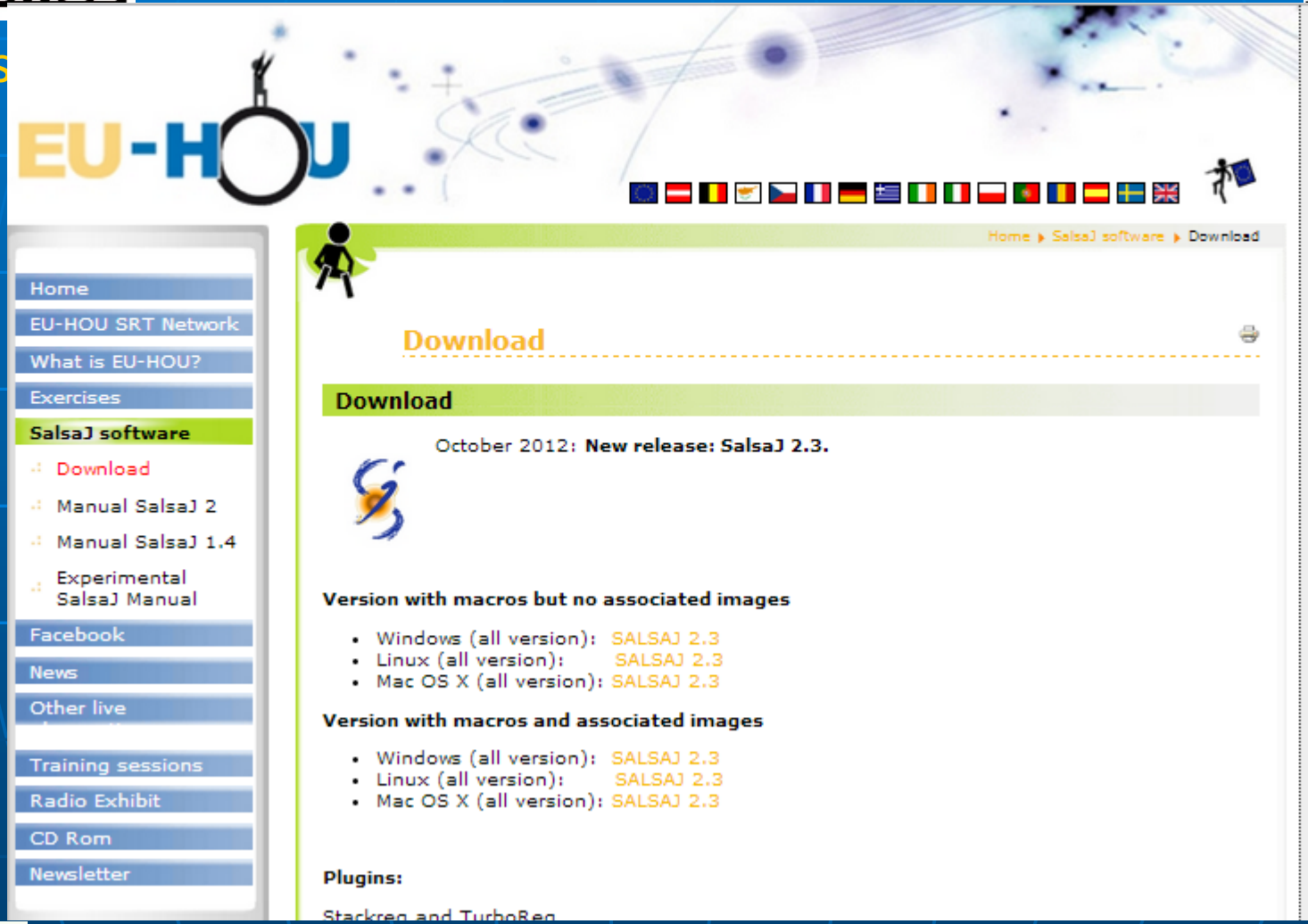
SalsaJ is a:
- free
- easy to install
- student friendly
- multi-platform
- multi-lingual

astronomical software to:
- display
- analyse
- manipulate

images and spectra

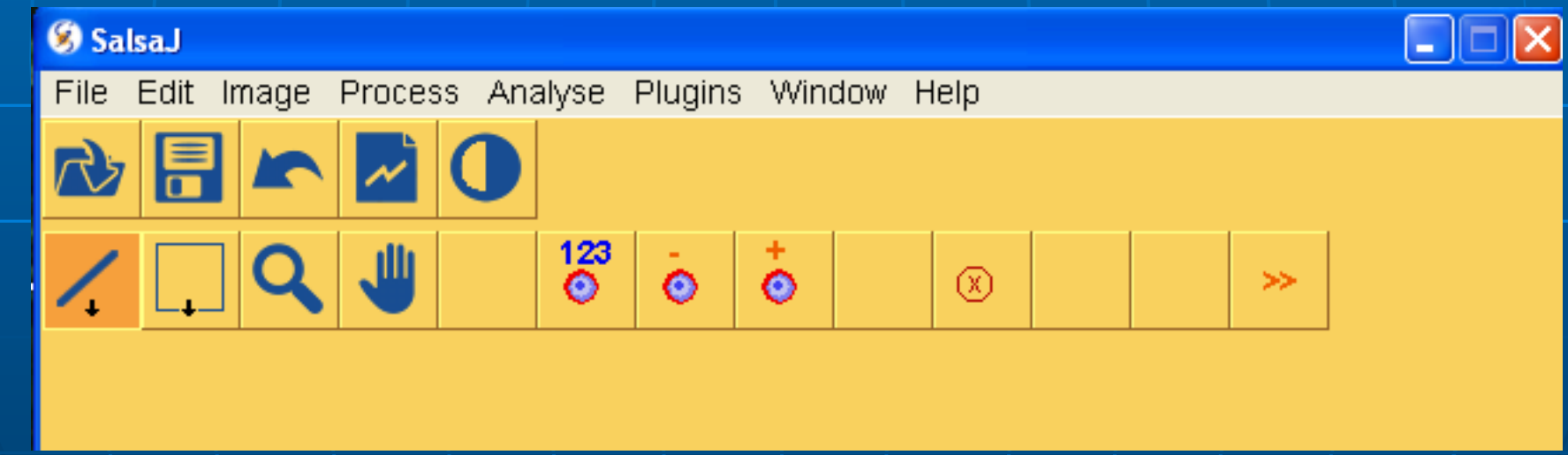
Installation

Choos

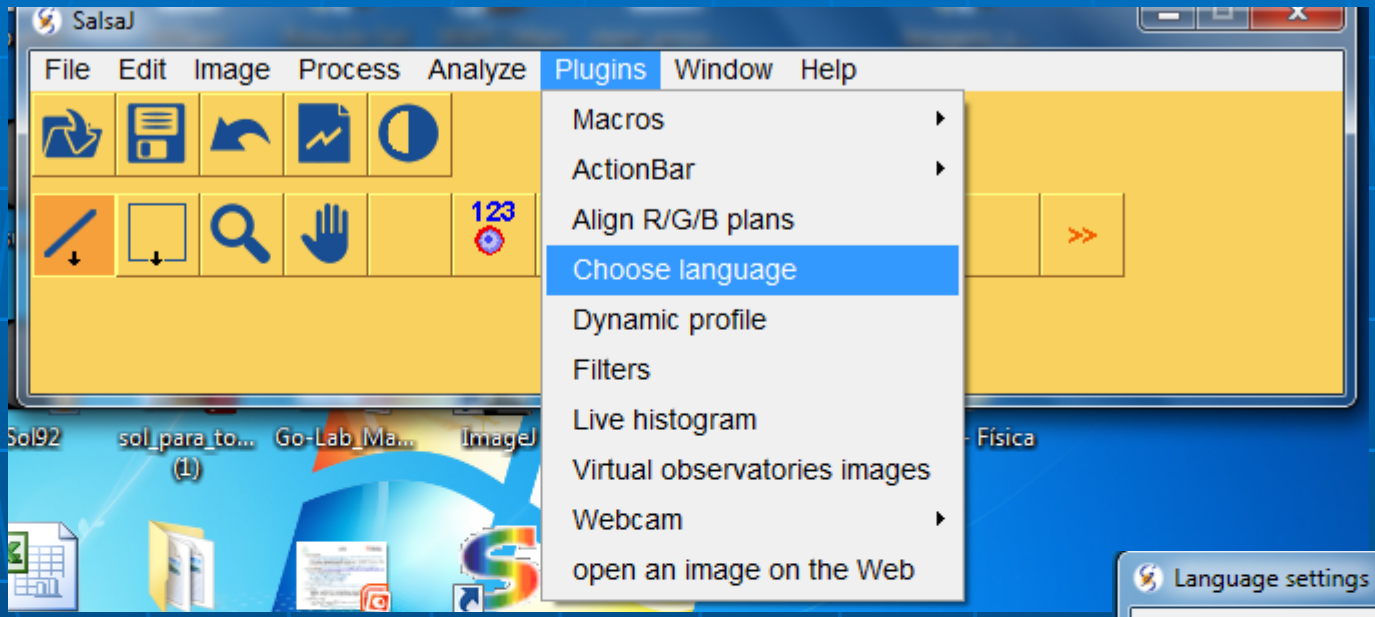


Open the SalsaJ program

After completing the installation click on this icon :



Change language



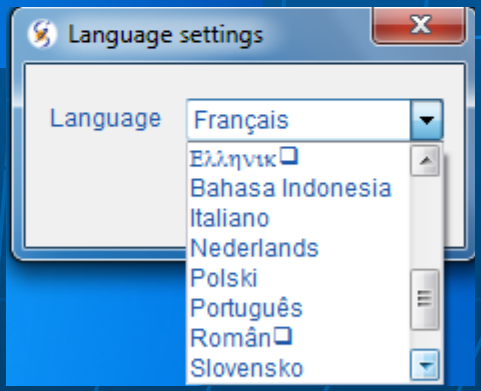
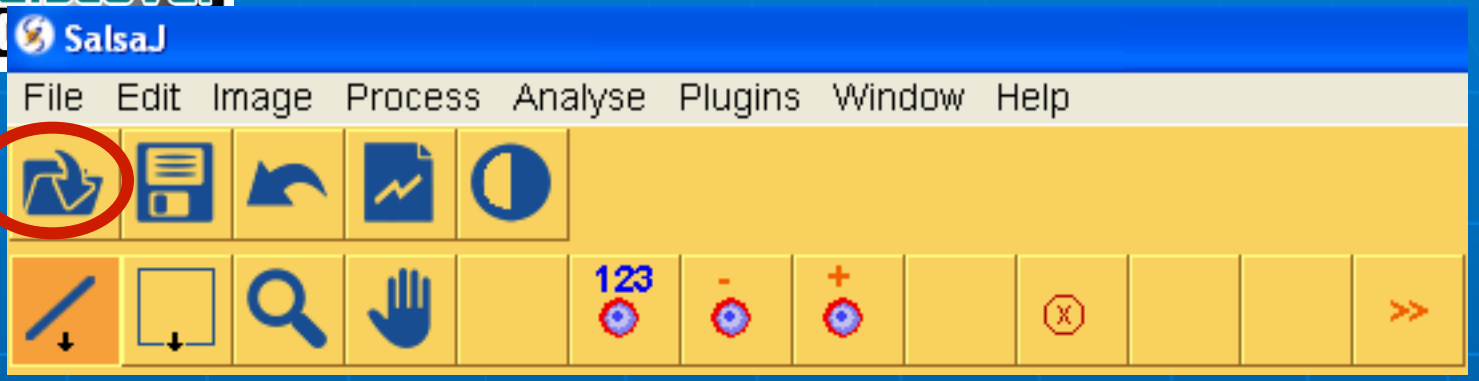
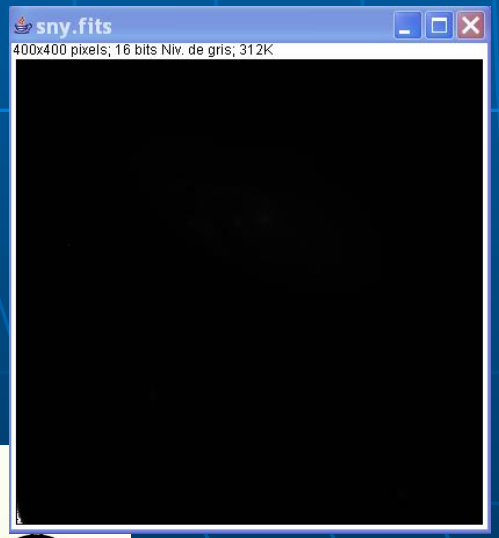


Image brightness

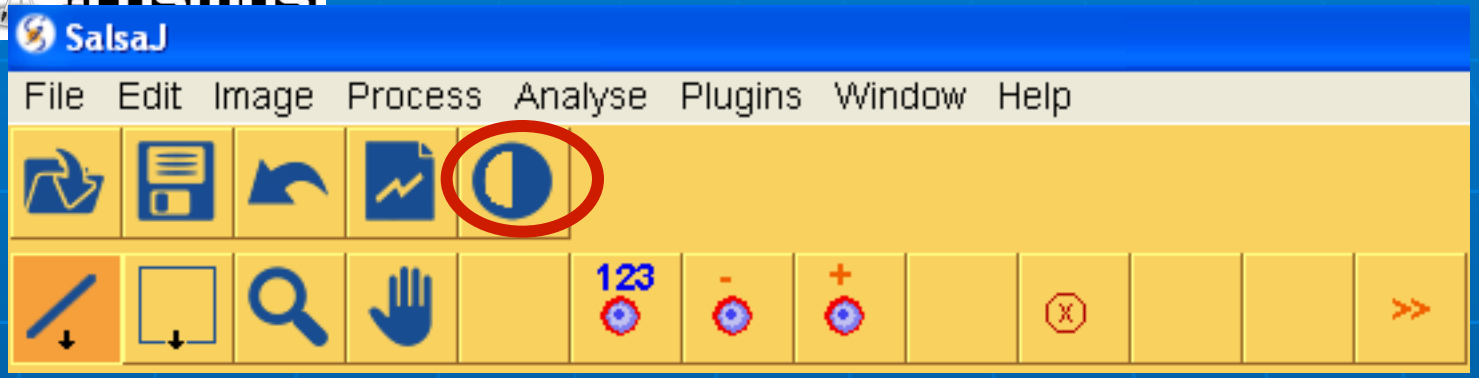


- Click on the icon or click on ‘Open’ in the ‘File’ menu
- Choose your image, e.g. the image ‘sny.fts’:



How to adjust the image brightness?

Image brightness



Click on the icon or on ‘Image’ menu of the toolbar, choose “Adjust” and “Brightness/Contrast”

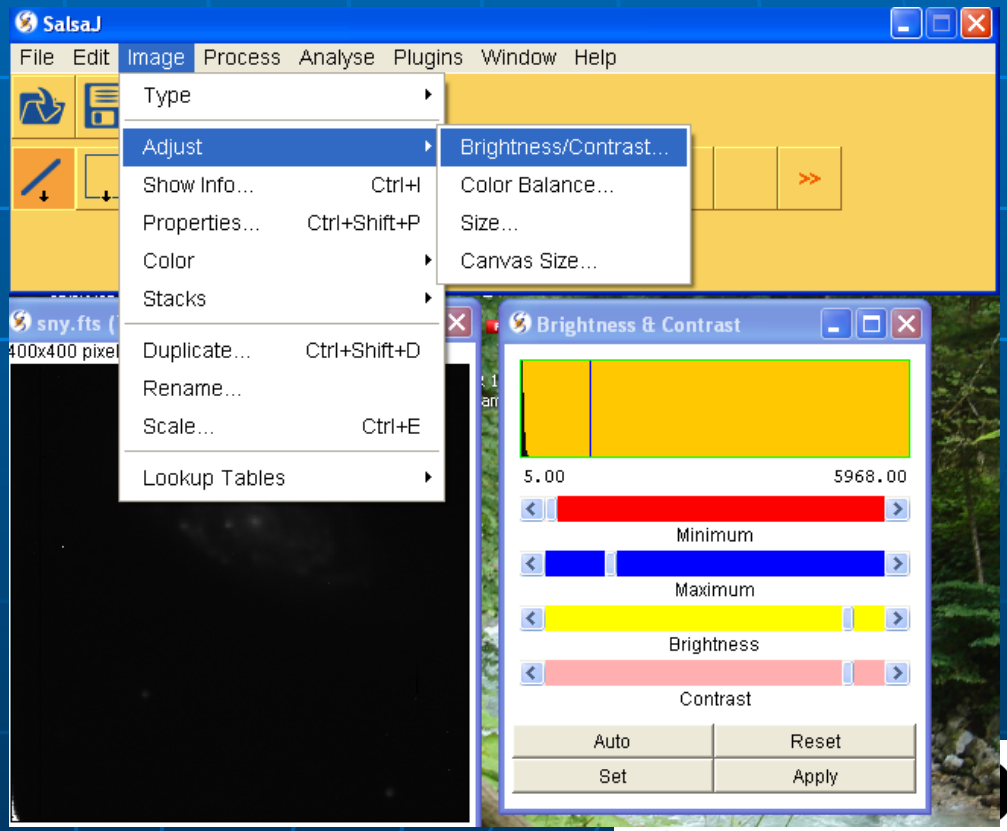
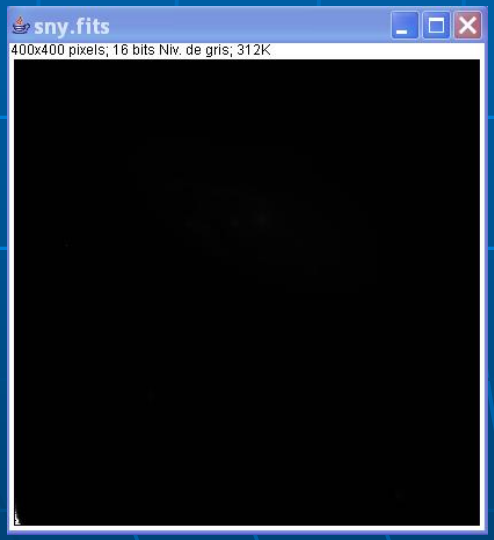
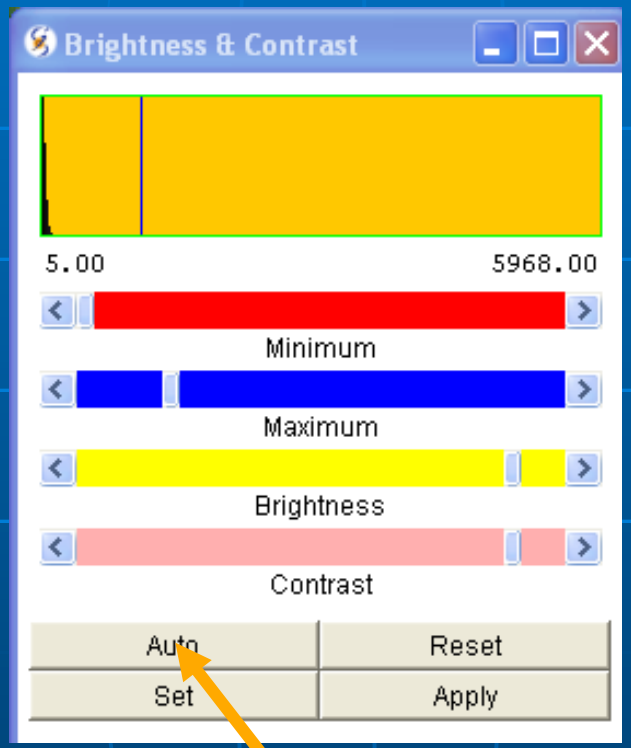
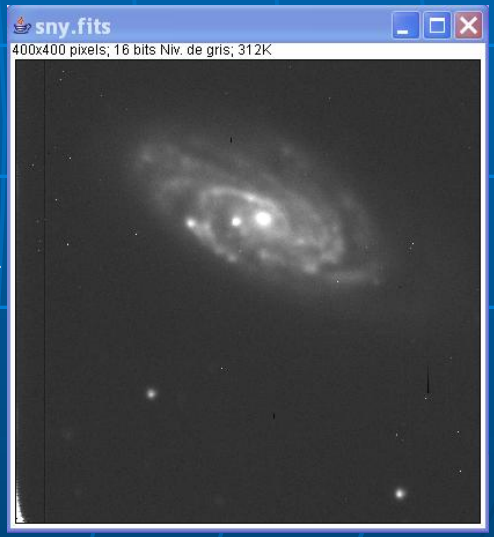


Image brightness

Adjust with Auto



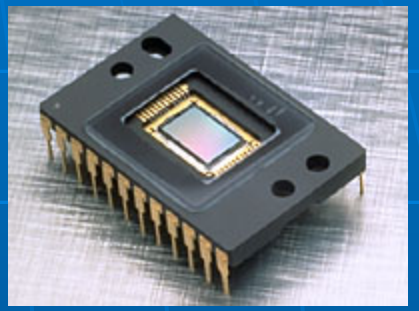




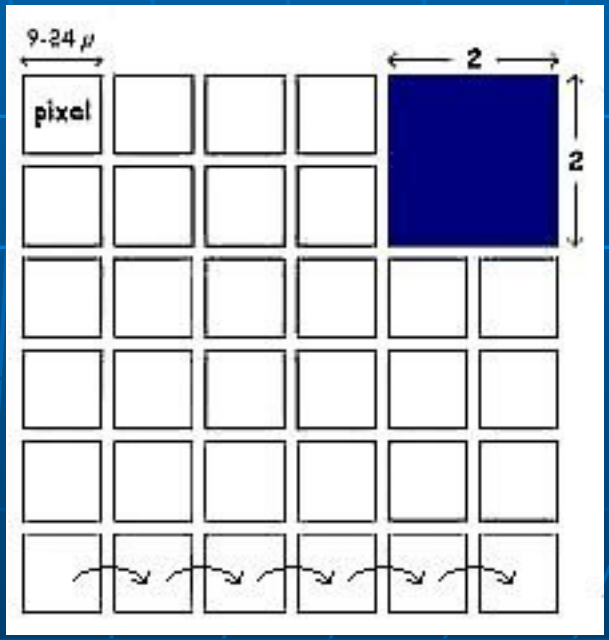
click 'Auto'

How to measure Light

- A CCD (Charge Coupled Device) converts photons in electrons criating na electric current.



