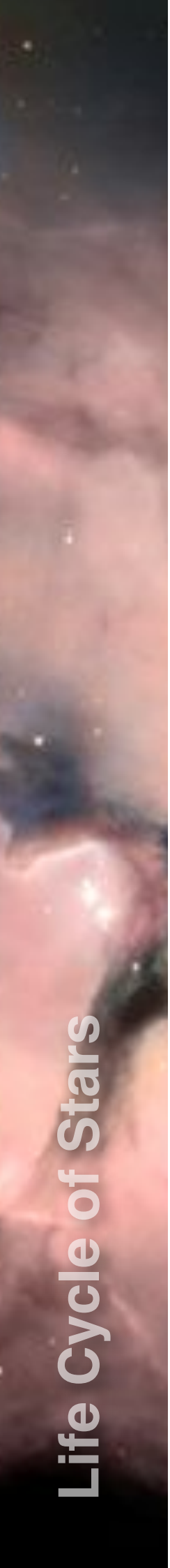

FAULKES TELESCOPE

Life Cycle of Stars

Identifying Be Stars

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Introduction

Be stars are young massive stars (usually around 6 – 15 times the mass of our Sun), which appear to have a disc of material (mainly hydrogen) orbiting them. These stars are usually of spectral type B, hence the terminology Be star (the 'e' stands for emission).

The origins of this disc are not fully understood, but it is believed to be associated with the fast speeds at which these stars rotate. The presence of a disc can be identified in the spectra of these stars, where emission lines corresponding to hydrogen are seen. In many instances, it is also believed that the rapid rotation is responsible for a 'flattening' of the star, as in the extreme case of Achernar (the most non-spherical star known).

Fig. 1. Artist's Impression of the Be star, Achernar, showing extreme "flattening" and an equatorial disc.

Be stars are usually very young (perhaps a few million years old) and are therefore often found in open clusters. The FT team's researchers, in collaboration with astronomers at the Open University, the University of Alicante and the University of Sao Paulo are interested in the link between young open clusters and Be stars.

Identifying Be Stars

It is also possible to identify Be stars by photometry alone. An image can be taken in the wide-band R filter, and the same field in the narrow-band H alpha filter. Since the wavelength of H alpha sits within the wider R-band, any star which has an excess of H alpha (i.e. it has more H alpha than you would expect for a star of that 'redness') can be seen.

All we need to do is to plot the stars on a graph where the x-axis is (B-V), and the y-axis is (R-H) as shown in Figure 2. Although we have only instrumental magnitudes, so the scales themselves are arbitrary, we will still see the Be stars (or at least the possible Be stars) standing out in the vertical direction, as in Figure 2. The value of (R-H) for a Be star will be less negative than for normal stars. As Be stars can have strong or weak emission lines, you may see a range of candidate stars, i.e. Figure 3 shows that star 94 has strong emission but stars 188 and 47 are weaker.

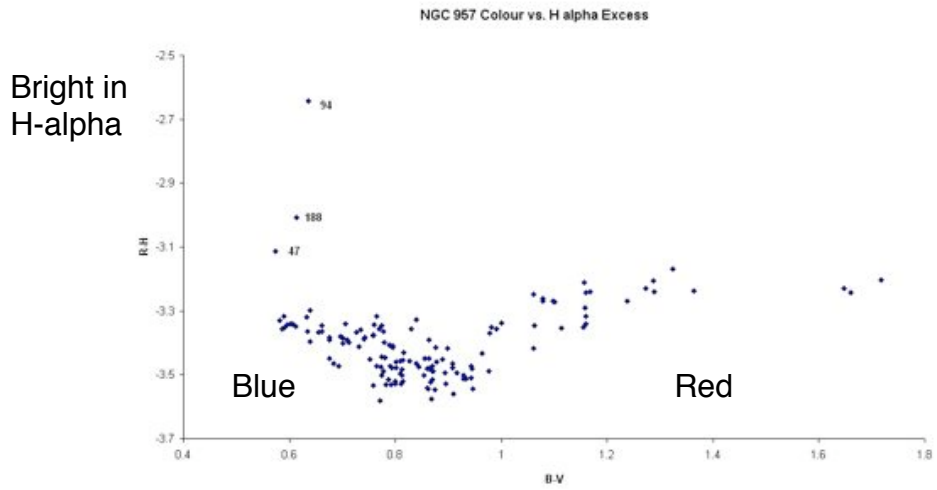

Fig. 2. Colour-colour diagram of (R-H) against (B-V) for the stars in NGC957. From this plot, we see three Be star candidates, stars 47, 94 and 188.

The spectra of stars also gives information on its type - from Figure 3 we can see that star 94 has a huge emission line, whilst stars 188 and 47 have weaker emission lines. The fact that there are emission lines for each star at this wavelength confirms their status as Be stars.

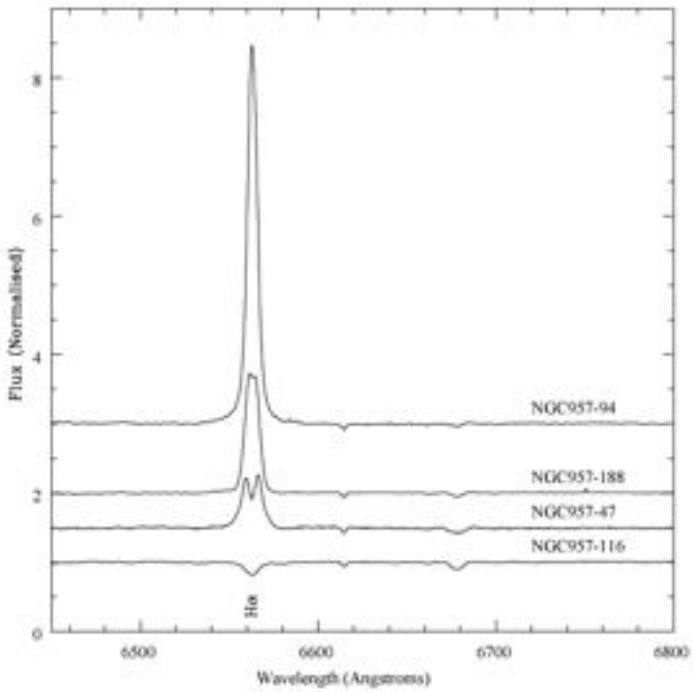

Fig. 3. Spectra of four stars from the open cluster, NGC957 covering the Hydrogen alpha line at 6563 Angstroms. Stars 94, 188 and 47 show H-alpha lines in emission, but star 116 is a normal B star (with H-alpha in absorption)

Further Information on Be stars can be found at:

http://en.wikipedia.org/wiki/Be_star
http://www.astro.virginia.edu/~dam3ma/sts98/
http://www.daviddarling.info/encyclopedia/B/Be_star.html