



FAULKES TELESCOPE

Galaxies

JPEG Viewer Instructions

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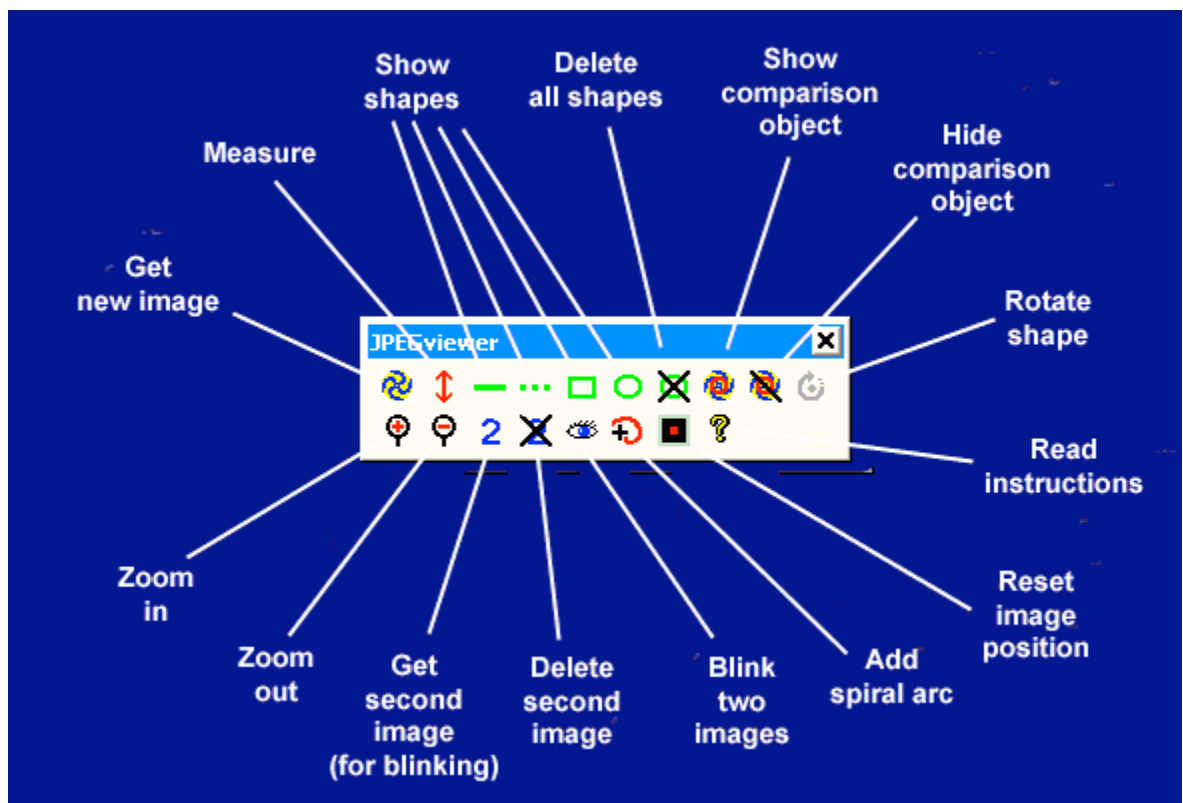
JPEG Viewer Instructions

Please Note: The viewer uses macros written in Visual Basic. These will not work if the Excel macro security level is set to 'high'. To change the security level to either 'medium' or 'low', go to the **Tools** menu in Excel, then choose **Macro**, followed by **Security** . . . You need to do this before opening the viewer.

Viewing and measuring

Open the spreadsheet JPEGviewer.xls

If you do not already have a copy of the JPEG viewer and measurer, you can download a copy by going to the Faulkes Telescope Website.



Get the image

Please Note: Images must be saved at a resolution of 72 dpi. (Faulkes images direct from the telescope are already at 72 dpi.)

Use the **Get new image** button to load a new image.

Enter image info

Enter the object name, the width of the field of view and its units on the right of the screen. If you know the distance to the object in your image, enter that and the correct unit.

Measure image using simple shapes

To measure the image using one of the simple shapes, click one of the **green** buttons, and drag the handles to the correct positions.

Then click the **Measure** button (double arrow) and read off the measurements on the right of the screen.

Distances in absolute units are shown as well as angular distances in the sky if you have entered the distance to the object.

To rotate a shape, first click on it, then click the **Rotate** button, then drag one of the handles in the desired direction.

Compare a familiar object

If you have entered a distance to your object, you can also superimpose shapes indicating the relative sizes of familiar objects by clicking the Show comparison object button.

Zoom in and out

Use the Zoom in and Zoom out buttons and the scroll bars to view details in specific areas of an image.

Blinking two images

Get a second image

To import a second image that you want to compare with the first one, use the Get second image button.

Blink the images

You can then click the Blink two images button to switch between the two images.