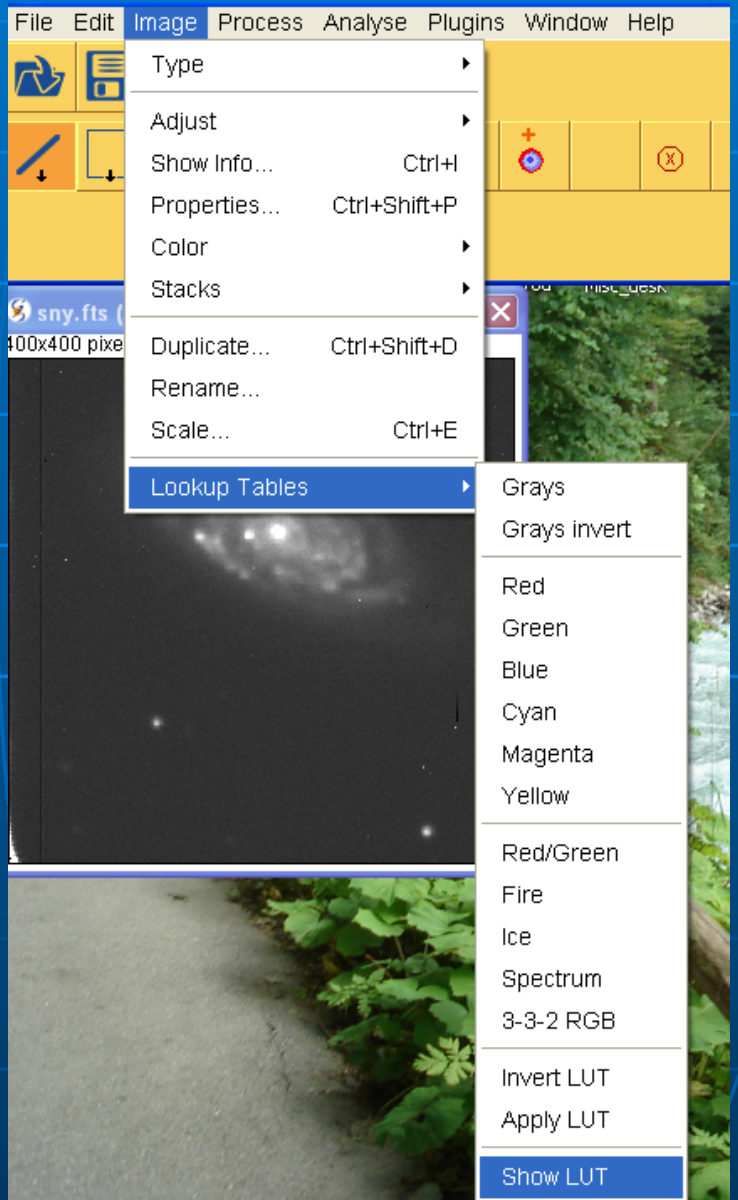
- CCDs are detectors made out of silicon. Each element is a pixel (*picture element)*.



What is an image?

- What are colors in an image?

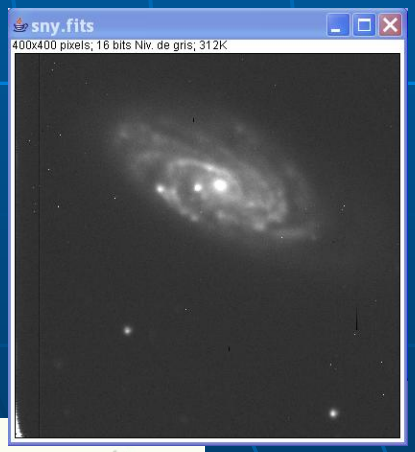
Display the Look-Up Table

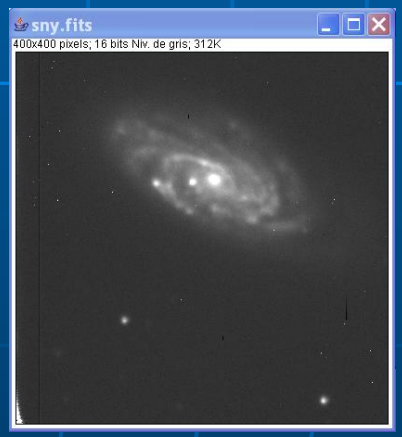


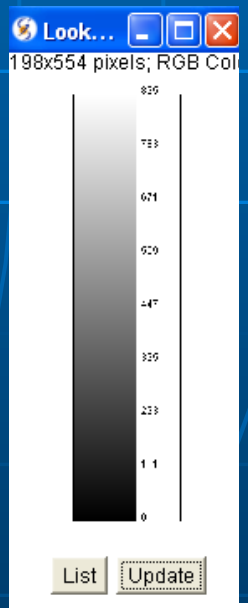
Display the Look-Up Table

The Look-Up Table (LUT) represents the relation between color and intensity of stars.

Select the option ‘Show LUT’ in the ‘Image’ menu.

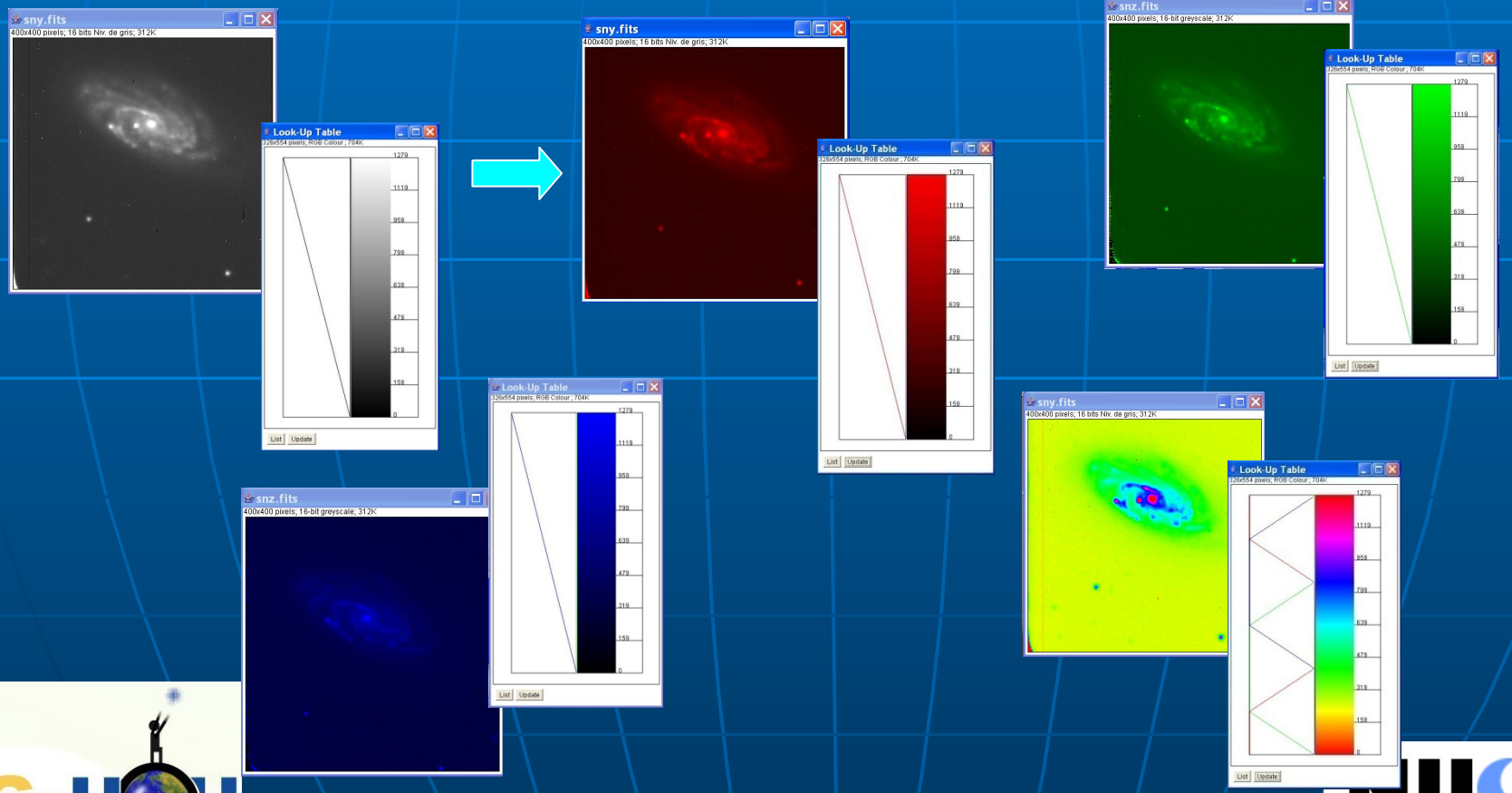




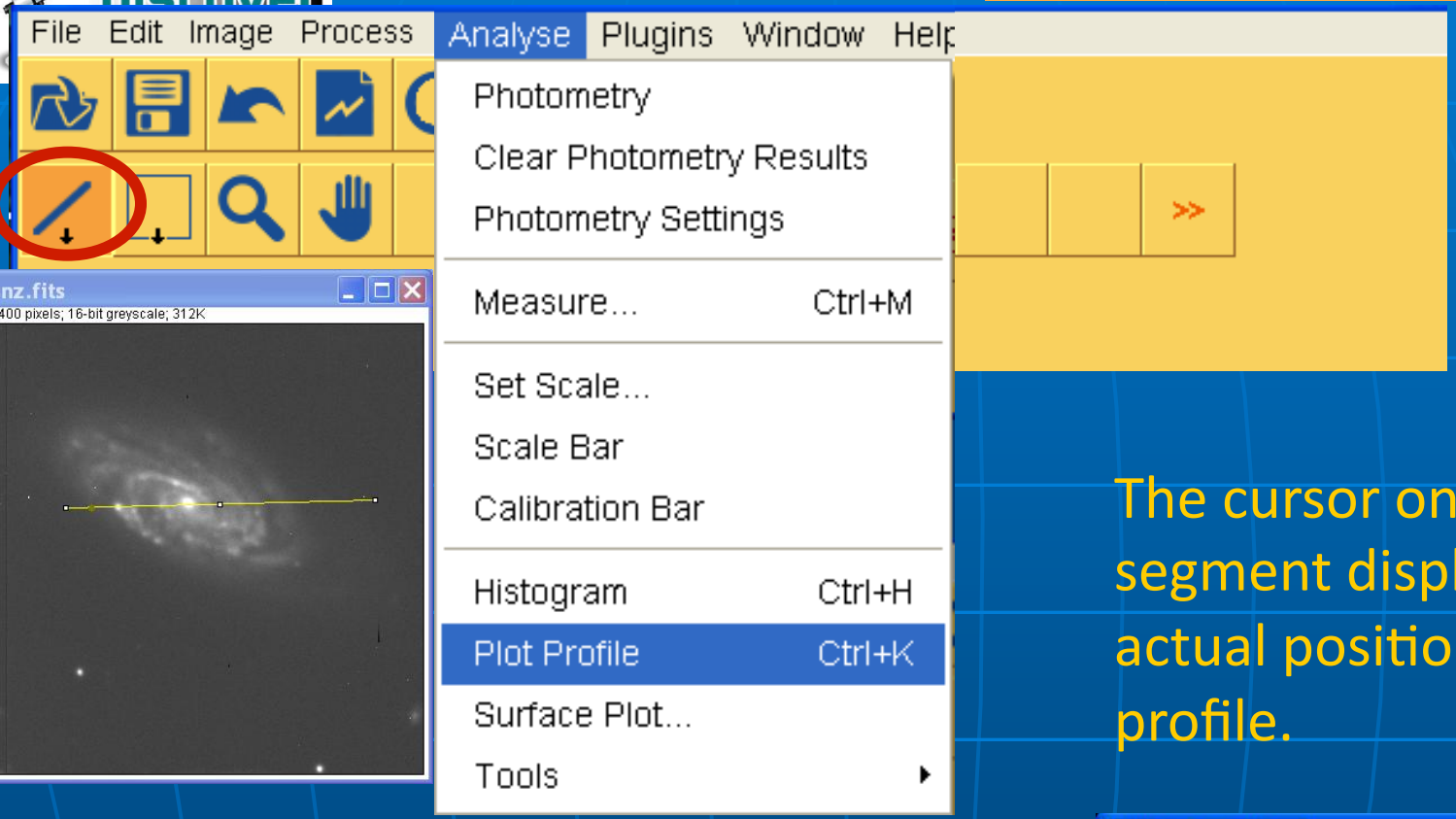


Change the Look-Up Table

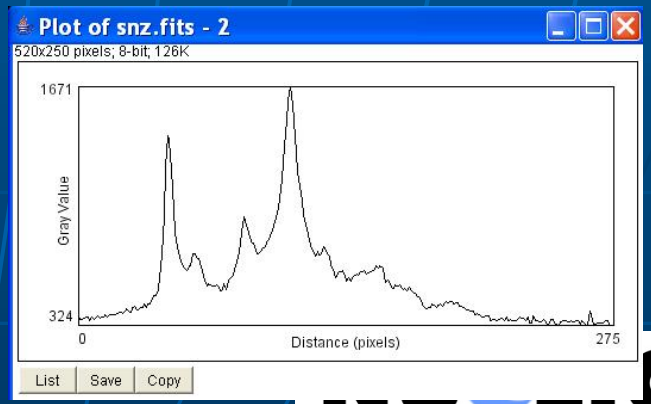
Select the option ‘Lookup Tables’ in the ‘Image‘ menu, for example ‘Red’, ‘Green’, ‘Blue’ or multi-color LUT ‘Spectrum’.



Make a profile



The cursor on the segment displays the actual position on the profile.



Plot a segment on the image to get the corresponding plot profile.

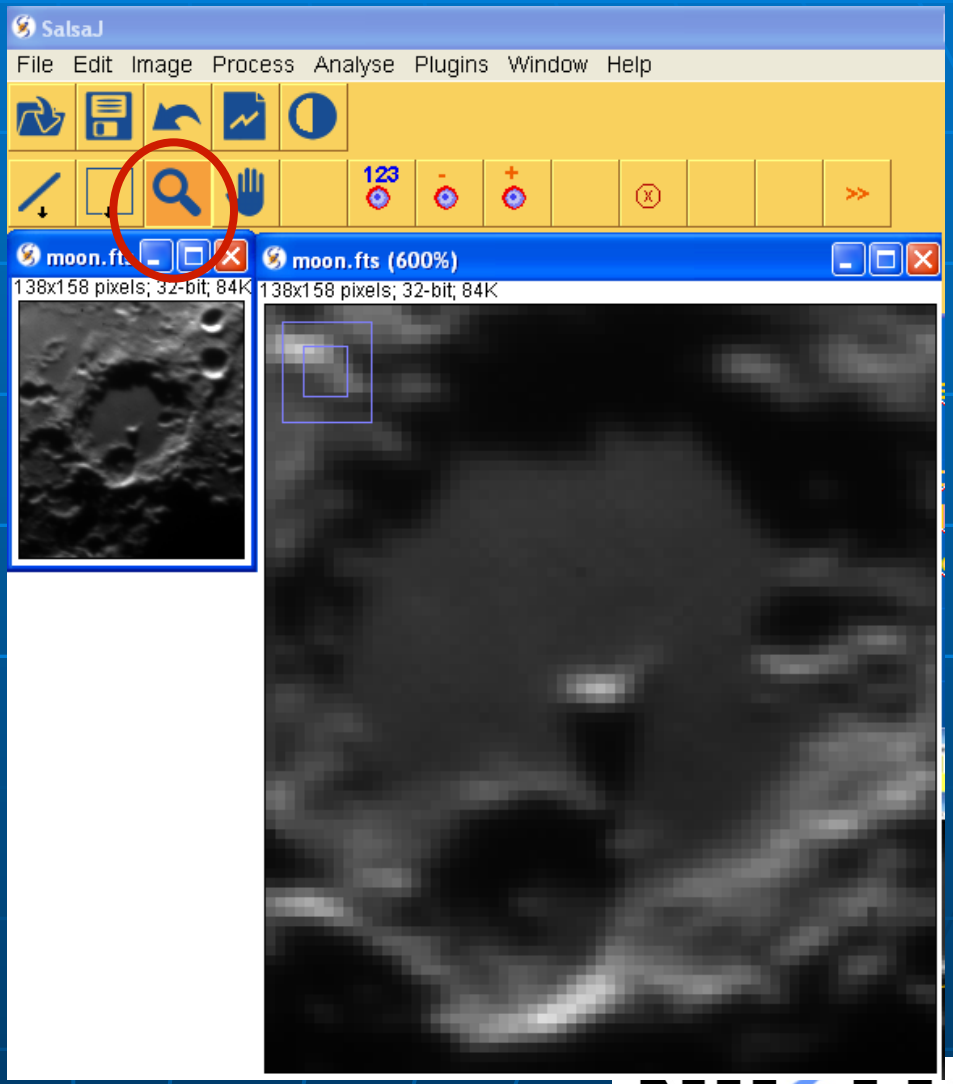
About the Display

- Open a moon image

- x and y are the coordinates of the cursor.
- In this example x and y are the coordinates of the central spike of the biggest crater.
- Value is the number of counts of the pixel which coordinates are displayed (brigthness)

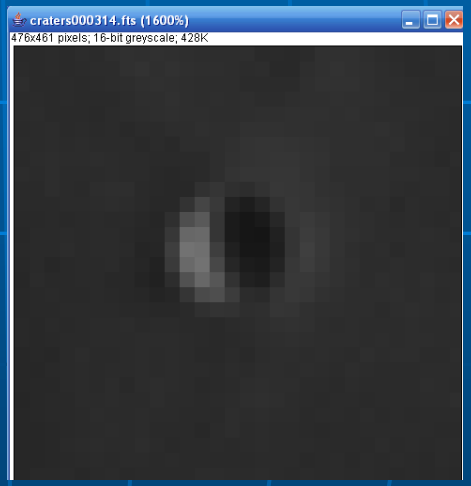
Zoom

- In SalsaJ, you can "zoom" the image using the magnifying glass tool in the tool bar.
- Just click anywhere in the image and it zoom in.
- To "zoom out" hold down Ctrl key while clicking on the image or use the right side or your mouse.



