

THE WO STARS AND THEIR ENVIRONMENT

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The WO stars form a subgroup of the WR class characterized by a strong O VI emission at 382 nm (Sanduleak 1971; Barlow & Hummer 1982). In 1989–90 we observed intermediate resolution spectra of the four Sanduleak WO stars and of their surrounding nebulosities using the Bologna-Loiano 1.52m and ESO-La Silla 1.52m and 2.2m telescopes (*e.g.*, Polcaro *et al.* 1991, 1992, 1994 in preparation). Fig. 1 shows that the spectra are similar but with some striking differences among the four stars. They can be arranged in a sequence in order of increasing ionization: Sand 2, Sand 1, Sand 5, Sand 4 (see Table 1). Sand 4 is a binary system, and the continuum of the O4 companion dominates over that of the WO star. In the other objects, the reddening-corrected continuum can be fitted by a 80 000 K BB, in agreement with the high ionization level of their emission spectra.

Tab. 1 WO stars – emission-line equivalent widths

line (Å)	ion	Sand 1	Sand 2	Sand 4	Sand 5
4686	He II + C IV	–	752	159	327
5280	O VI	12	56	–	72
5580	O V	26	160	>108	215
5820	C IV	139	2757	114	401
6080	O VIII	?	p	3	8
6560	He II + C IV	24	88	104	102
7060	C IV	17	98	97	74:

The structures and the chemical compositions of the surrounding nebulae appear to be different. Diffuse emission in the C IV 581 nm doublet has been observed in Sand 5 (Polcaro *et al.* 1991). Sand 4 is surrounded by an H II 468.6 nm emission region (Melnick & Heydari-Malayeri 1991), embedded in a diffuse nebulosity (Dopita *et al.* 1990). We took five long-slit spectra, corresponding to the central star and to a number of structures identified on the H α + [N II] images by Dopita *et al.* (1990). We found that the H α , [N II], [S II] and [Ar III] lines are strongly variable depending on the position in the

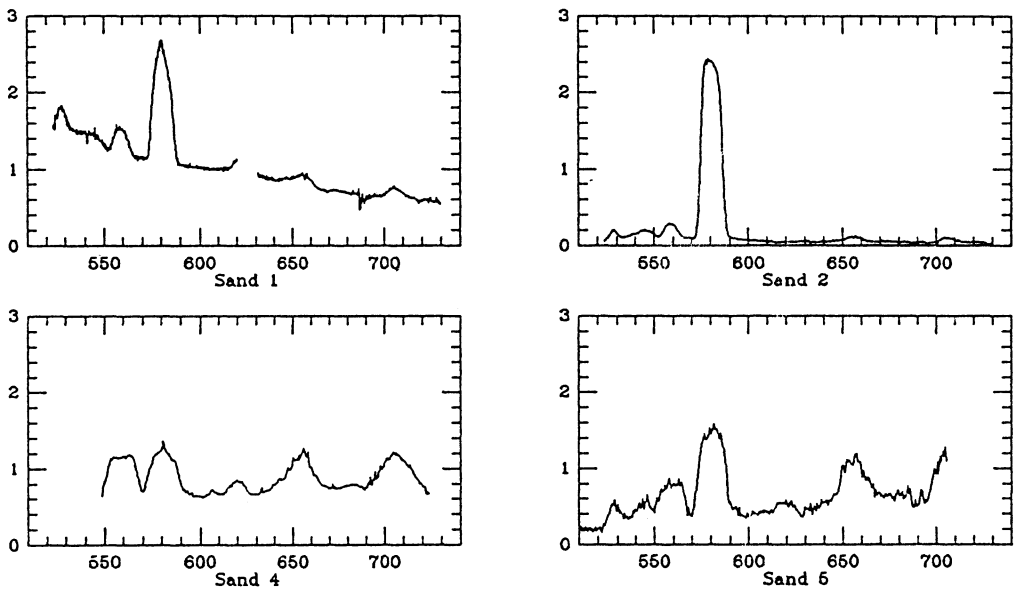


Fig. 1. The optical spectra of the WO stars

nebula. We also noted that the [N II] pattern is anomalous with respect to the other lines. He II 468.6 nm line is present not only around the central star but also in some of the northern structures. Long slit spectra of the LMC star Sand 2 revealed an asymmetric nebulosity clearly connected to the central object, visible at least in $H\alpha$ and [N II] wavelengths.

References

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