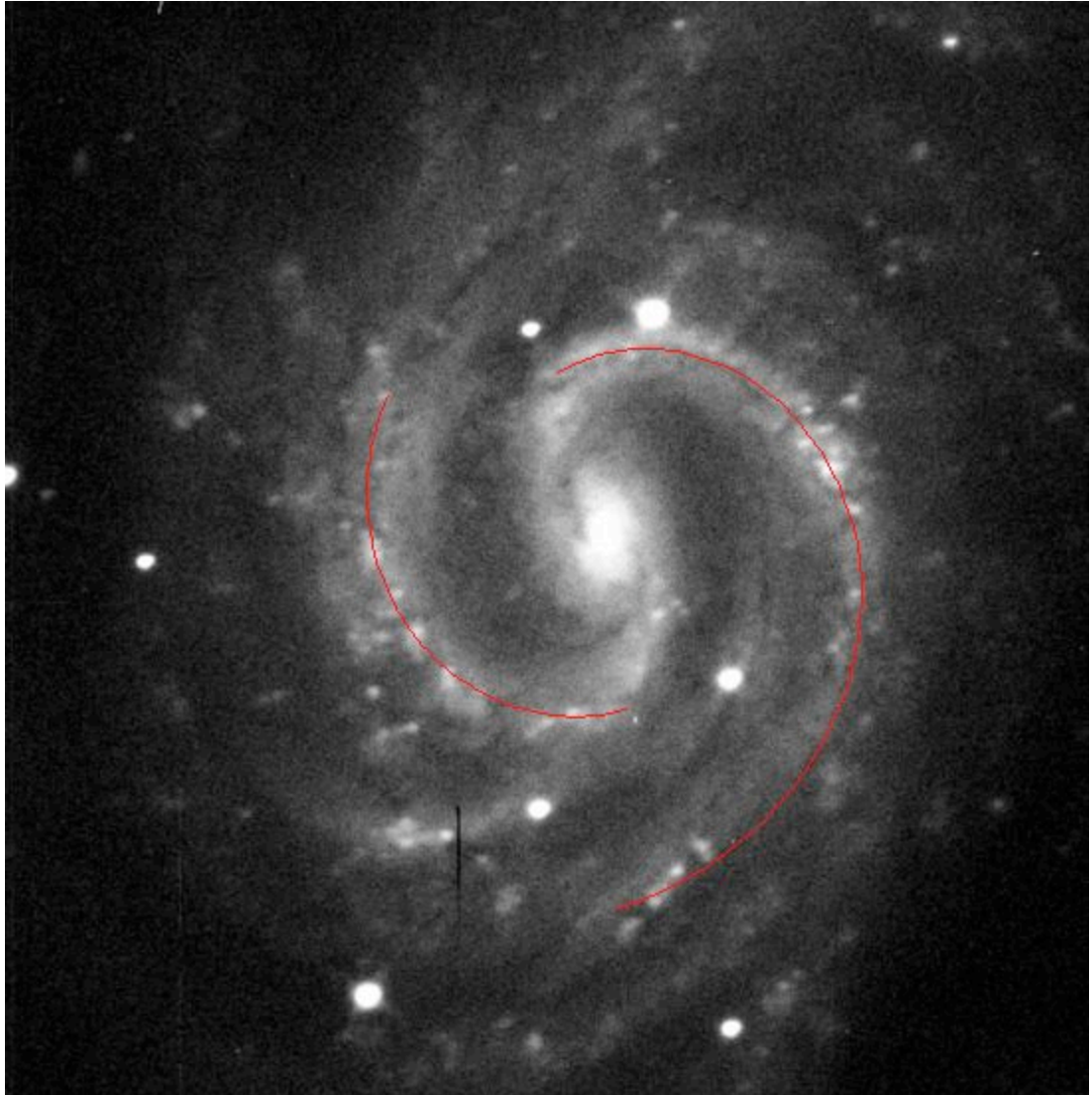
You might, for example, want to compare images of a galaxy taken with V band and R band filters.

You will also find blinking useful for comparing a 'posterized' version of an image, or one with surface brightness contours showing. This is useful when using the viewer to measure spiral arms in galaxies.

Using the JPEG viewer to measure spiral arms in galaxies

Open the viewer and measurer, get the image and enter the information about it

Details of how to do this are given above.