Measuring size with images

Open an image and zoom in



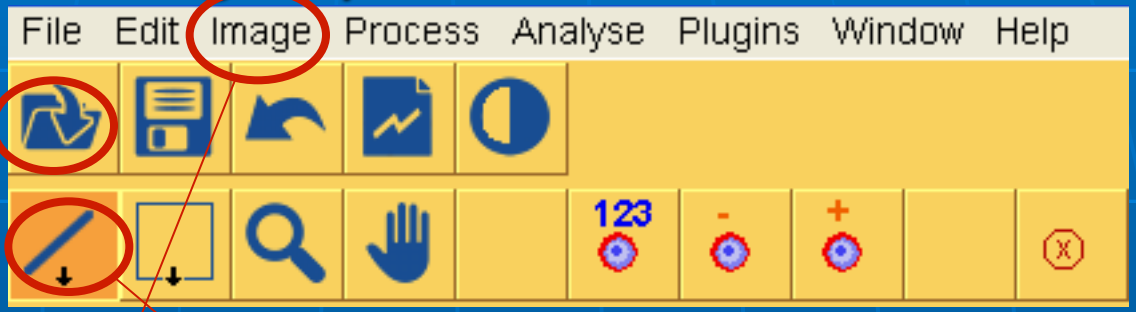
Each square is a pixel (picture element)

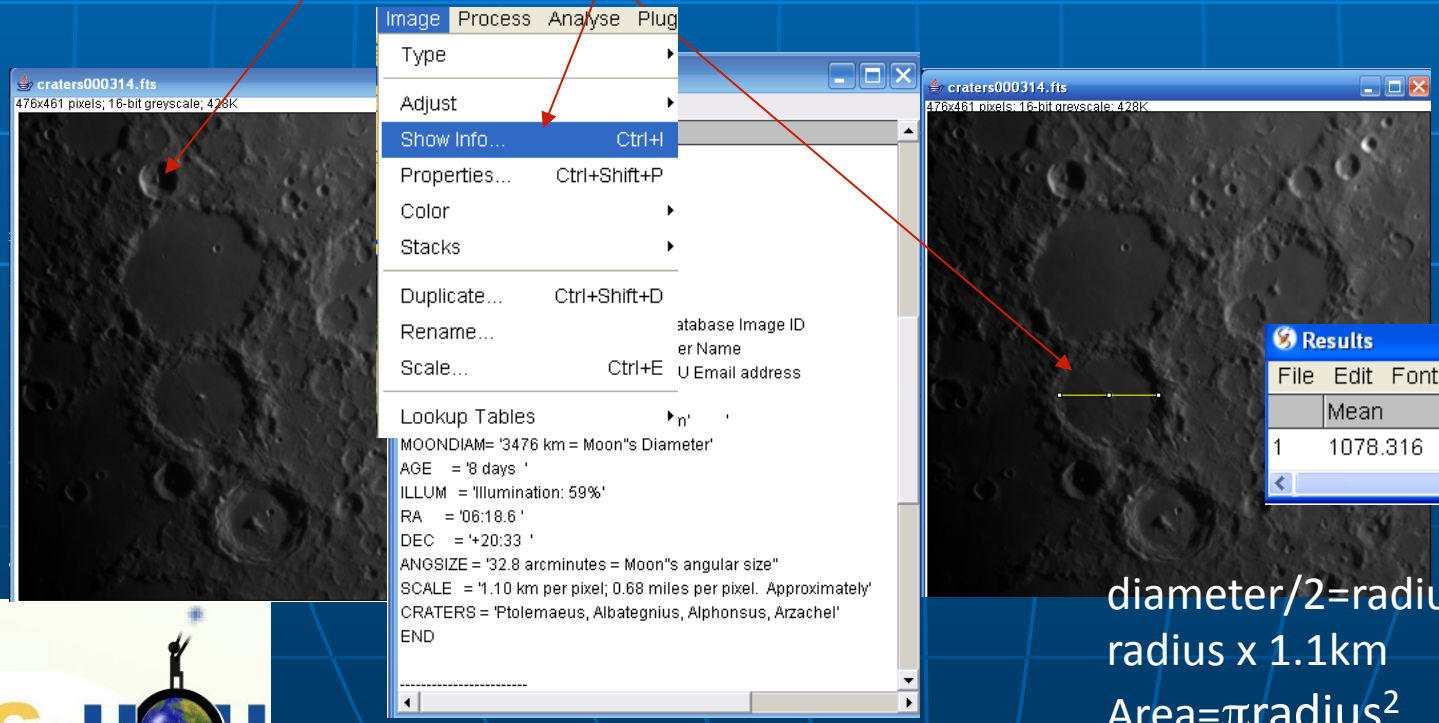
Measuring size with images

- Find a crater as big as your town.

Open image

Craters000314.fits





Finaly in "Analyse" menu choose 'measure'

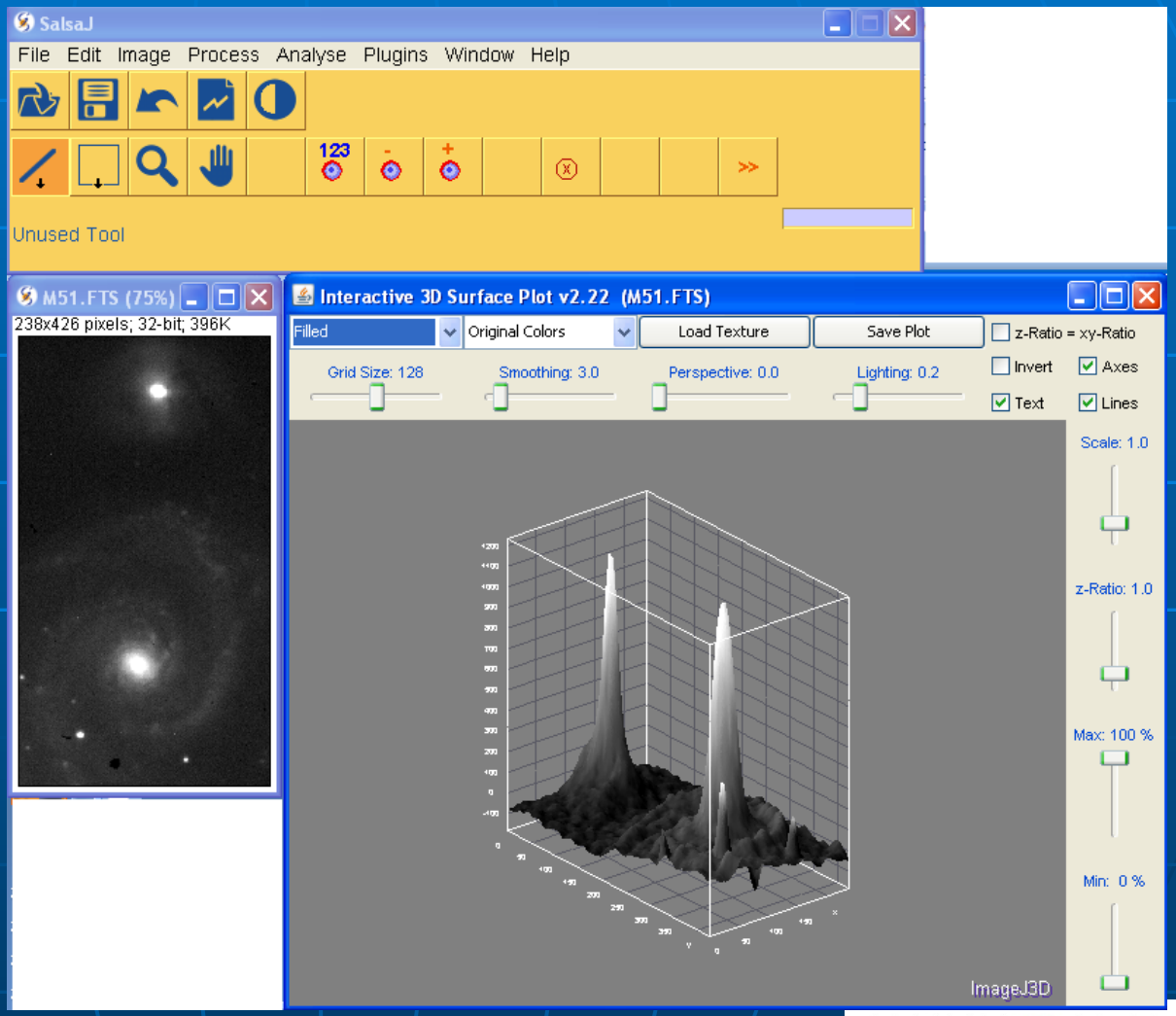
diameter/2=radius

radius x 1.1km

Area=πradius^2

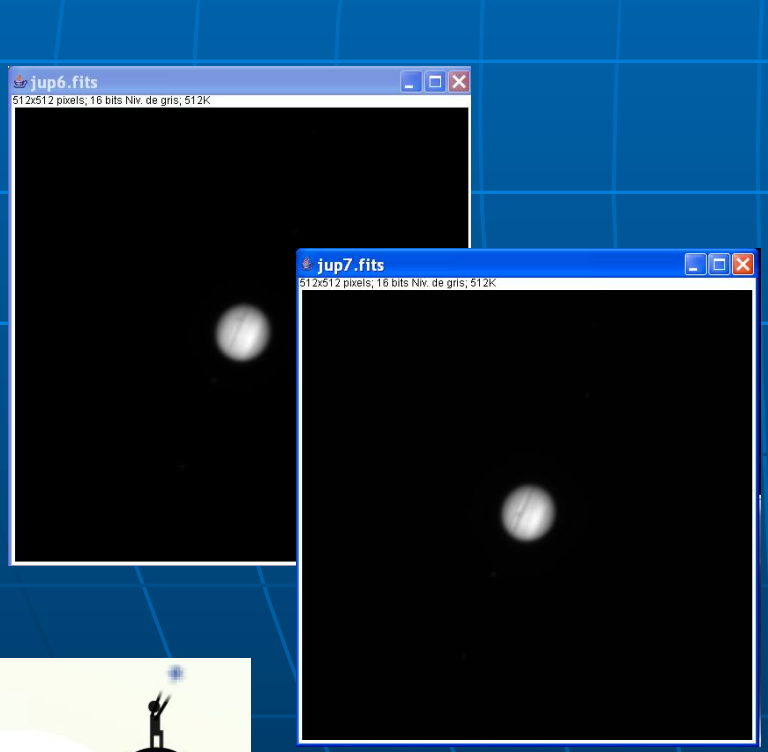
Make a surface plot

- Select a region in image “M51.fits” to obtain the correspondent surface plot or just measure the whole image
- Open the “Analyze” menu and choose “Surface plot” and accept the default options.



Basic operations

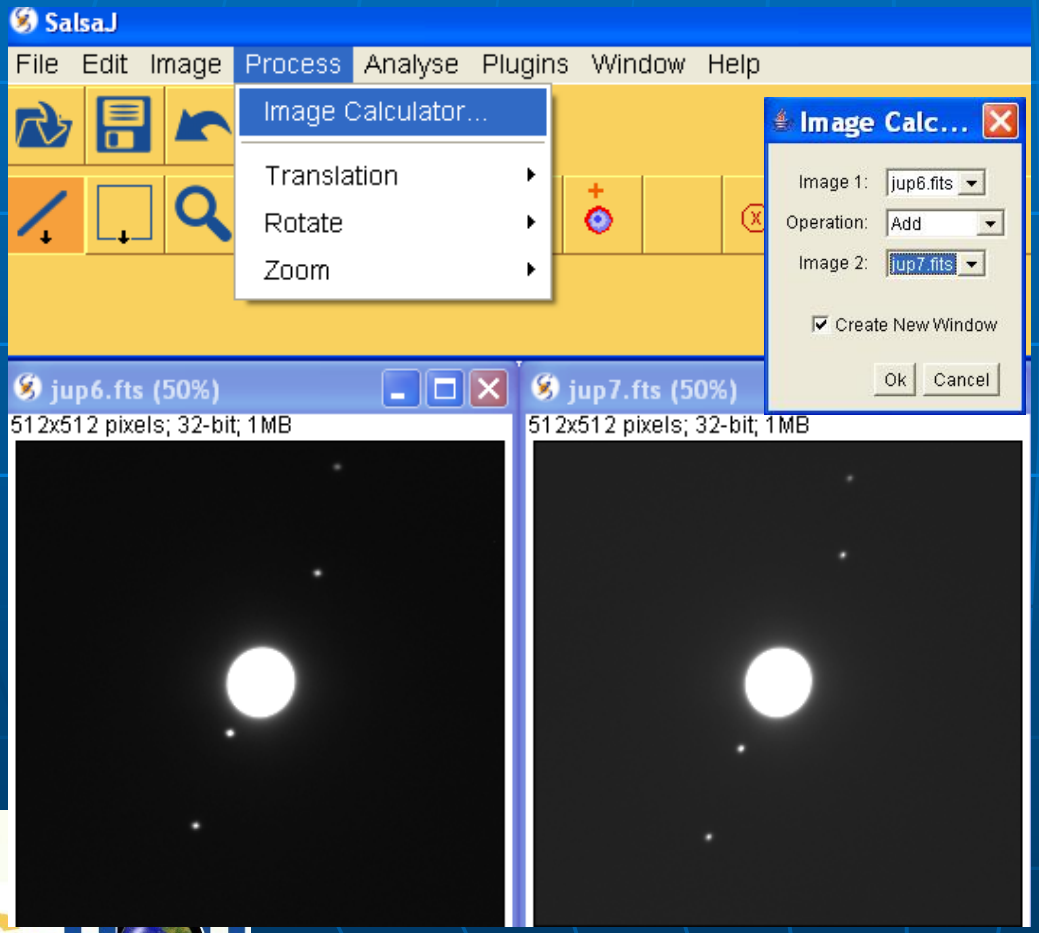
Open two images to make some basic operations :



Adjust images with 'Auto'

Add two images

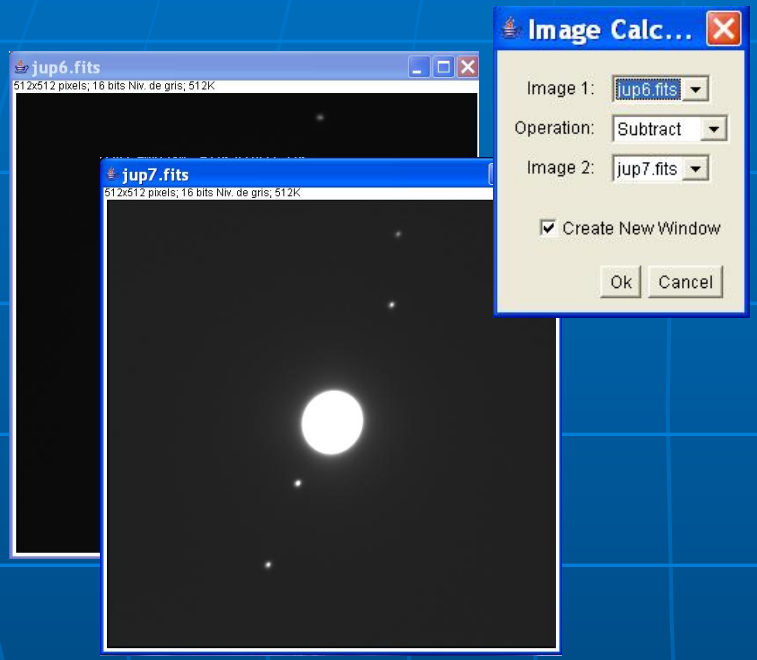
To compare two images, it is interesting to add them : Select in the ‘Process’ menu the option ‘Image Calculator…’, the result will be created in a new window.

