

WOLF-RAYET AND OF STARS IN THE OB ASSOCIATIONS LH 101 AND LH 104 IN THE LMC

G. TESTOR

DAEC, Observatoire de Meudon, F-92195 Meudon Cedex, France

Abstract. We observed in the Large Magellanic Cloud the associations LH 101 and LH 104, containing six Wolf-Rayet stars: one WN and five WCE subtypes. These regions are located south of the 30 Dor nebula. The new observations include UVB photometry for a thousand stars and spectroscopy in the range from 3600 to 5300 Å for about 90 stars. In LH 101 an O6.5f, an O6.5 + WN8 and a hydrogen emission star are identified. Cluster HR diagrams of these OB associations reveal their age structure.

Key words: stars: Wolf-Rayet – evolution

The OB associations LH 101 and LH 104 (Lucke 1972) are embedded in the H II region N158 located south of 30 Dor. In the LMC this region is the third richest area in Wolf-Rayet stars: six WR stars (Breysacher 1988). A more detailed description of this region and its environment can be found in Lortet & Testor (1988). In Fig. 1 the spectra of Brey 91 and three peculiar bright stars are plotted in the range 4000-4900 Å. The spectrum of Brey 91 confirms the spectral type of WN9-10 given by Breysacher (1988). The spectrum of star 5, separated by $\sim 5''$ from Brey 91, shows N III $\lambda 4640$ and He II $\lambda 4686$ lines in emission with FWHM $\geq 10\text{Å}$, and $\lambda 4471$ and $\lambda 4541$ in absorption. The spectrum of star 6 located north-east of Brey 91 also shows $\lambda 4471$ and $\lambda 4541$ in absorption, but broader N III $\lambda 4640$ and He II $\lambda 4686$ than star 5. Star 5 seems to be an O6.5IIIIf type, star 6 a WN8+O6.5V system.

Sk-69°247 was classified A0Ia⁺ by Fitzpatrick *et al.* (1984). Nandy *et al.* (1984) found a strong P-Cygni emission line at C IV $\lambda 1550$, and confirms this star to be a binary as suggested earlier by Thomson *et al.* (1982). Classifying the new spectrum according to the ratio Mg II $\lambda 4481$ /He I $\lambda 4471$ indicates that this star is of type B8. It is variable due to broad H β emission, which had not been noticed up to now (Stahl *et al.* 1985).

To determine the age structure of LH 101 we used the first results of the new photometric and spectroscopic data. For LH 104 we used UVB photometry and spectral types listed by Schild & Testor (1992). The method for determining M_{bol} and T_{eff} is described in Testor *et al.* (1993). The presence of very hot stars is reflected by the nebula N158: LH 101 is completely embedded in strong H II nebular emission. LH 104 is mainly surrounded by strong filaments. They contain at least 12 and 3 O-type stars, respectively. According to Meynet's isochrones plotted on the upper HR diagram we find that LH 101 consists of two age groups, one very young to the south with

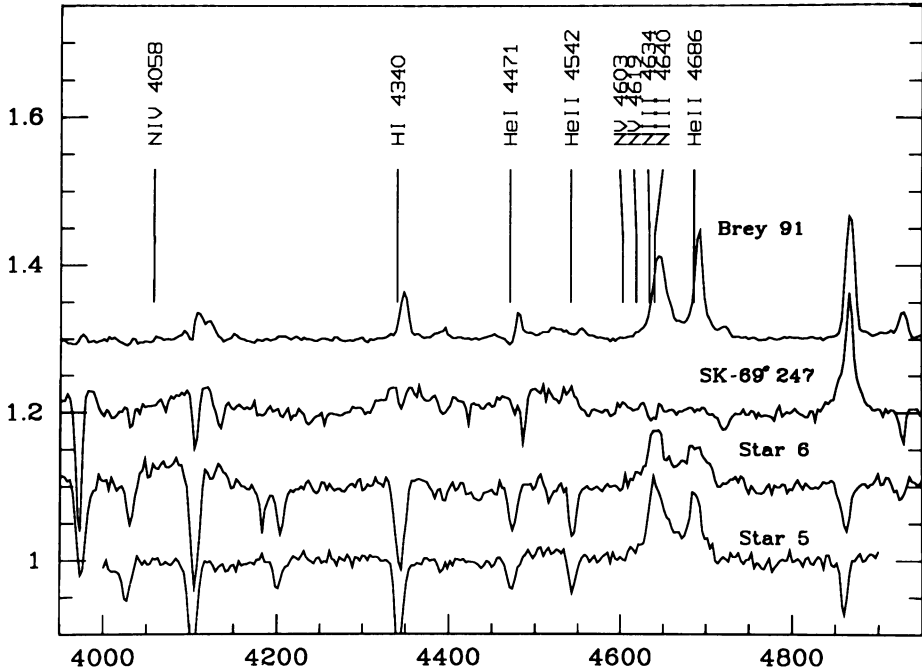


Fig. 1. Spectra of the four bright stars in LH 101.

an age of 1.5-2.5 Myr and the other one to the north with an age > 8 Myr. LH 104, on the other hand, seems to be older. It consists essentially of two groups of 2-3 Myr and 7-10 Myr.

References

- Breysacher, J. 1988, PhD thesis, University of Paris VII
 Fitzpatrick, L.E. 1991, *PASP* **103**, 1123
 Lortet, M.C., Testor, G. 1988, *A&A* **194**, 11
 Lucke, P.B. 1972, PhD thesis, University of Washington
 Meynet, G. 1992, private communication
 Nandy, K., Thompson, G.I, Morgan, D.H., Houziaux, L. 1984, *MNRAS* **210**, 131
 Schild, H., Testor, G. 1992, *A&A Suppl.* **92**, 729
 Stahl, O., Wolf, B., de Groot, M., Leitherer, C. 1985, *A&A* **140**, 459
 Testor, G., Schild, H., Lortet, M.C. 1993, *A&A* **280**, 426
 Thomson, G. I., Nandy, K., Morgan, D.H., Willis, A.J., Wilson, R., Houziaux, L. 1982, *MNRAS* **200**, 551