

DISCOVERY AND ANALYSIS OF Li-RICH GIANTS

Bruno V. Castilho¹, Beatriz Barbuy¹, and Jane Gregório-Hetem¹

We analyze the far-infrared emission of Li-rich giants based on data from the *IRAS* Point Source Catalog. These stars are not confined to a limited area in the *IRAS* color diagram, but they have a distribution very different from Li-normal giants and there are concentration regions. This behavior suggests that they are moving through tracks in this diagram, probably caused by mass loss.

Based on an *IRAS* colors criterion we have been carrying out a survey for searching new Li-rich giants. We have obtained spectra for 130 candidates, at ESO, LNA and OHP, which means about one third of our initial list. We identified five new Li-rich stars and five other ones having medium Li lines.

We obtained CCD images, in the I band, for 18 Li-rich giants in order to study the envelopes of these stars. Except for HD 65750 no other has shown signs of dust or gas in this band. We conclude that the *IRAS* emission of these stars is due to a cold and extended envelope, only detectable in the infrared.

An Echelle spectrum was obtained for HD 146850 using ESO's 3.6-m telescope. The analysis of this Li-rich giant, identified in our survey, shows no peculiar characteristics compared with Li-normal giants apart from the Li abundance ($\log N(\text{Li}) = 1.6$), which is high for the metallicity $[\text{Fe}/\text{H}] = -0.3$.

Except for the Li abundance, these stars are like normal red giants. No correlation was found between mass, rotation or $^{12}\text{C}/^{13}\text{C}$ ratio and Li abundance. This and their far infrared emission features suggest that we may be observing a short phase of the stellar evolution of ordinary stars when Li is normally created.

Castilho, B.V., Master Thesis, Jan/1995, IAG/USP, Sao Paulo, Brazil

Castilho, B.V., Barbuy, B., & Gregorio-Hetem, J. 1995, *A&A* 297, 503

Gregorio-Hetem, J., Castilho, B.V., & Barbuy, B. 1993, *A&A* 268, L25

¹Instituto de Astronomia e Geofísica, Universidade de São Paulo, Brazil

PHOTOMETRY AND POLARIMETRY OF THE WOLF-RAYET BINARY SYSTEM HD 5980

S. Cellone^{1,2}, R. Barbá^{1,3}, V. Niemelä^{1,4,5}, C. Feinstein^{1,3}, N. Morrell^{1,3}, M.A. Cerruti^{4,3}, L. García¹, A. Moffat⁶, G. Baume^{1,2}, E. Brandi^{1,5}, A. Orsatti^{1,3}, I. Vega^{1,3,4}, R. Martínez¹, S. Waldhausen¹, G. Bosch^{1,2}, M. Méndez^{1,3}, P. Ostrov^{1,2}, and E. Fernández-Lajús¹

In 1994, Barbá & Niemelä (IAU Circ. 6099) reported a sudden outburst-like behavior of HD 5980, an eclipsing WR binary in the Small Magellanic Cloud. The star had brightened considerably, and the previous WR type spectrum changed to one resembling a luminous blue variable (LBV). We report the results of our CCD photometry and linear polarimetry of HD 5980. The observations were performed at CASLEO, San Juan, and at La Plata Observatory, Argentina.

Our photometric observations show that after its sudden outburst in mid 1994, the brightness of HD 5980 steadily decreased. Superimposed on this general trend, variations associated with the orbital period of this eclipsing binary are seen, although the light minima appear shallower than previously. In addition, there is a hint for erratic variations in the system.

Pre-outburst linear polarization observations were obtained with the VATPOL polarimeter at the 2.15-m telescope at CASLEO between 1987 and 1991. During the post-outburst phase (1995), the observations were performed with the Torino Five Channel Photopolarimeter and the same telescope.

The pre-outburst linear polarization data show variations locked with the orbital phase of the eclipsing binary. The center of the double wave Fourier fit in the $Q - U$ plane coincides with the linear polarization of the neighboring star Sk 80, suggesting that this value corresponds to the foreground polarization vector. After the outburst, the linear polarization vectors are larger and have different center in the $Q - U$ plane, indicating that the circumbinary material has been increased by the ejecta.

¹Fac. de Cs Astronómicas y Geofísicas, UNLP, Argentina

²Fellow of CONICET, Argentina

³Member of the Carrera del Investigador Científico, CONICET, Argentina

⁴Instituto de Astronomía y Física del Espacio, Buenos Aires, Argentina

⁵Member of the Carrera del Investigador Científico, CIC, Provincia de Buenos Aires, Argentina

⁶Université de Montréal, Montréal QB, Canada