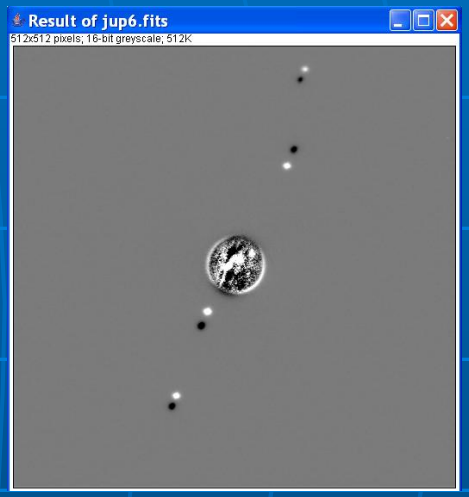


Choose the images, the operation and click ‘OK’

Subtract two images

It is also interesting to subtract them :

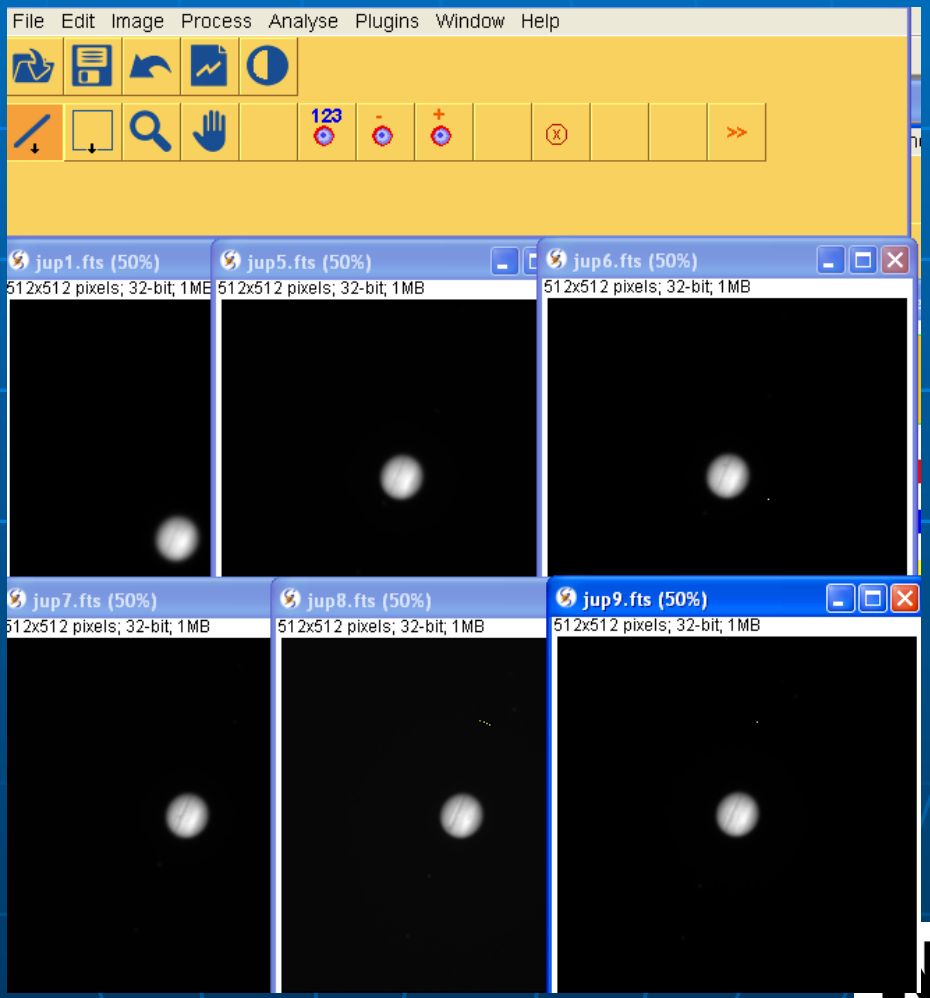




Make a movie

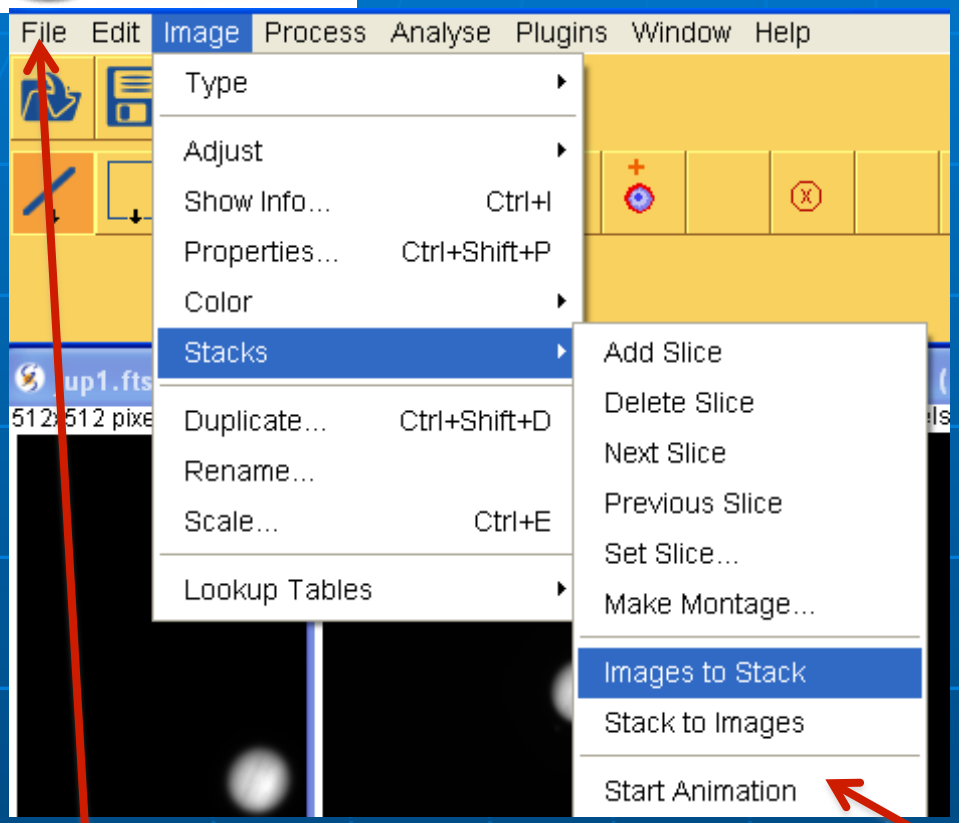
To make a movie open all the images and chose in the Image menu the option Stacks followed by Images to Stack

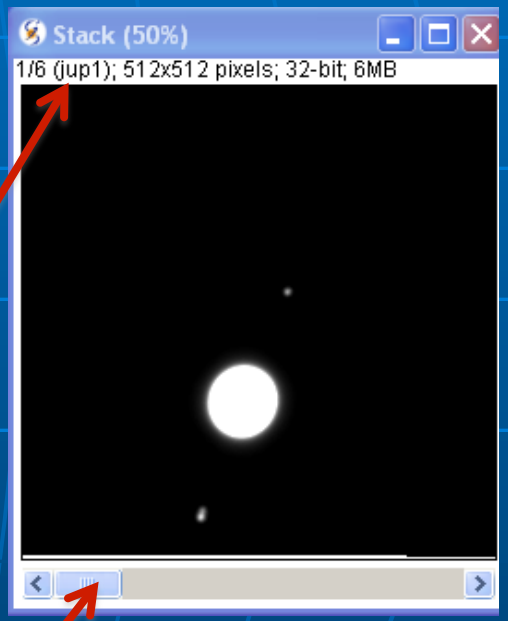
Open all Jupiter files



Make a movie

Convert images to stack. Adjust brightness and contrast to be able to see the Moons



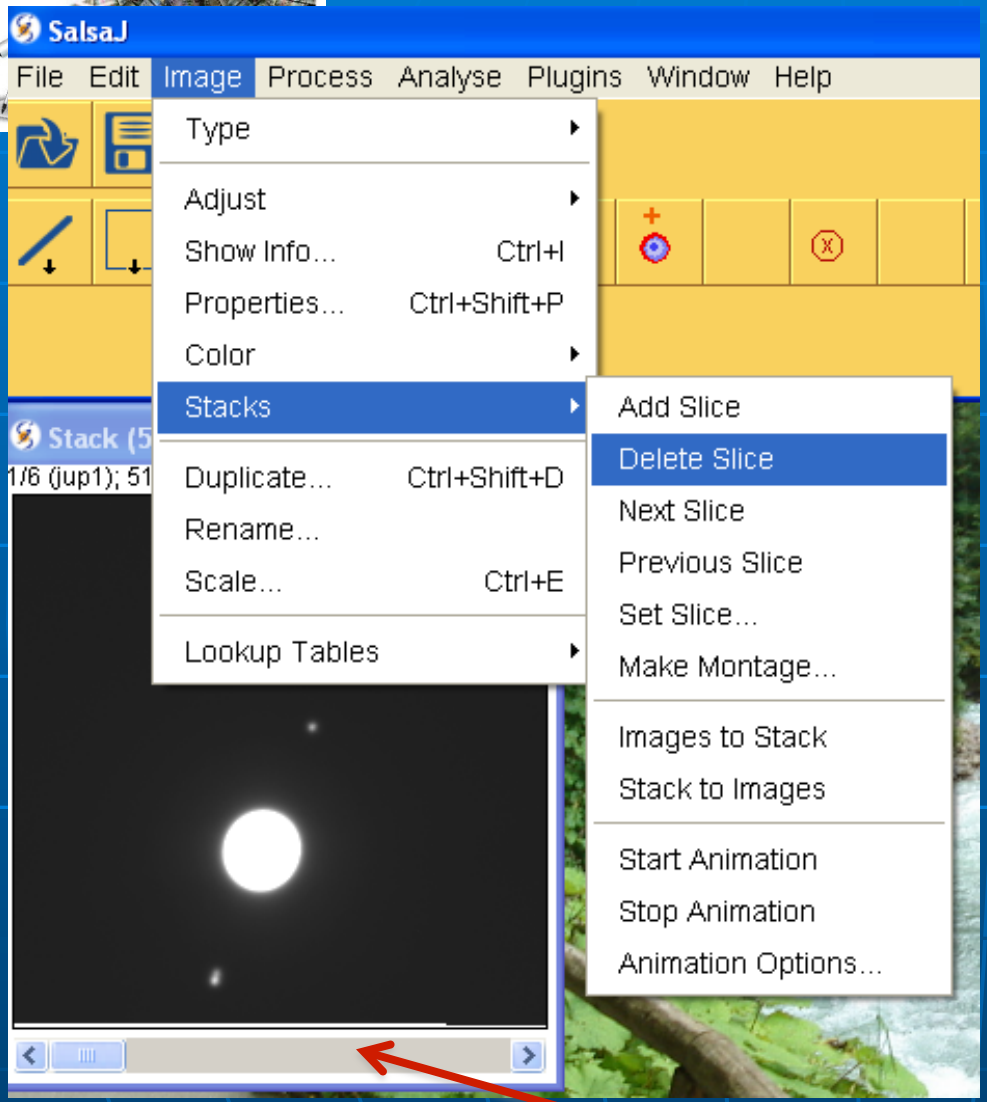


Identify the image that doesn't belong to the sequence

Manually scroll to see the animation. Or Start animation

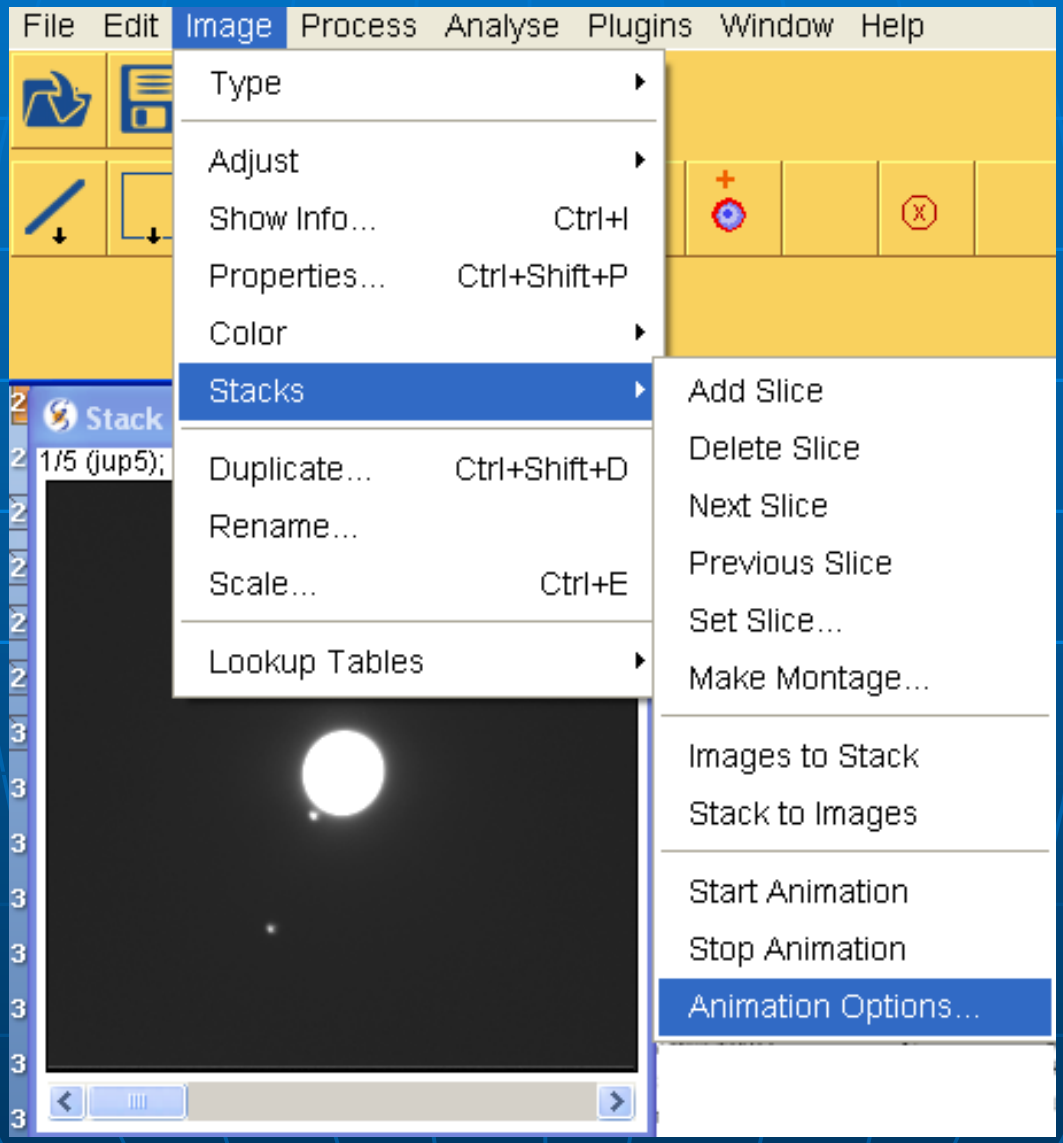
You can save the stack as and .avi file

Delete a slice



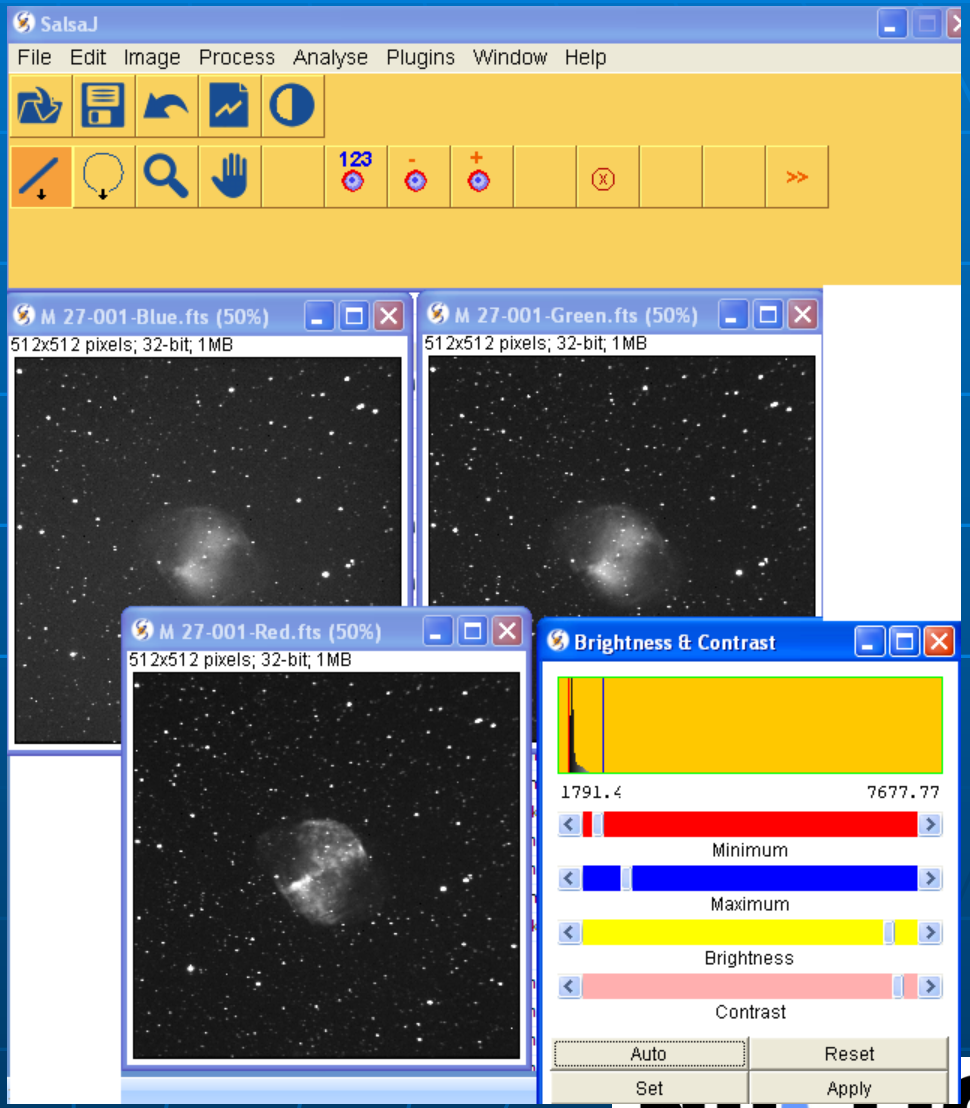
Manually position in the slice you want to delete

Change the Speed



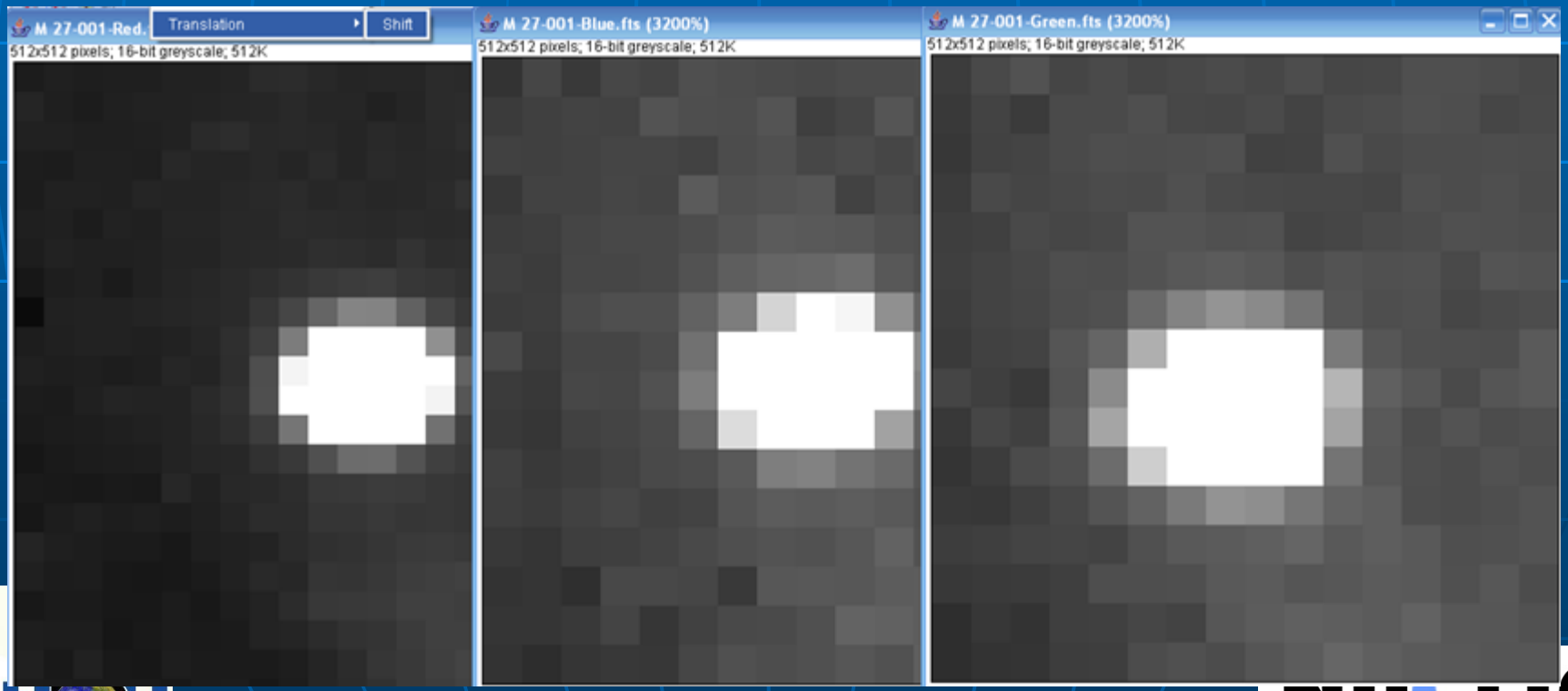
Color Images with SalsaJ

- Open M27 blue, green and red images. Remember to adjust brightness and contrast



