

AAQ RESOLUTION SURVEY

Observing Double Stars

INTRODUCTION

Objective of the Survey

The main objective is to have fun and see some beautiful and challenging sights ! But in doing so, we can collect data that will allow us to make some statements about how resolution (in simple terms, the ability to see detail) depends on the observer, the telescope and of course the object itself. This is an interesting issue in its own right, but can also help observers decide on what might be possible with their combination of 'scope, observer and conditions. One of the best ways to test resolution is to observe double stars and simply state whether you can see them as separate points of light or not. And that's what the survey asks you to do.

What To Do

Each month, 5 doubles of different characteristics will be identified in Graeme Jenkinson's observing list in the AAQ newsletter as being the survey pairs for the month. You are asked to observe them and then fill in the observation form, stating whether you have been able to "split" the pair, ie distinguish the two stars (there is more than one interpretation of this – see below). Observe them more than once under different conditions if you like. Every observation is a help to developing the database. Give the completed forms to Tim Napier-Munn at the next monthly meeting, or email them to him at tgn-m@bigpond.net.au. Progress reports will be given at meetings and in the newsletter.

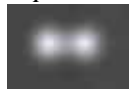
Observing Hints

How to interpret the image - The image of a star in a telescope is not a point of light but a light disk surrounded by concentric light and dark rings, called the Airy pattern, due to diffraction. In poor seeing the image is a moving smudge of light. In deciding whether you can separate the two stars, look at the light disk(s) and try and decide whether there is space between them, or if they are touching, or look like a elongated disk, or just look like one disk, something like these:

Separated- clear



Separated - notch effect



Maybe – elongated

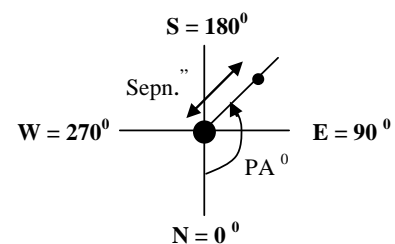


Not



Seeing - "Seeing" is the limitation the atmosphere places on the quality of the image. An easy pair one night may be impossible the next, purely because of worse seeing conditions. In fact observing "standard" difficult doubles is a good way to assess the seeing. But don't be put off if the seeing is poor. The effect of seeing is one of the variables we want to understand. See the observing form for more details.

Check it – For the more difficult pairs, the best way to confirm whether you have resolved it is to check the position angle (PA) to see if it is about the same as the listed value. The PA is measured from the primary (brightest) star from North in an Easterly direction, so the PA in the diagram is about 135° . If you are not sure which is North and East, either switch off the drive (the star will drift due West) or nudge the scope tube in a known direction and see which way the star moves. The orientation will depend on the scope.



Magnification - We are all taught (rightly) that magnification isn't everything. But it is more important in observing doubles than in most branches of astronomy, because it has to be large enough to allow the eye to resolve the separation, which can be very small (less than 1 arcsecond in extreme cases). The general rule is: for close doubles, build up the magnification from low to high until the separation is apparent (if at all). The maximum magnification that can be sustained will be limited by the seeing. An analysis of the work of a number of double star observers gave this correlation for the most common magnifications they used: $89\sqrt{D}$, where D is the telescope aperture in cm, eg 347x for a 6", 449x for a 10", and 531x for a 14". And sometimes much more ! Picking the best magnification comes quickly with practice. Don't be put off by published rules of thumb which often advise lower maximum "useful" magnifications. They are usually driven by not wasting the light in the exit pupil, which in our case is not an issue.