

Summary

This is a straightforward project to image a number of interacting galaxies in colour, and then to identify different features visible in the images. Students can also make basic measurements on their interacting galaxies, (for example, how far apart they are in the sky,) using a simple spreadsheet based measuring tool, the Jpeg Viewer.



Planning

1. **Look at calendar** Choose an observing date and time when the Moon is not visible (because the glare it creates swamps images of faint, extended objects like galaxies).
2. **Book** Book your observing slot.
3. **Choose targets** Once you know when you will be using the telescope, you can choose a number of galaxies to observe which will be higher than 30 degrees above the horizon (so that the atmosphere does not cause a lot of absorption). Select interacting galaxies that look interesting in the Arp Catalogue – or just take pot luck and see what you find!

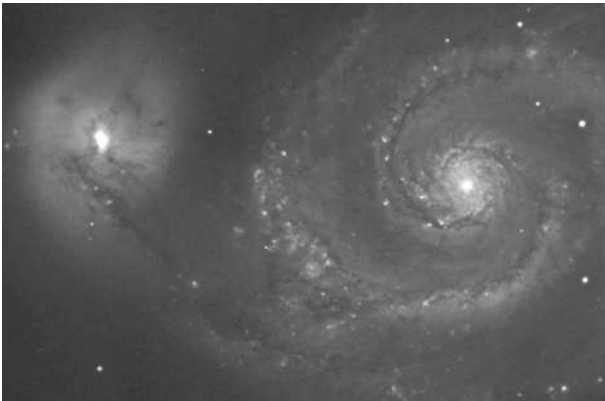
To find suitable interacting galaxies for any time of the year use the Faulkes Observations Planner (or planetarium software).

In a half hour session you should be able to obtain about six or seven images, assuming that each takes about four minutes, including the time for the telescope to slew from one target to the next.



Observing (obtaining data)

1. **Observe** Use the telescope to get a colour image of each galaxy. Use an exposure time of at least 30 seconds for each of the separate red, green and blue component images. (Some interacting galaxies have very faint 'tidal tails' – thin streams of stars pulled off by the gravity of a nearby galaxy – the longer the exposure time, the more clearly you will see these.)
2. **Save** When your observing session is over, you will be taken to a web page with thumbnails of all the images you have obtained. Click on each of these in turn. This causes a larger version to open on screen. Hover over each larger image using the mouse, and when the 'save' icon appears in the top left hand corner, click on this and save the image to a suitable place on your hard disc.



Analysing

Studying your interacting galaxies

1. **Print** Open each of your colour jpeg images in a program like *Paint Shop Pro* or *Photoshop Elements*, and print it out using the best quality available to you.
2. **Read** The Observations Planner lists particular features of the different interacting galaxies. (If you want to read some more technical information about interacting galaxies, look at the preface to the Arp Catalogue on the internet.)
3. **Examine** Look carefully at each of your images and see if you can identify these features. Label these on your print-out.
4. **Classify** Decide on the types of galaxy that are interacting in your image, according to the Hubble Classification (e.g. elliptical, spiral, barred spiral, . . .).
5. **Write** Describe each image in your own words, referring to the galaxies you have just identified, and saying what special features you can see. If you are feeling very ambitious, you might like to guess how the galaxies have been moving and how they have affected each other.

Measuring your galaxies

1. **Open viewer** Open the *JPEG Viewer* spreadsheet.
2. **Get image** Click the *Get new image* button in the toolbar and open each galaxy in turn. For each follow the next few instructions.
3. **Measure** Use the green shape buttons in the toolbar to make different measurements, (e.g., how far apart are the interacting galaxies relative to their sizes? Since we don't know what angle we are viewing from, two galaxies could actually be further apart than they appear in a two dimensional image.) For further details on using the JPEG Viewer, look at the instructions.

Evaluating

1. What factors might have limited the quality of the images you obtained, for example poor atmospheric seeing conditions, bright moonlight, twilight?
2. Are there any ways that you would improve on what you have done if you were to do the project again using different target galaxies? For example, would you use different exposure times or different filters?