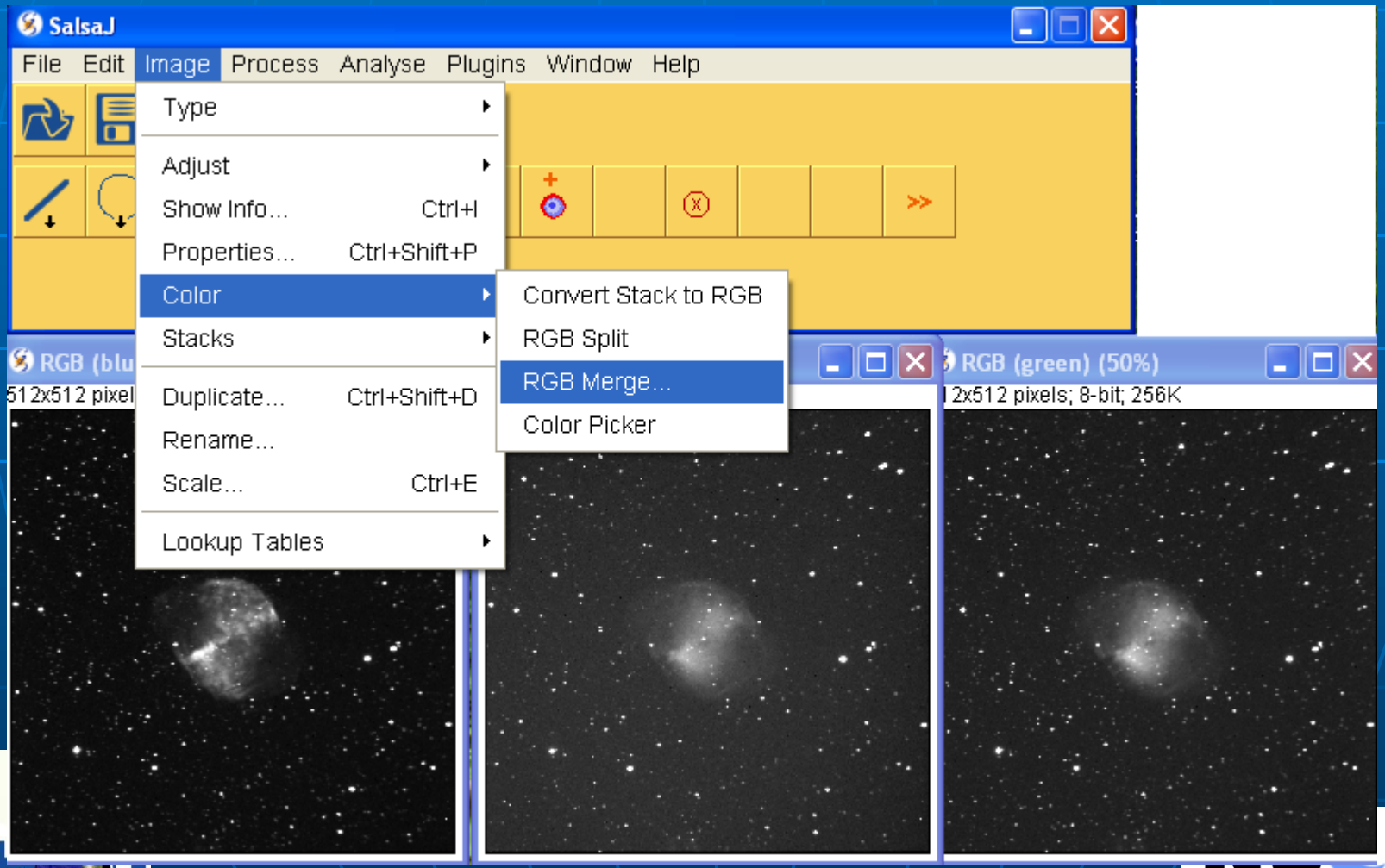
color images with SalsaJ

- After zooming each image to the maximum, verify the coordinates of the pixel with higher counts (value) and use the function 'translation' in "Process" menu to correct the shift…if needed … you will not need it in this example.



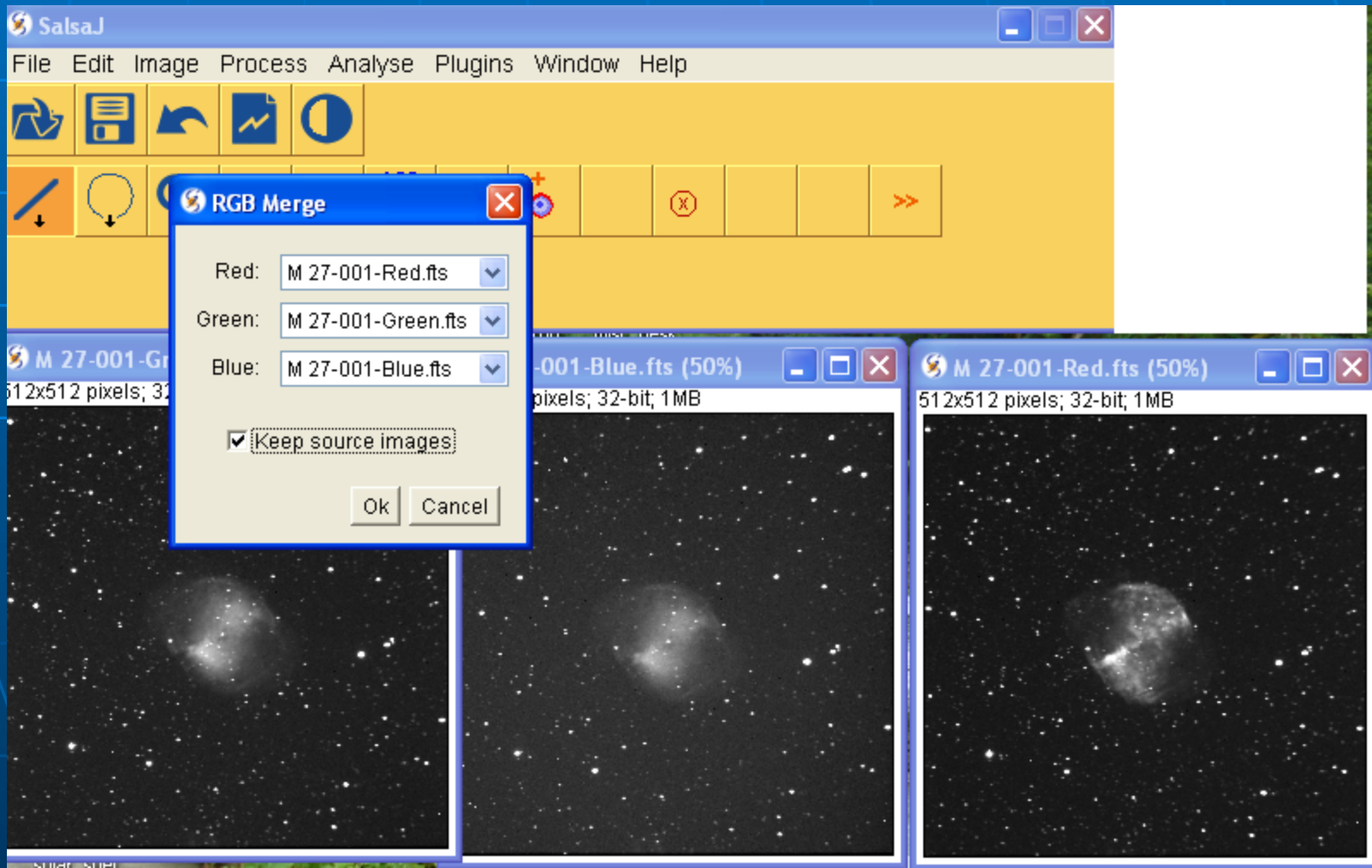
Color Images with SalsaJ

- Build a color image using 'RGB Merge' of 'color' in "Image" menu.



Color Images with SalsaJ

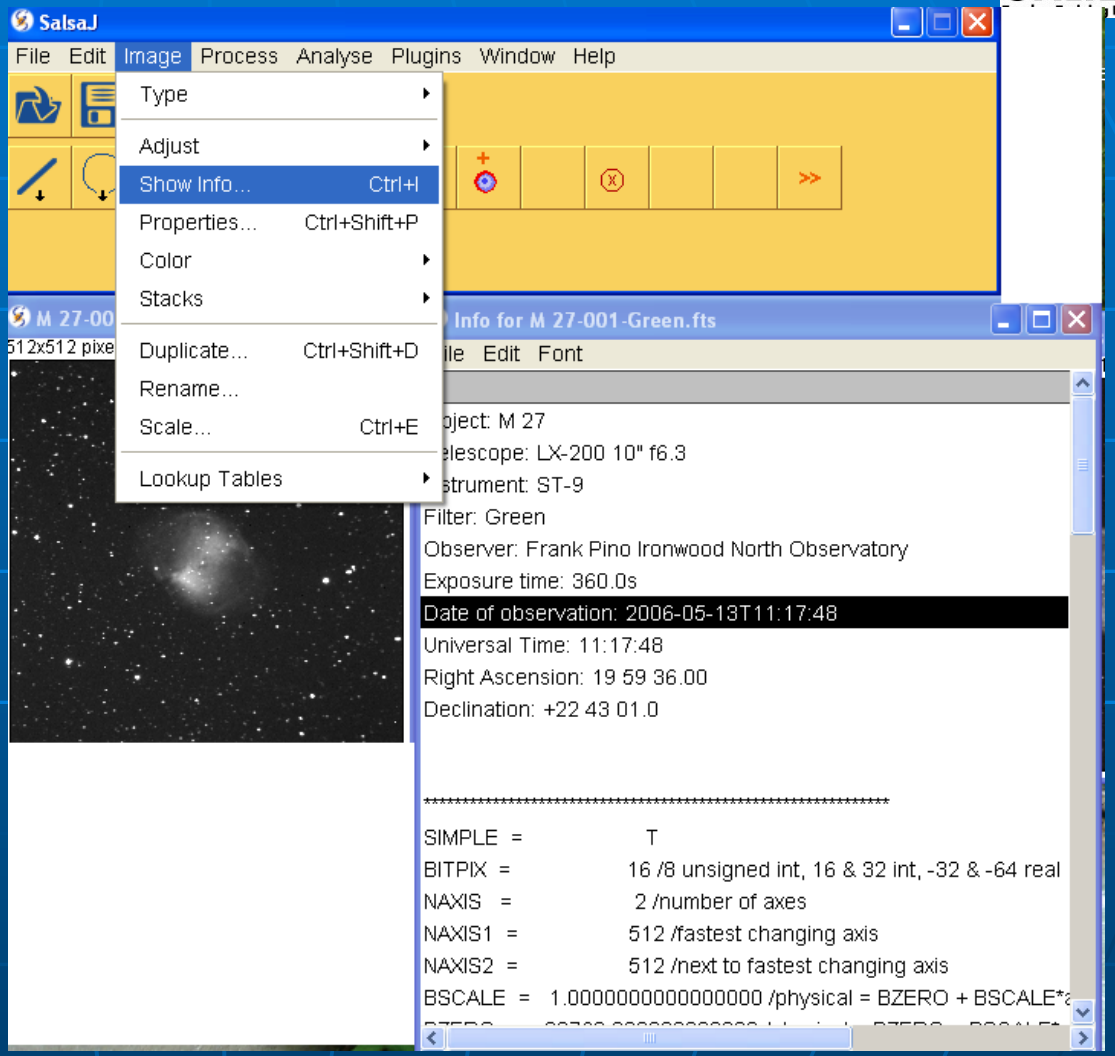
- On the displayed box choose the correspondent image and remember to check the option ‘keep source stacks’.



Color Images with SalsaJ

- Usually the filter is not part of the name of the image. To find this check the image info.

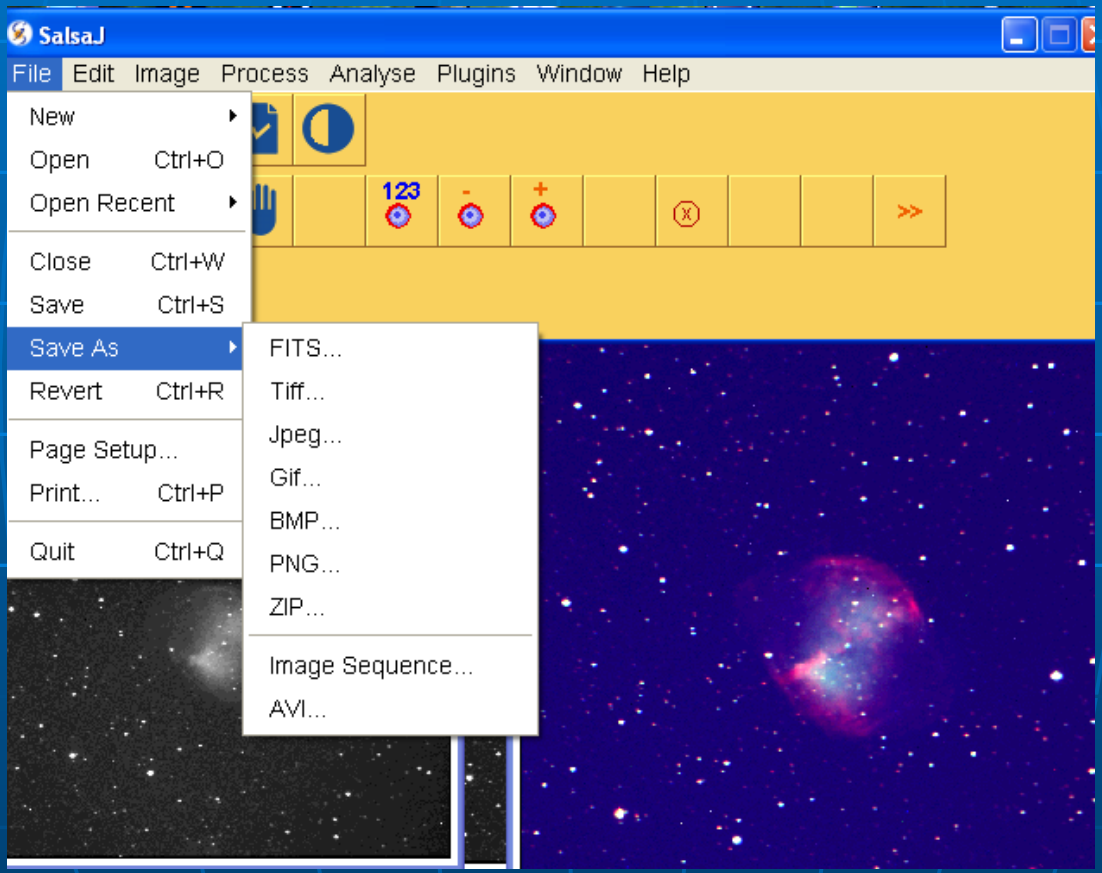
Att.: jpeg images don't have this type of info associated to it. This is a FITS feature



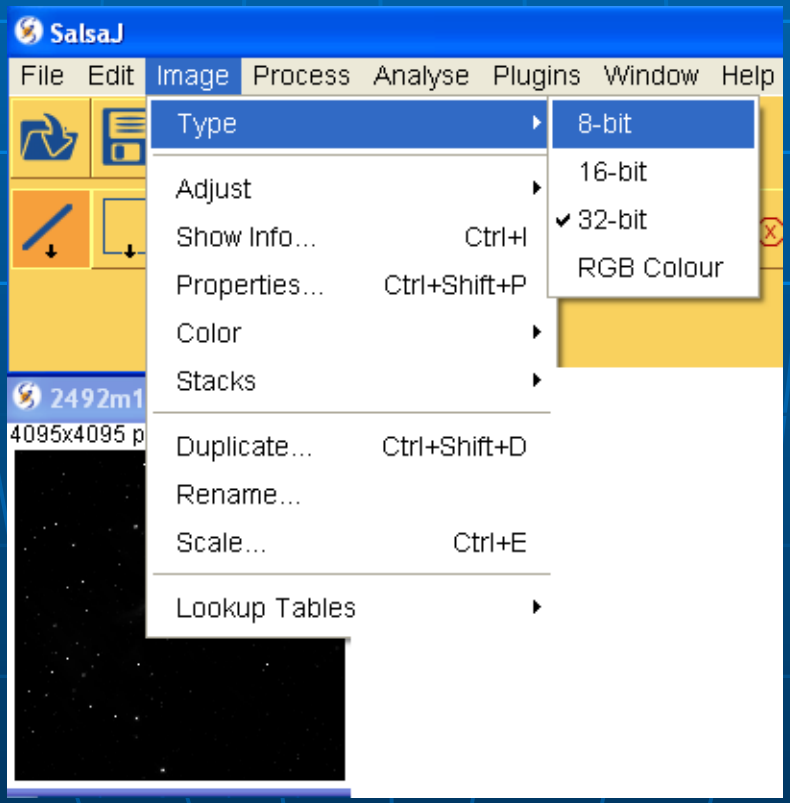
FITS or **Flexible Image Transport System** is a digital file format used to store, transmit, and manipulate images.

color images with SalsaJ

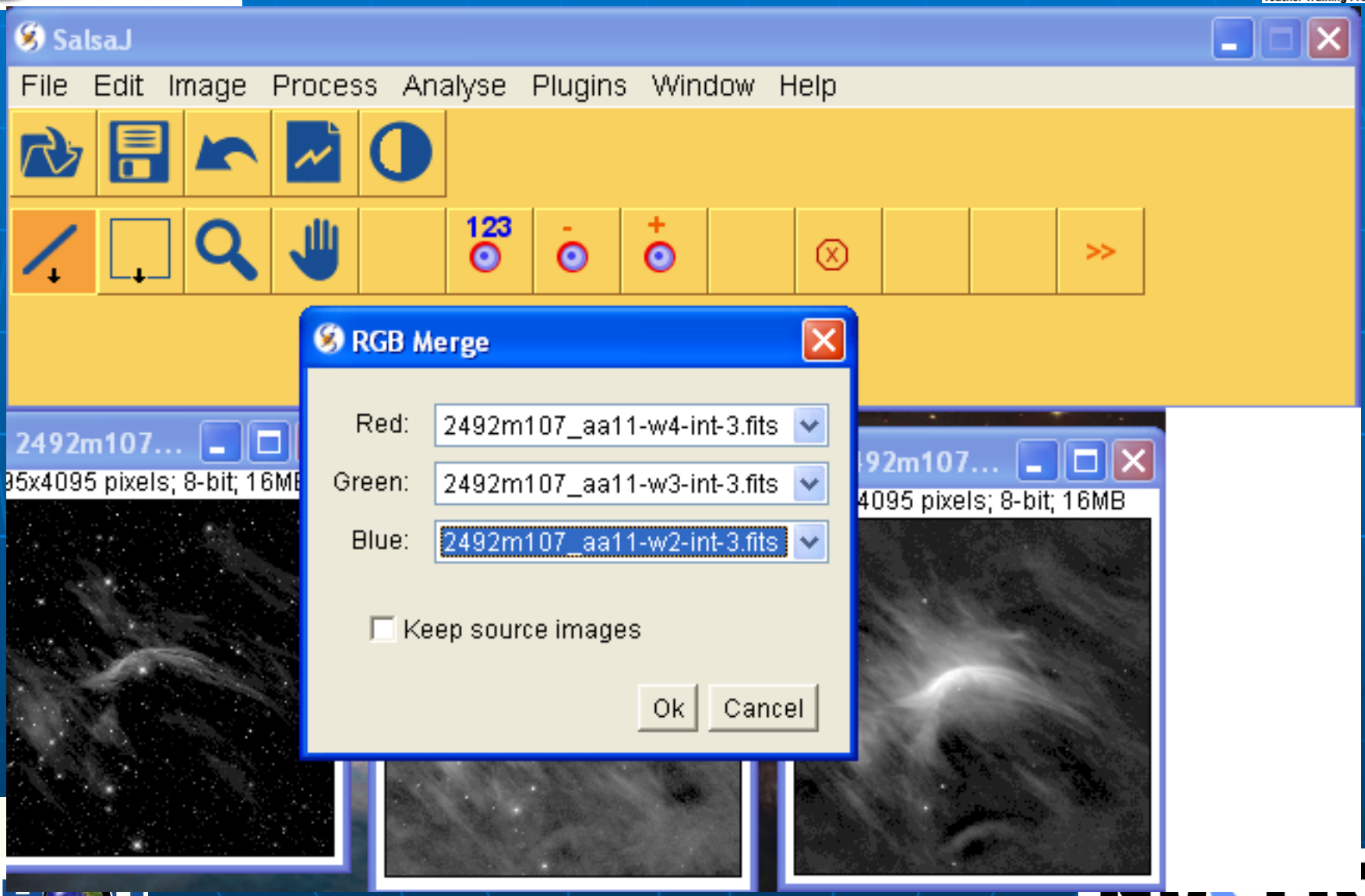
- If the result is good save the image.