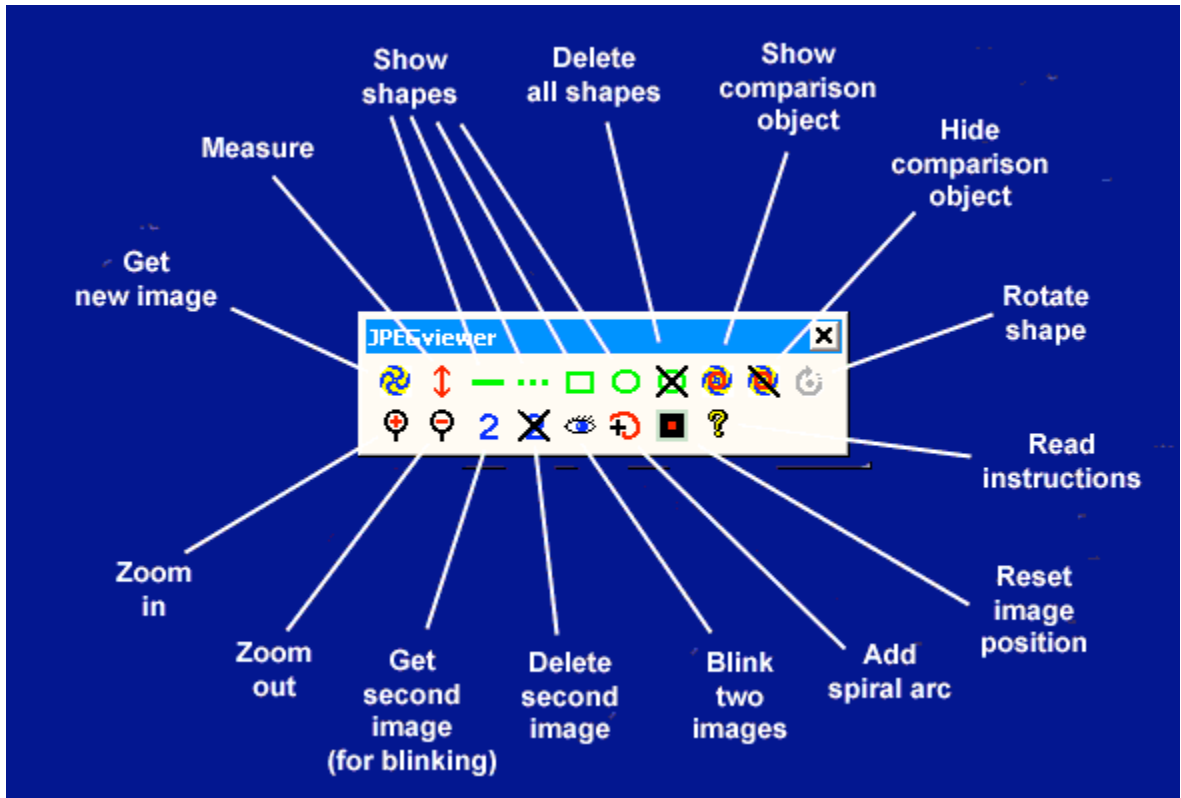


Two log spiral arcs fitted to face-one barred spiral NGC 4535 (as imaged by Faulkes Telescope North during March 2004)

Is the galaxy face-on or tilted?

If it is tilted you will have to measure the angle of tilt or 'viewing angle' first. How to do this is explained at the bottom of this worksheet.

Add a spiral arc



Click the **Add spiral arc** button.

You will be asked to say if the galaxy is face on or tilted, and whether the spiral arms go clockwise or anticlockwise. If tilted, you will also be given instructions about measuring the angle of tilt by fitting an ellipse around the galaxy. Further details of this.

This brings up a red blob for marking the galaxy centre, and a log spiral arc with the start and finish marked by green and magenta blobs (respectively).

Fitting the spiral arc to a spiral arm

Drag the red blob to the centre of the galaxy, the green blob to the start of a spiral arm, and the magenta blob to the end of the same spiral arm, then click the Measure button (double arrow).

If you want to adjust the spiral arc, drag the three blobs to new positions and click Measure again.

When you are satisfied that the spiral arc is in the right position, click the Finished adjusting arcs button (a red blob with a diagonal line through it).

Read off the pitch angle and the angular size (i.e. angle subtended at the centre) on the right of the screen.

Additional spiral arcs

Click the **Add spiral arc** button again for further spiral arms (max five).

Adjusting spiral arcs

If at any time you want to make further adjustments to any of the spiral arcs click the Adjust spiral arcs button - the blobs reappear and can be dragged to new positions.

Measuring the viewing angle for a spiral (or other disc) galaxy

Before you draw spiral arcs for a tilted galaxy you have to measure the viewing angle - this is zero for a face on galaxy and 90 degrees for an edge on galaxy.

You measure the viewing angle by fitting an ellipse around the outer edge of the galaxy.

Hint: Fitting an ellipse to the outer edge of a galaxy is much easier if you first produce a JPEG image showing only a few levels of brightness. Choose the Number of levels that shows the outline of the galaxy most clearly.

- In Photoshop Elements select Image/Adjustments/Posterize.
- In Paint Shop Pro select Effects/Artistic Effects/Posterize.

Alternatively you can use an image with surface brightness contours superimposed.

Viewing tilted arcs face on

Click the **Show spiral arcs not tilted** button to show what tilted spiral arcs would look like face on.

Click the **Show spiral arcs tilted** button to show them tilted again.
