

## AN OPTICAL STUDY OF SOUTHERN Be STARS\*

F. Giovannelli<sup>1</sup>, C. Rossi<sup>2</sup>, and A. A. Vittone<sup>3</sup>

1) Istituto di Astrofisica Spaziale, CNR, Frascati, Italy

2) Istituto Astronomico, Universita' La Sapienza, Roma, Italy

3) Osservatorio Astronomico di Capodimonte, Napoli, Italy

### Introduction and Results

Within the framework of a coordinated campaign of observations in optical and IR of a sample of 21 southern Be stars, we report some results from spectra taken at ESO La Silla Observatory with 1.5m telescope equipped with IDS and the Boller & Chivens grating spectrograph used at 220 A/mm reciprocal dispersion. The spectra, taken in March 1985, range from about 4250 to 7000 A. The equivalent widths of the Balmer lines, either in emission or in absorption, have been computed. Fig. 1 shows the relationship between the logarithm of the absolute value of the H $\alpha$ , H $\gamma$  equivalent widths ratio and the logarithm of the luminosity of the stars in solar units.

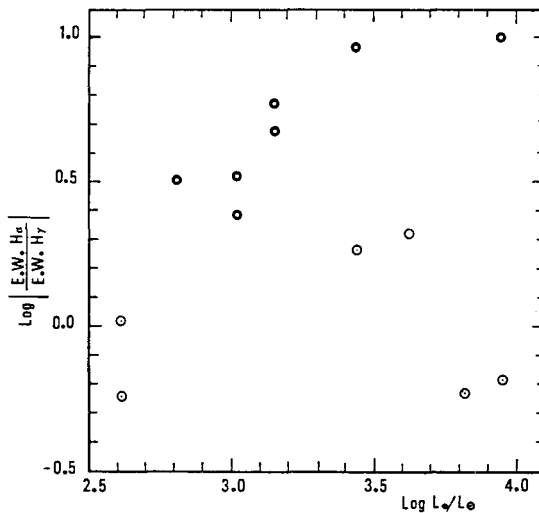


Fig. 1. H $\alpha$  - H $\gamma$  equivalent width ratios vs. the luminosity of the stars.

- are referred to stars with H $\alpha$  E.W. < 7 Å.
- are referred to stars with H $\alpha$  E.W. > 15 Å.

Using data from the IR measurements of the same sample made almost simultaneously by Persi and Ferrari-Toniolo (this Colloquium), we have searched for correlations among optical and IR parameters in order to study the characteristics of the surrounding envelopes of these Be

\* Based on observations made at the European Southern Observatory (ESO) at La Silla, Chile.

stars. Fig. 2 shows, as an example, the correlation between the intensities of the Br $\gamma$  lines and the H $\alpha$  equivalent widths.

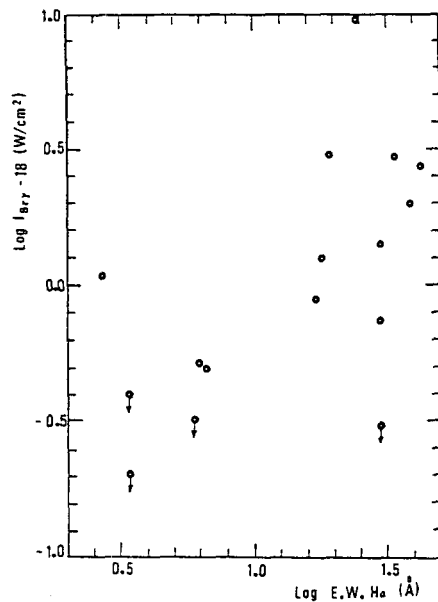


Fig. 2. Intensities of the Br $\gamma$  lines vs. the equivalent widths of H $\alpha$  lines.

### Conclusions

Fig. 1 clearly shows two classes of stars separated because of the different values of the H $\alpha$  - H $\gamma$  equivalent width ratios. For values of this ratio greater than about 2, the stars have H $\alpha$  equivalent widths greater than 15 Å, while for values of the ratio less than about 2, the H $\alpha$  equivalent widths are less than 7 Å. It is obvious that we cannot draw statistical conclusions because of the small number of the observed stars; nevertheless we are encouraged to develop the study of this correlation, which uses H $\gamma$  line equivalent width, since this line is a good indicator of activity in Be stars, as recently shown by de Loore *et al.* (1984) and Guarnieri *et al.* (1985), especially when associated with an X-ray emitter, like a neutron star, to form a Be/X-ray transient system. Other lines, like the rapidly varying radial velocities of Fe II emission lines, could be fruitful when used as indicators of X-ray activity (Bartolini *et al.*, this Colloquium). So, our correlation could be an auxiliary method in searching for probable Be/X-ray systems. A detailed paper on this topic is in preparation.

### References

- Bartolini, C., *et al.*: 1986, this Colloquium.  
 de Loore, C., *et al.*: 1984, *Astron. Astrophys.* 141, 279.  
 Guarnieri, A., *et al.*: 1985, in Multifrequency Behaviour of Galactic Accreting Sources, F. Giovannelli (ed.), Siderea, Roma, p. 318.  
 Persi, P., Ferrari-Toniolo, M.: 1986, this Colloquium.