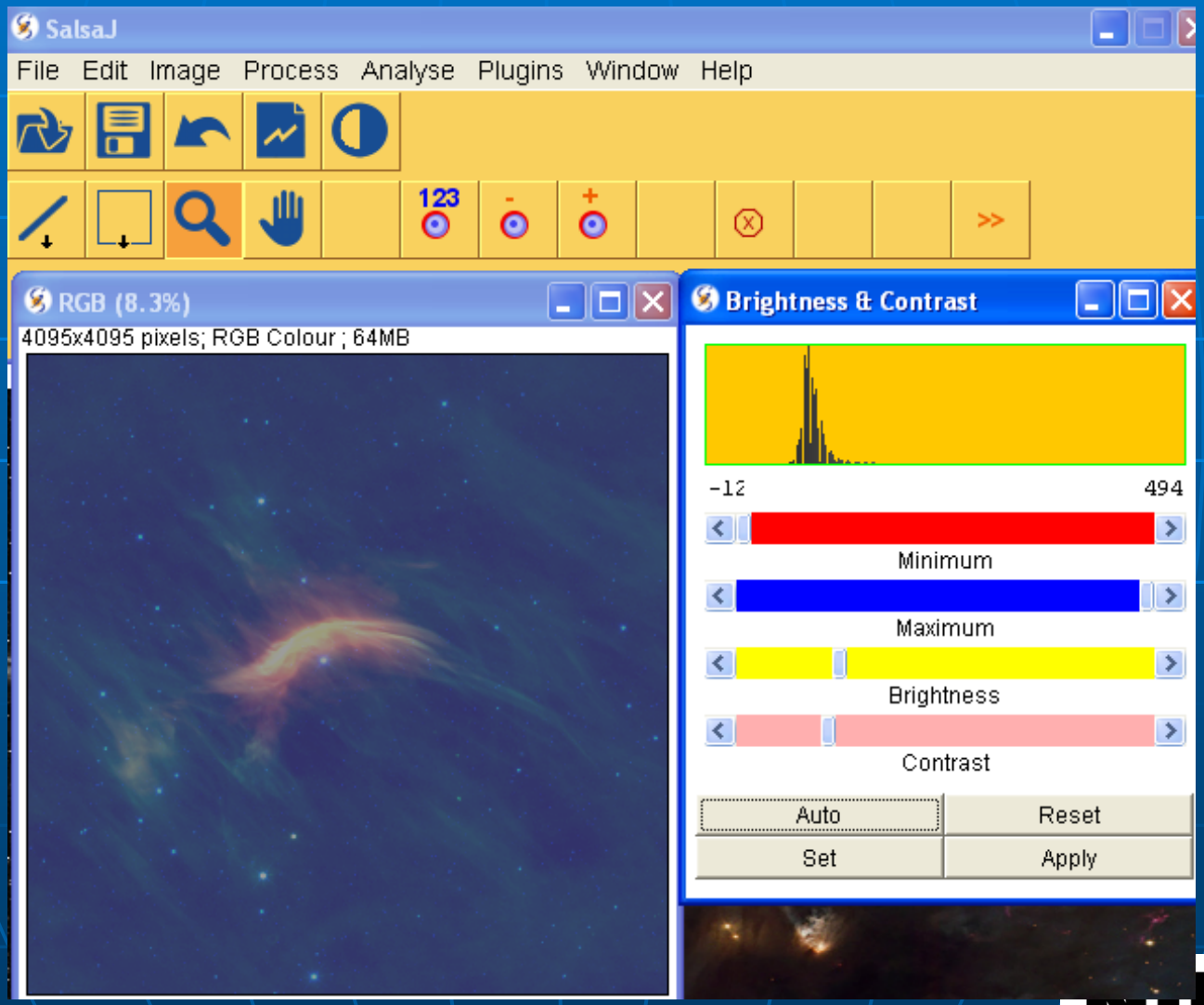
- Open the ZetaOph images W2, W3 and W4 fromWISE telescope one by one and change the type to 8 bit to reduce the size if needed



Make your color image

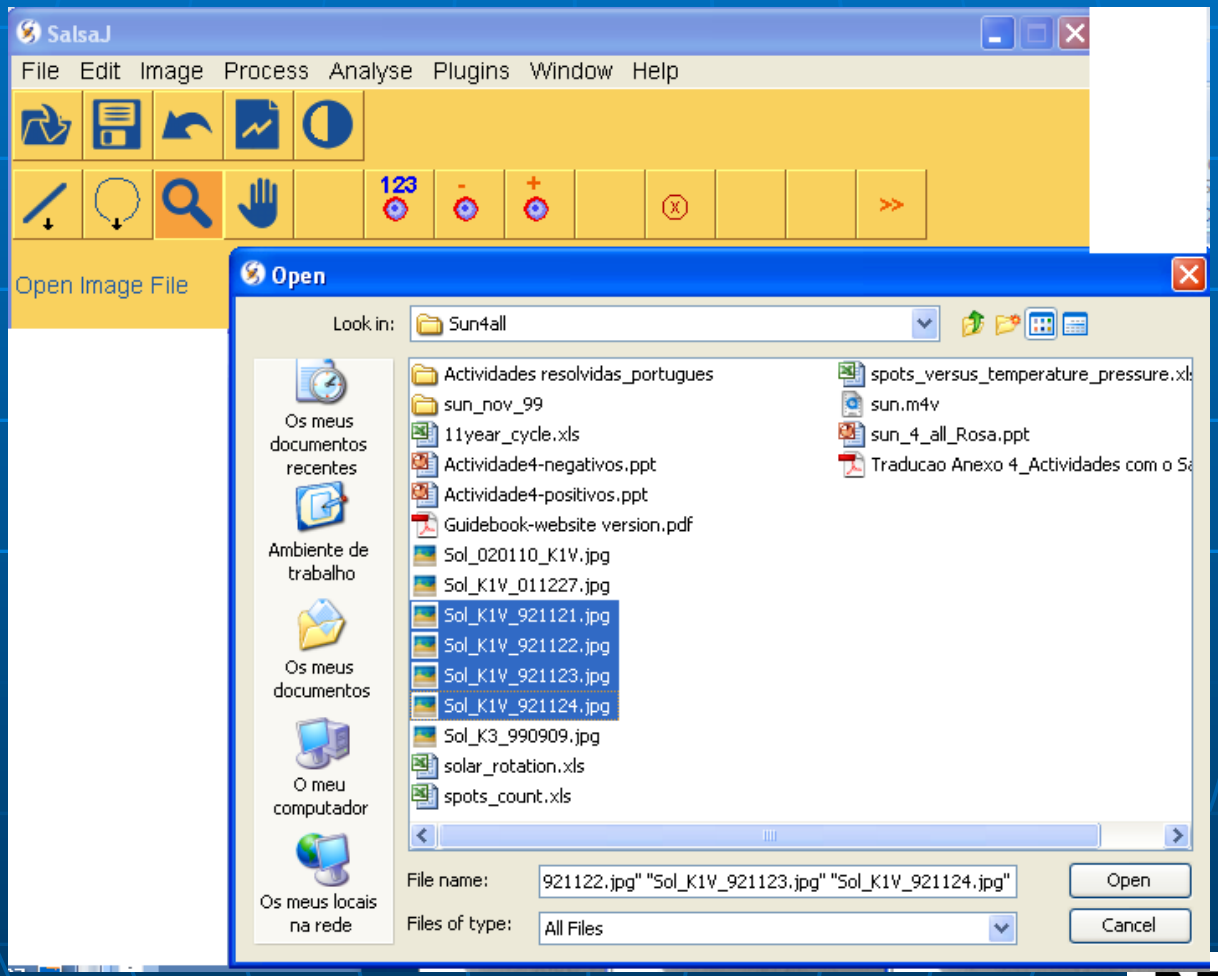


Play with the image

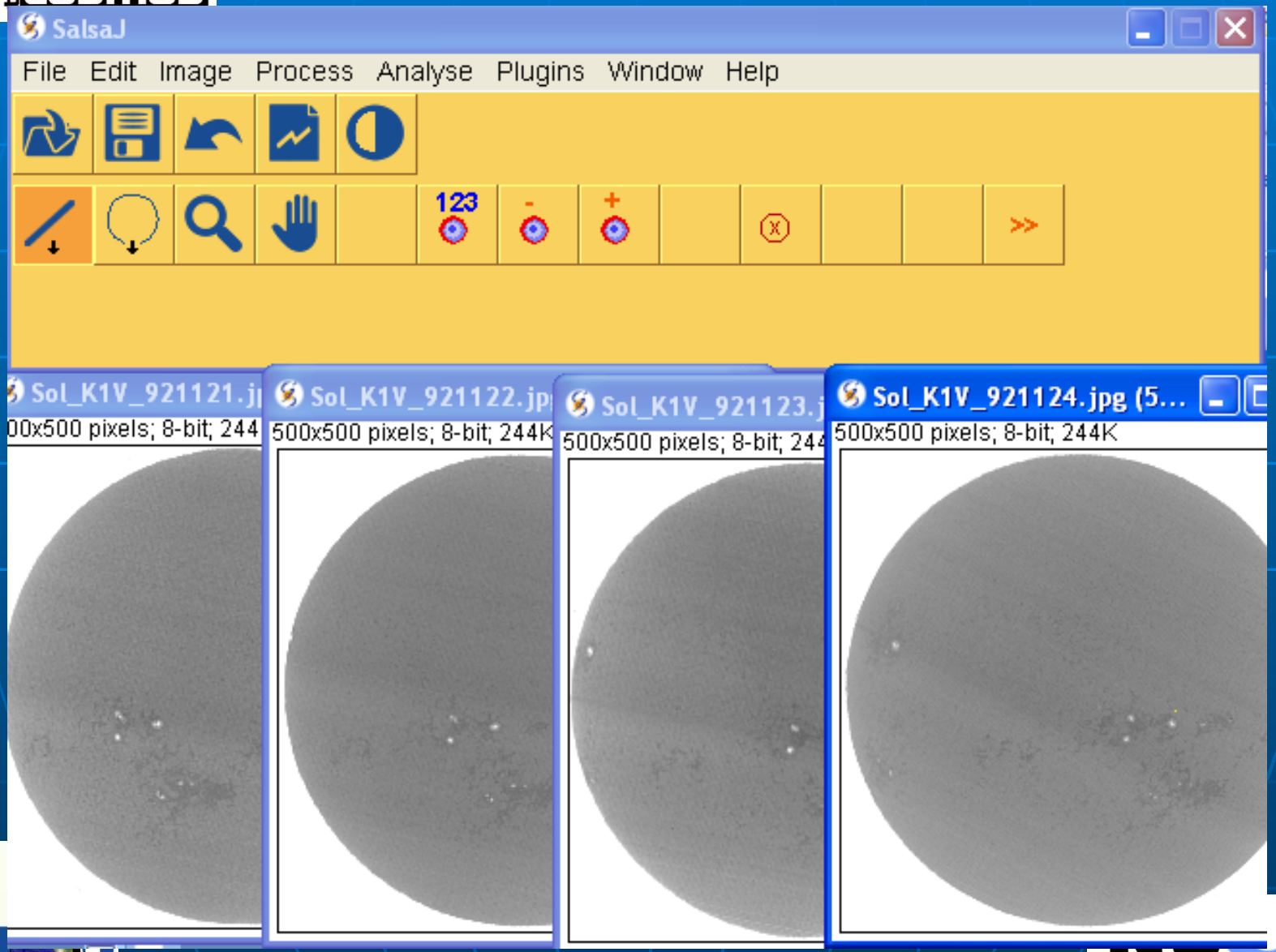


Making a movie

- Open the images of the Sun

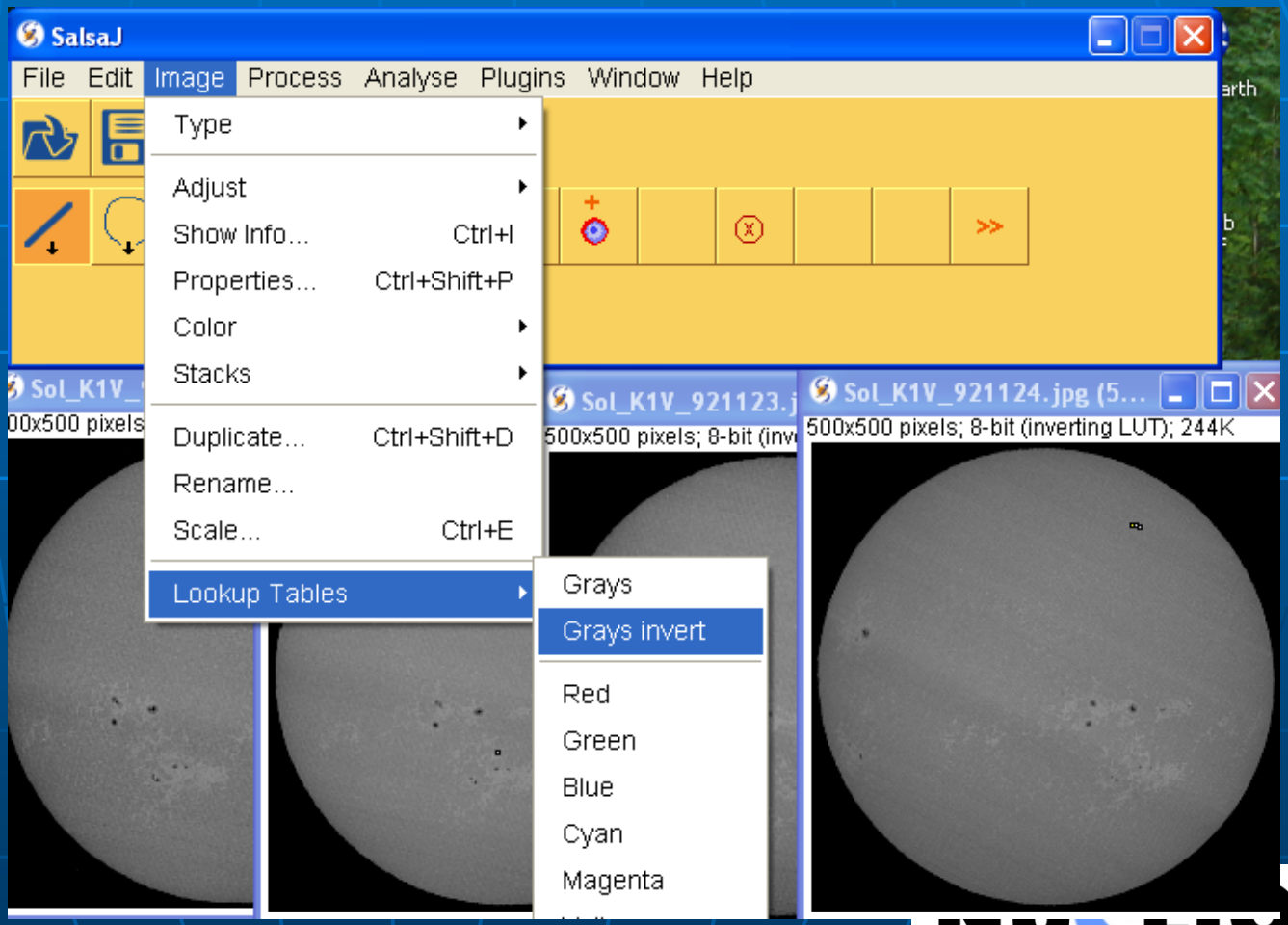


Making a movie

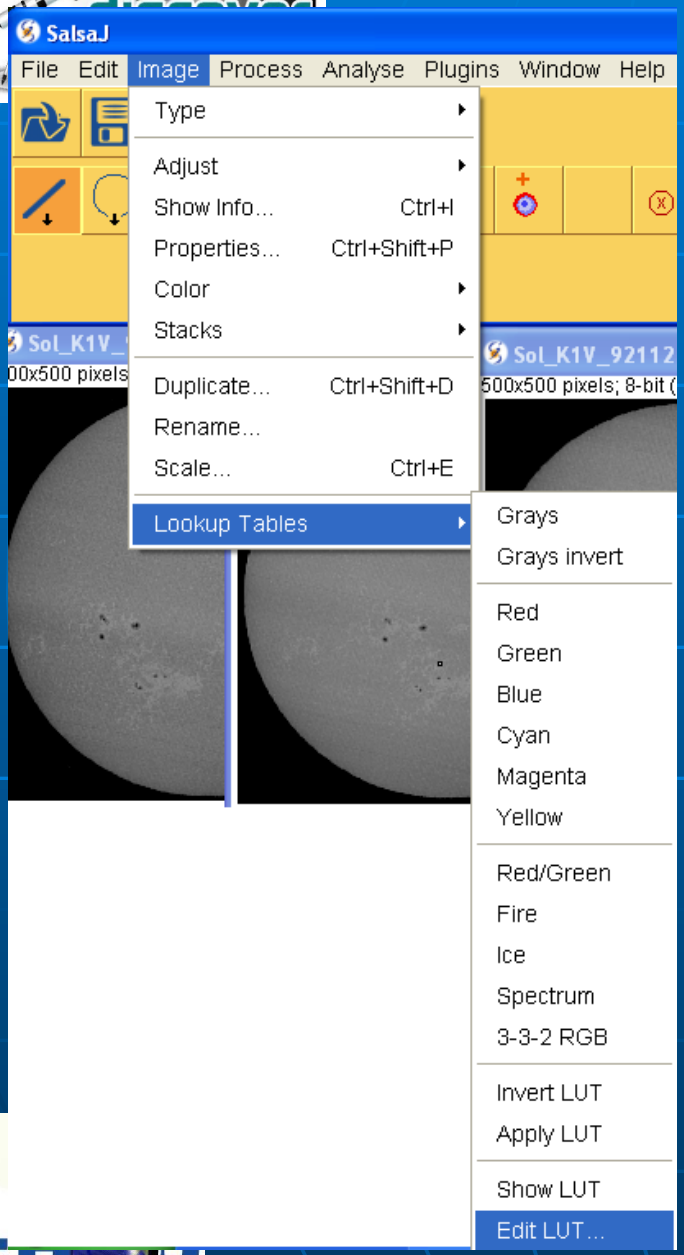


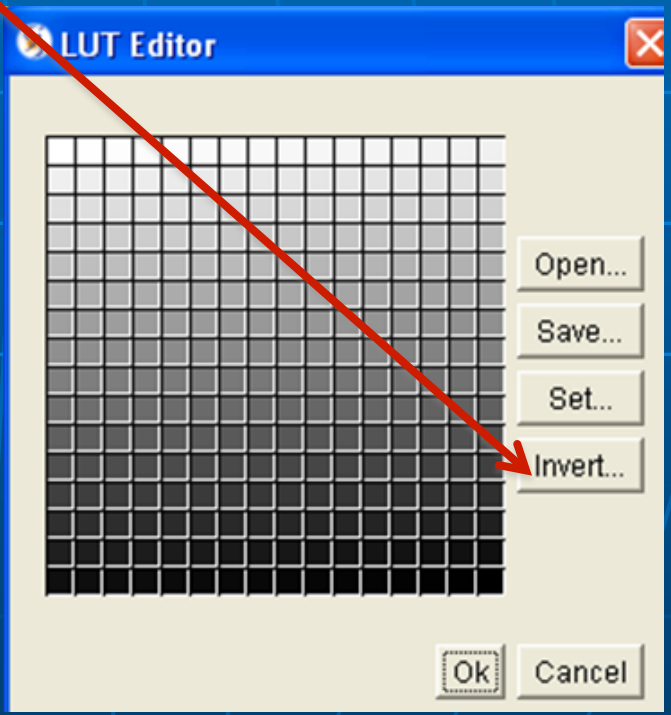
Making a movie

- Invert the color of the images



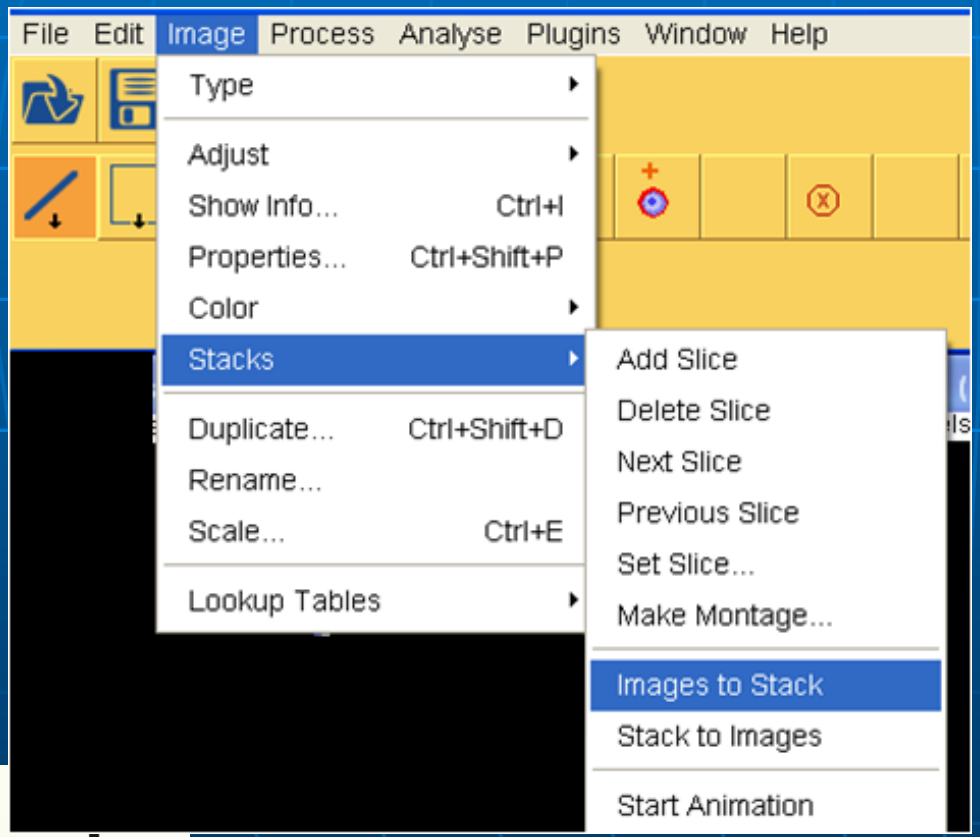
- Other alternative to invert the color

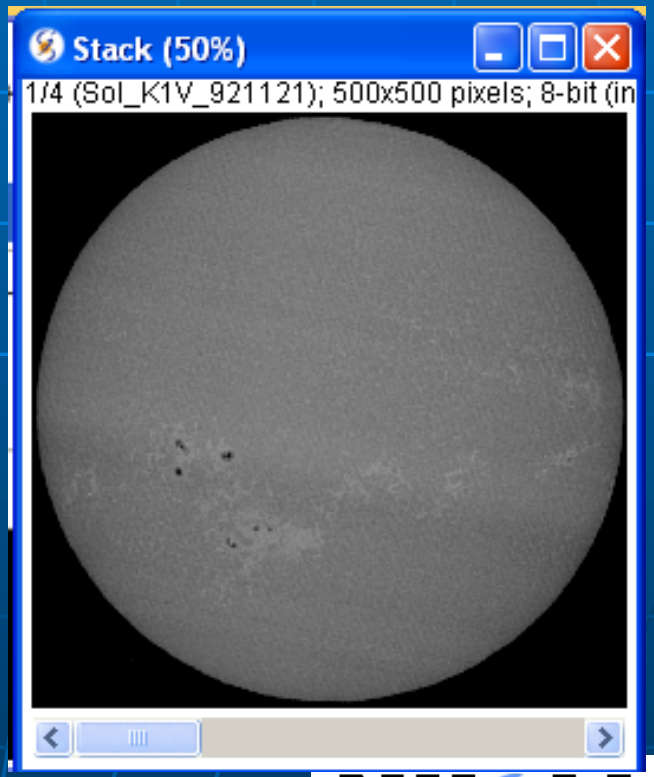




Making a movie

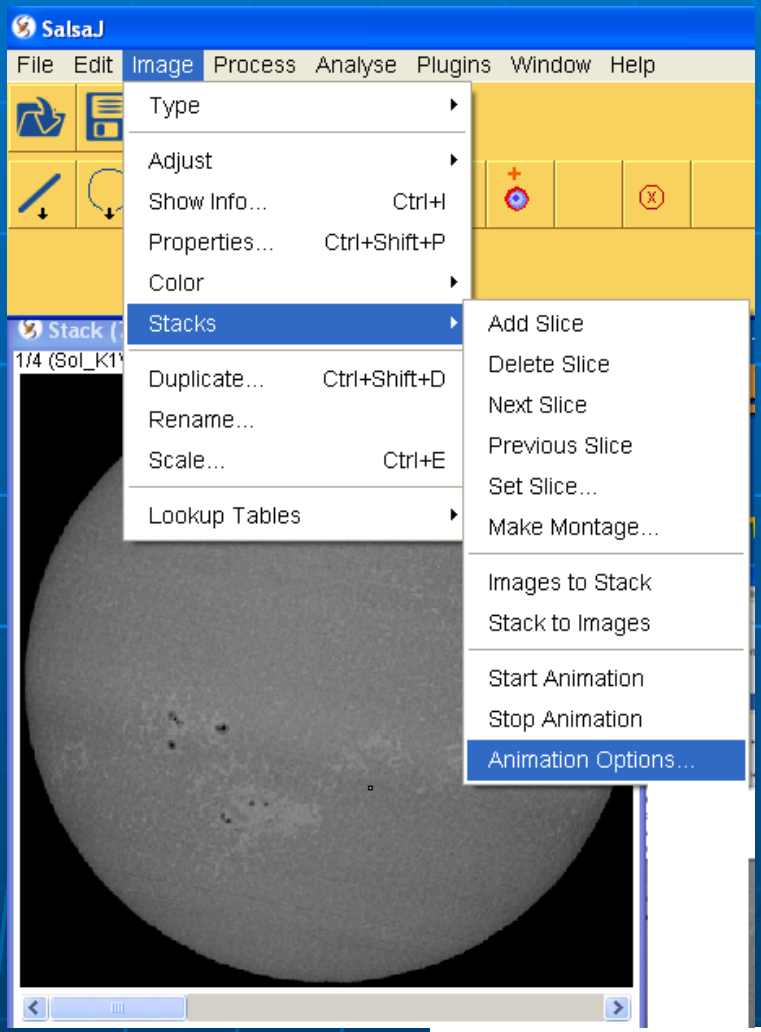
- Stack -> Convert images to Stack



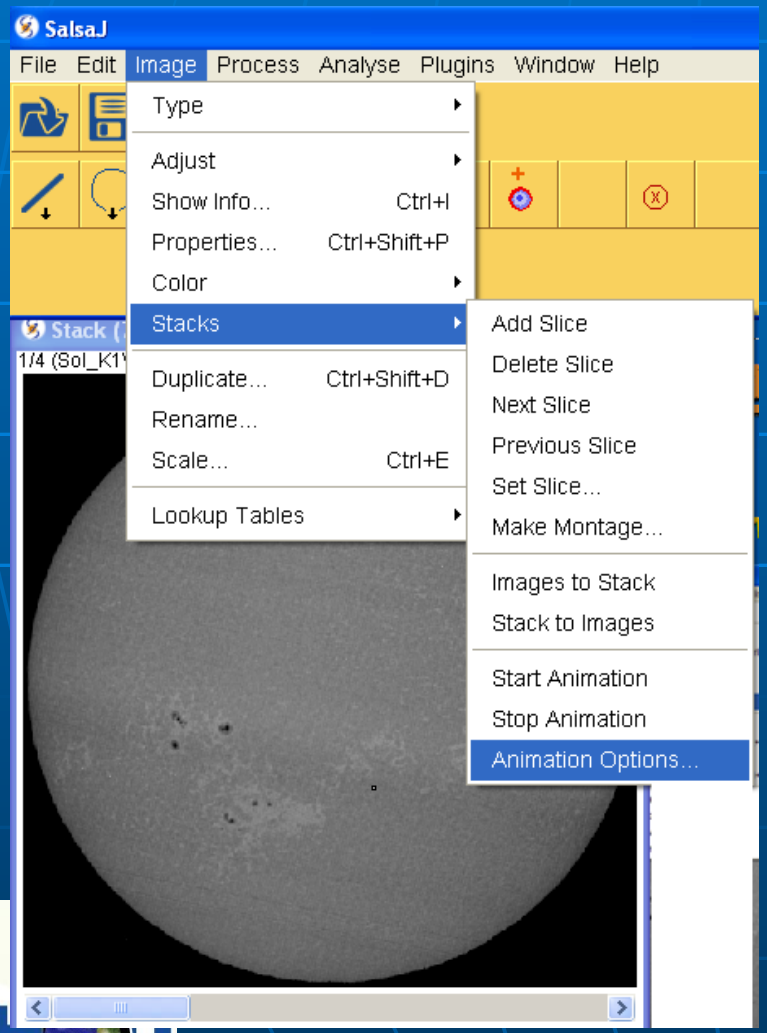


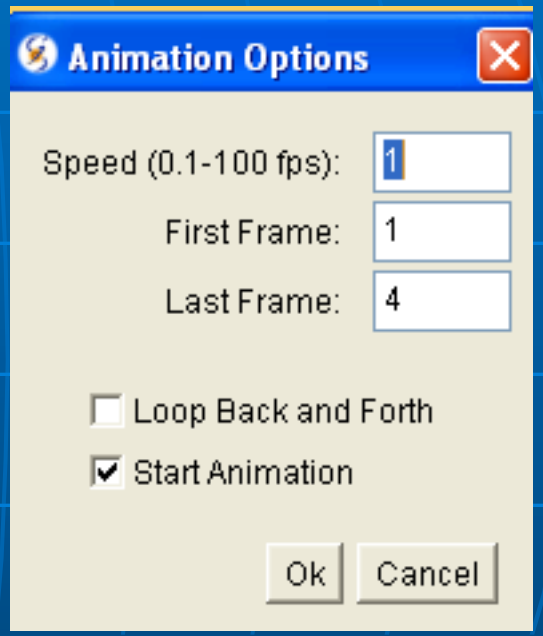
Making a movie

Change the animation options if needed



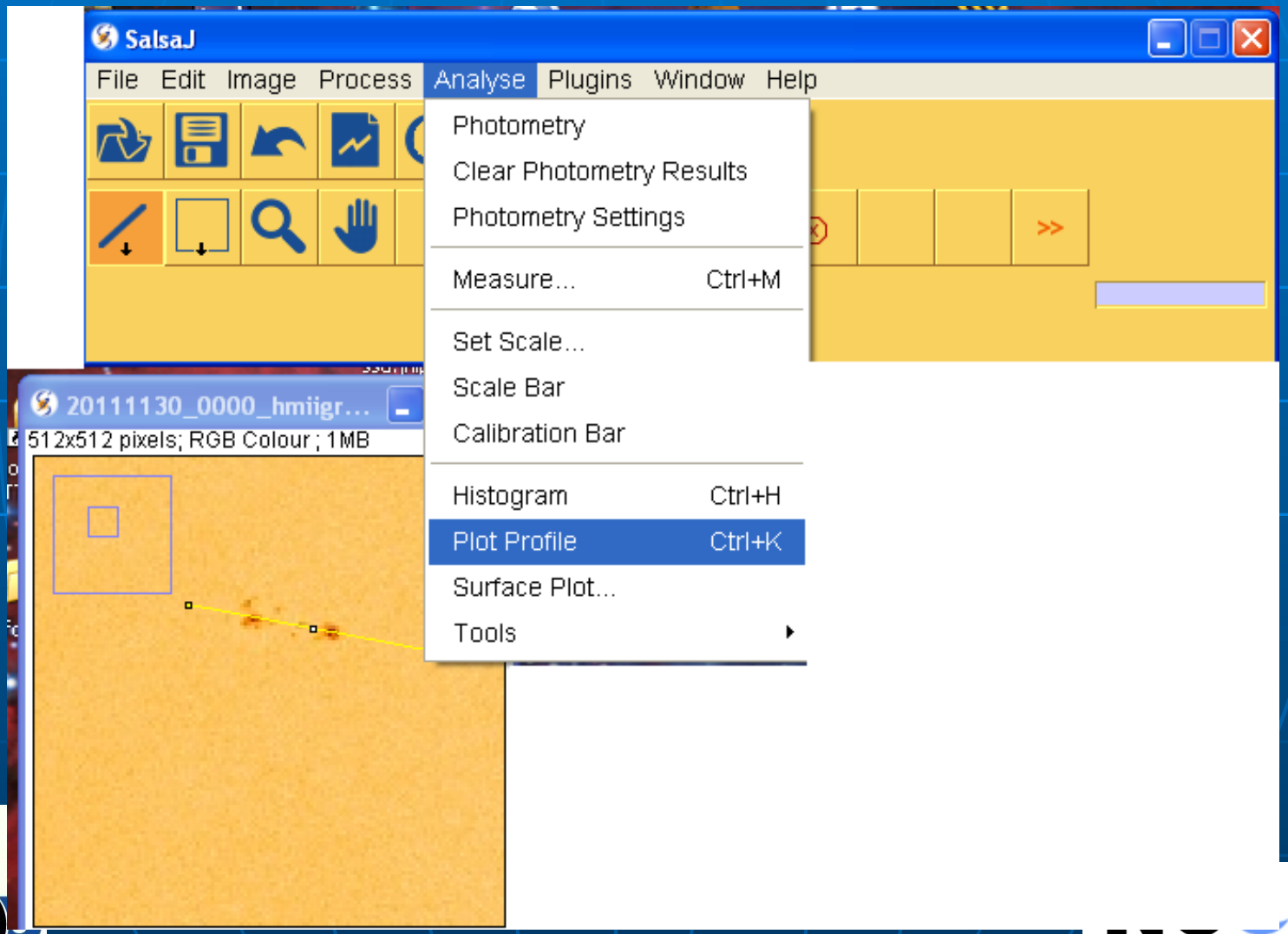
Making a movie

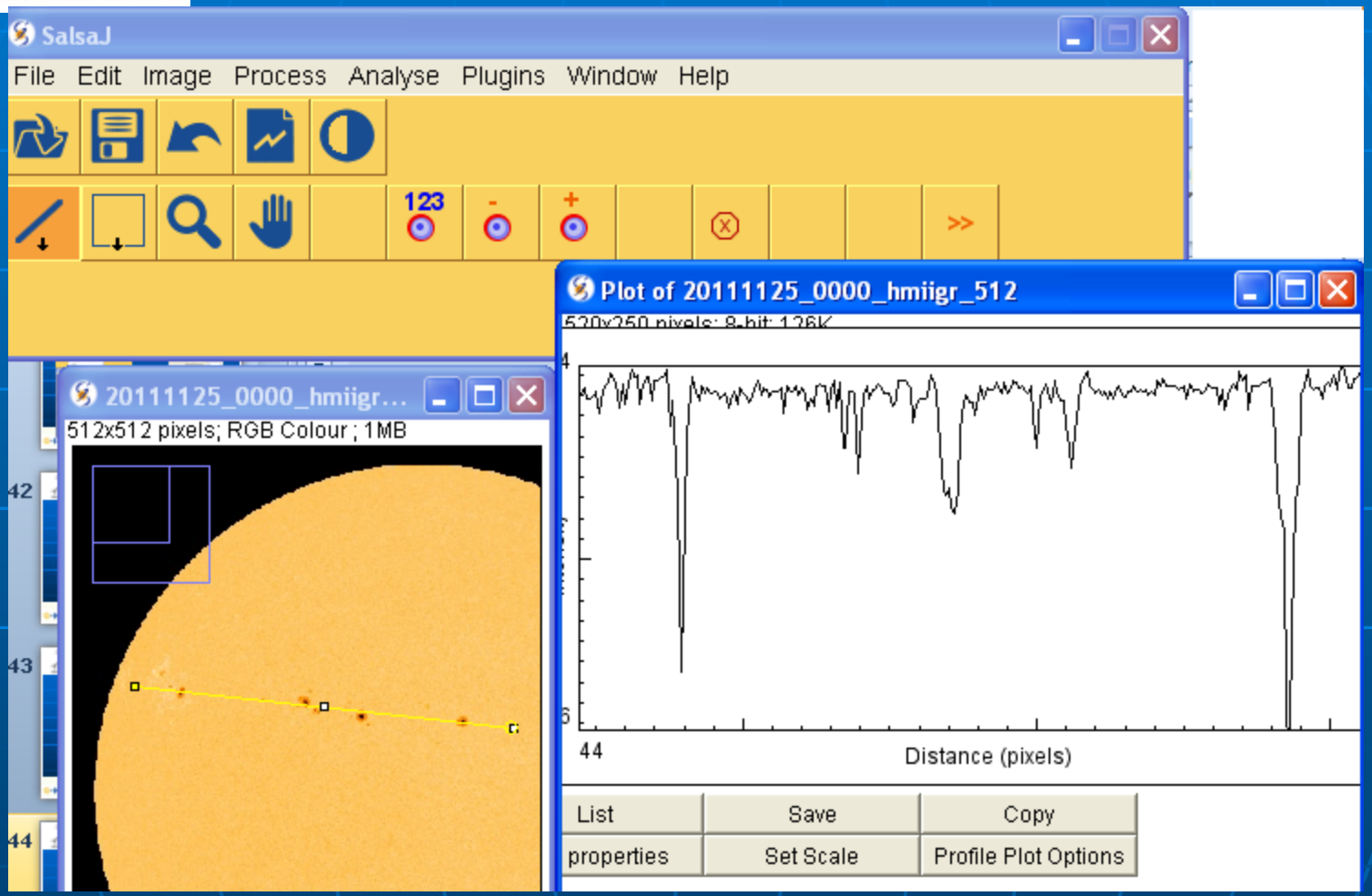




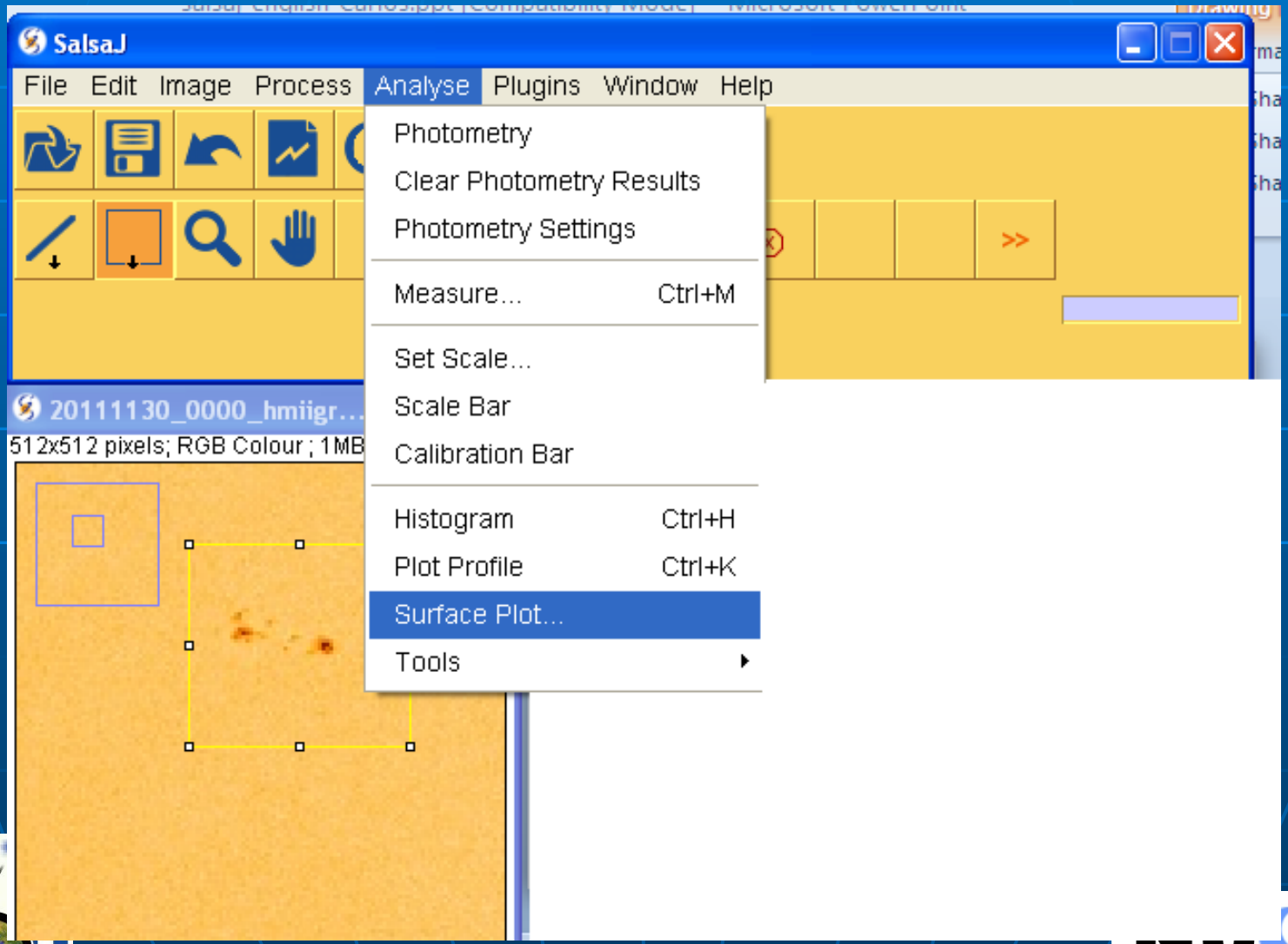
Change the animation to 1 frame/seg and start animation

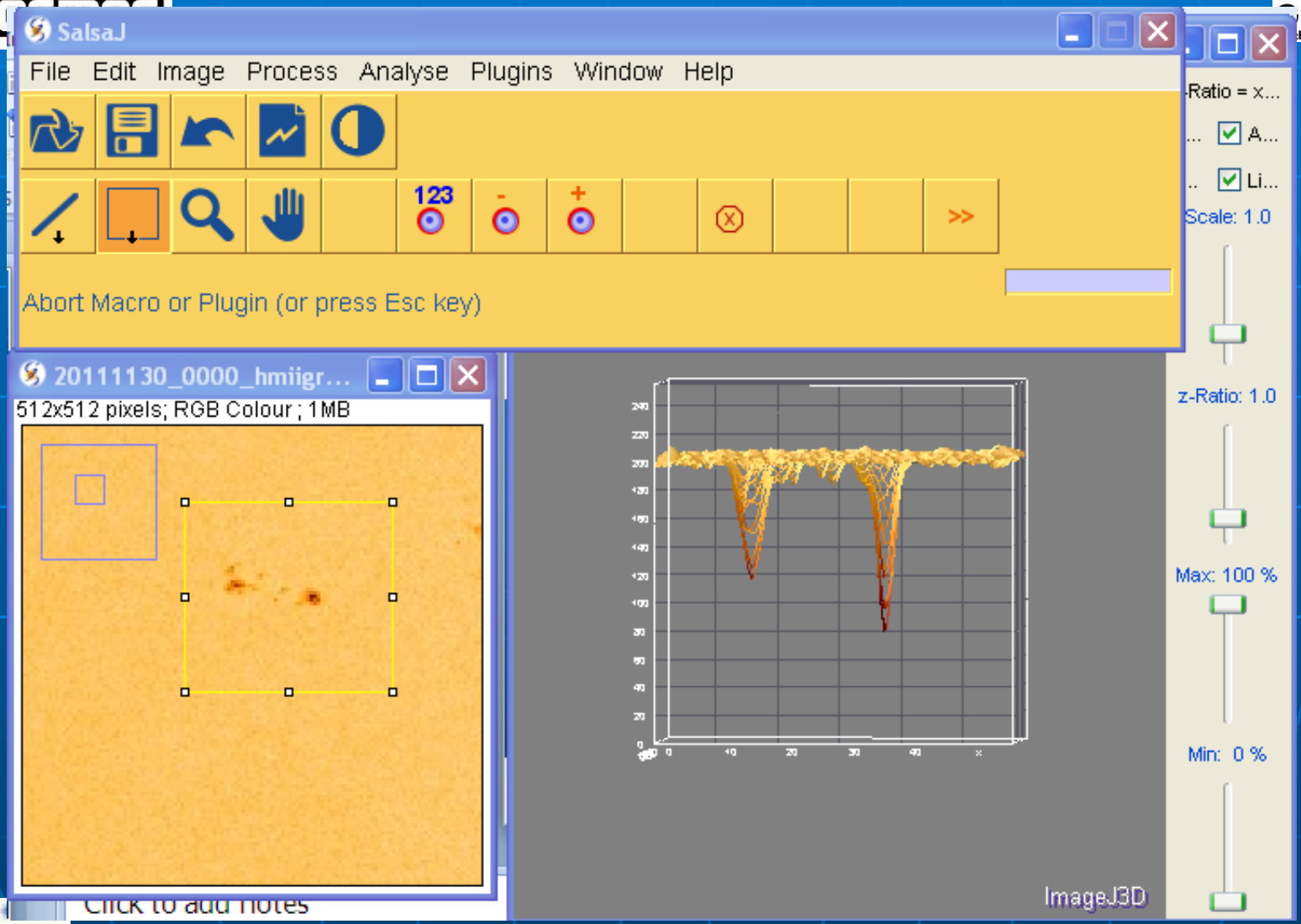
COUNTING SUNSPOTS WITH PLOT PROFILE



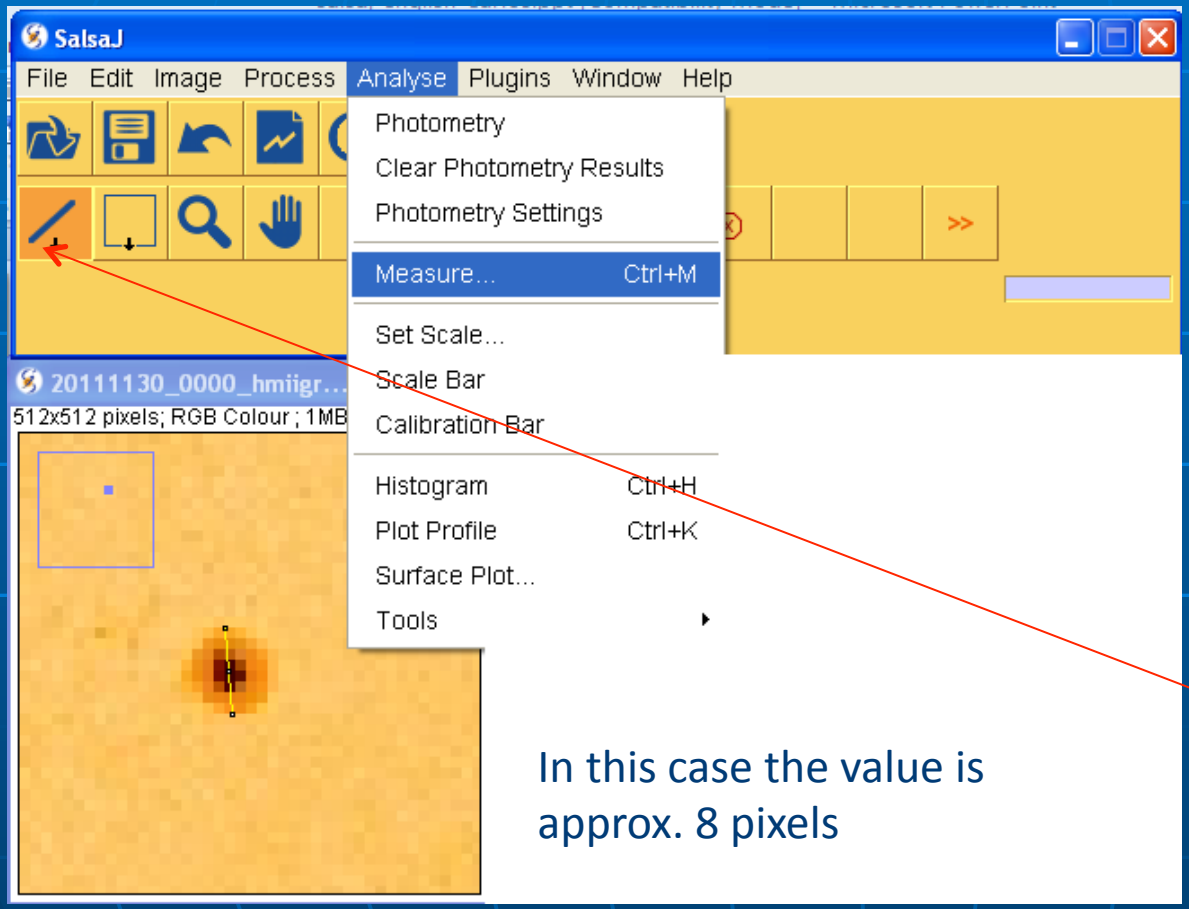

SalsaJ
File Edit Image Process Analyse Plugins Window Help
123
>>
20111125_0000_hmiigr...
512x512 pixels; RGB Colour ; 1MB
42
43
44
Plot of 20111125_0000_hmiigr_512
520x250 pixels; 8-bit; 126K
44
Distance (pixels)
List
Save
Copy
properties
Set Scale
Profile Plot Options

COUNTING SUNSPOTS WITH SURFACE PLOT




SalsaJ
File Edit Image Process Analyse Plugins Window Help
Abort Macro or Plugin (or press Esc key)
20111130_0000_hmiigr...
512x512 pixels; RGB Colour ; 1MB
Click to add notes
ImageJ3D
Ratio = x...
A...
Li...
Scale: 1.0
z-Ratio: 1.0
Max: 100 %
Min: 0 %

Measuring the size of a sunspot



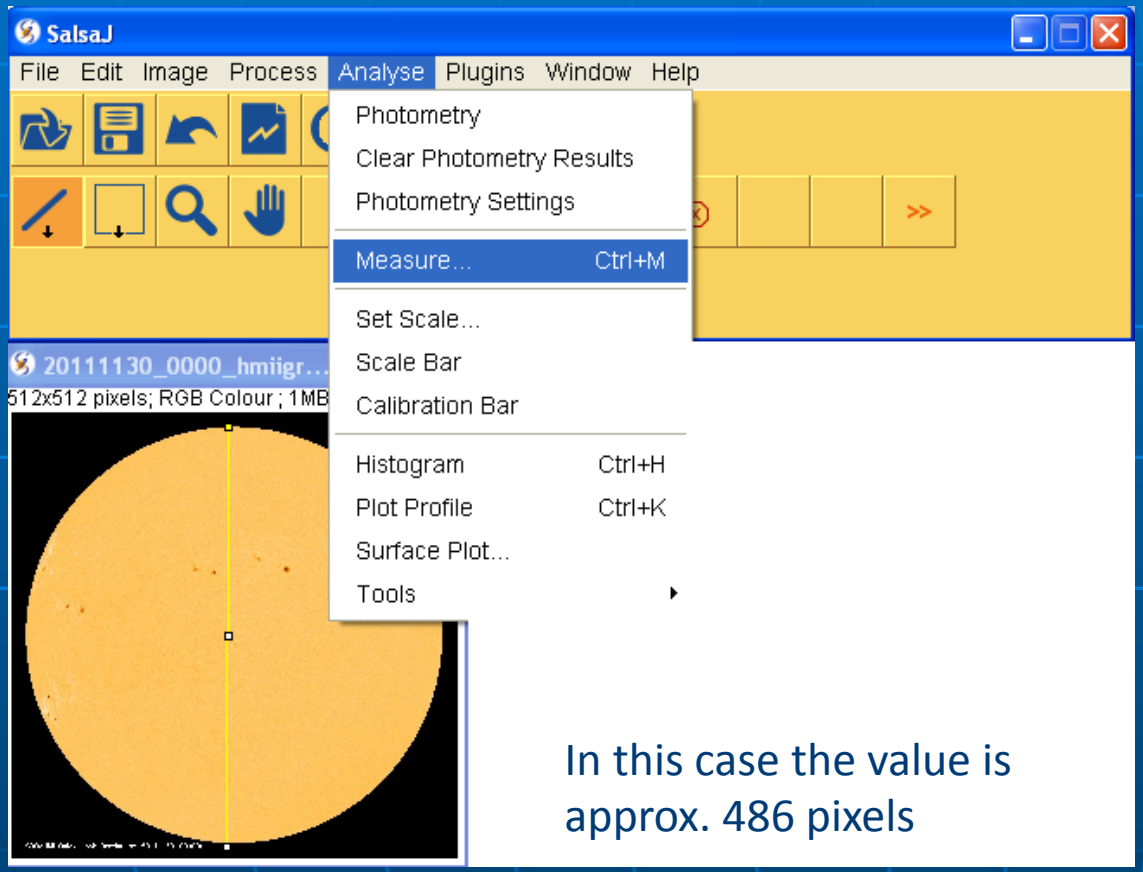
In this case the value is approx. 8 pixels

Zoom in to measure the spot in pixels.

Select the straight line and draw it across the spot.

Then Select : Analyse and Measure from the menu.

Measuring the diameter of the Sun



In this case the value is approx. 486 pixels

Select the straight line and draw it across the Sun.

Then Select : Analyse and Measure from the menu.

Measuring the size of a sunspot

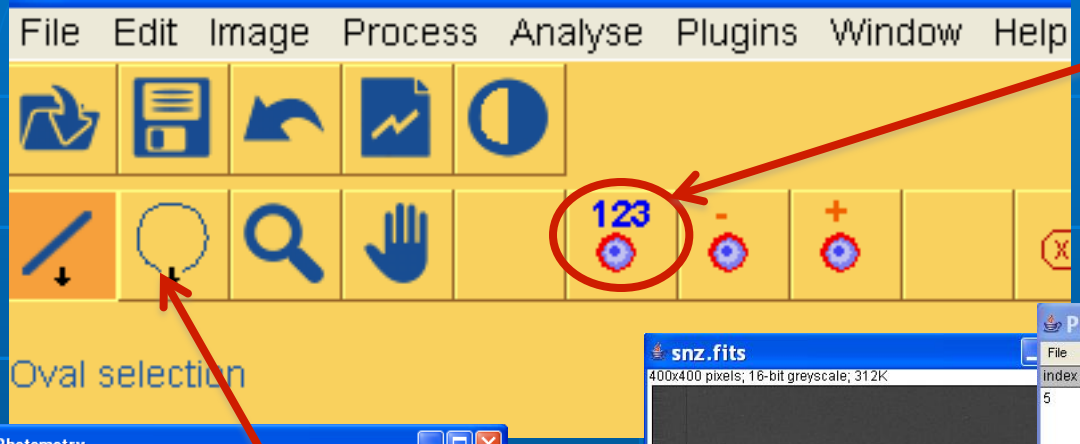
- Knowing that the sun has a diameter of approximately 1 360 000 km you can calculate the size of the spot.

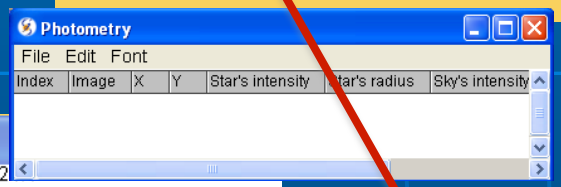
- Solar disk ~ 1 380 000 km <-- > 486 pixels
- Sunspot x < -- > 8 pixels

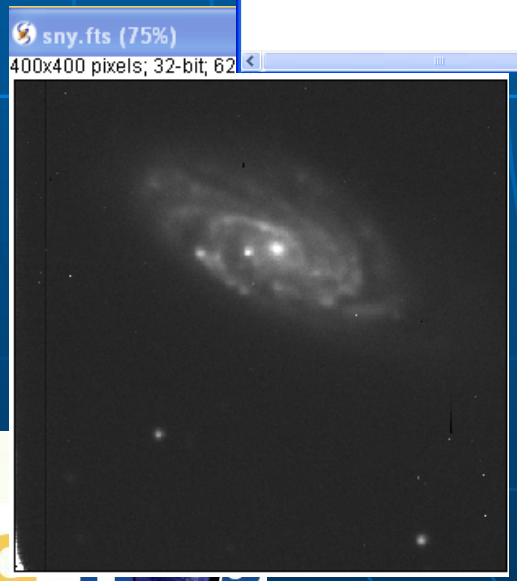
- Sunspot size ~ 22 716km (1,7 times de size of the Earth)

Photometry

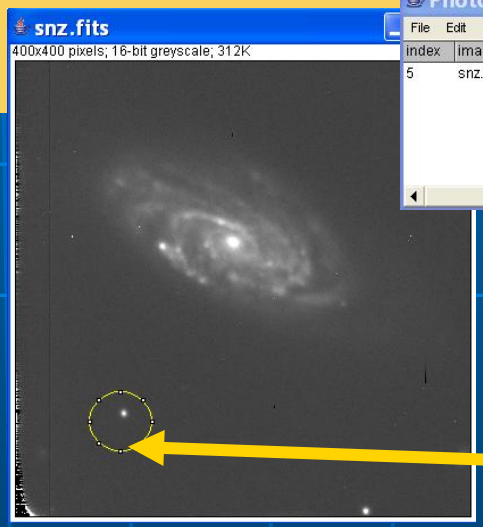
The photometry tool enables to measure the brightness of stars.

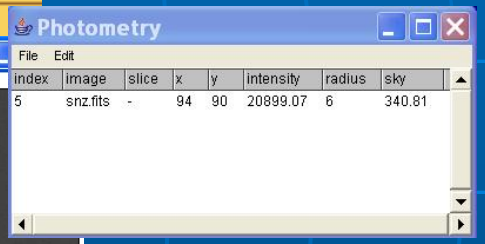






With the right button of your mouse choose the circle





Click on the object you want to measure.

The result appears in the second window.

Photometry

You can make adjustments in the photometry parameters