

## NEW WHT+FOS OPTICAL SPECTRA OF WR STARS IN M33 & M31

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We have secured new optical spectra of 11 WR stars in M33 and M31 using the WHT+Faint Object Spectrograph, covering  $\lambda\lambda 4800\text{--}9800\text{\AA}$  at  $14\text{\AA}$  and  $\lambda\lambda 3500\text{--}5000\text{\AA}$  at  $7\text{\AA}$  resolution. In our M33 sample five stars are classified as WC4–5 from their C IV  $\lambda 5800$ /C III  $\lambda 5696$  line strengths (*viz* MC 6, MC 53, MC 79, MC 24 and MC 71), one as WC6 (MC 65), one is a WNE-CE star (MC 48) and one is possibly an intermediate WC4-WO star (MC 78). Of the two stars observed in M31, one is classified as WC4–5 (MS 11) and the other as WC7-8 (MS 4).

From our new data and earlier WHT+FOS spectra we find a wide spread in the FWHM of C IV  $\lambda 5800$  for WC4–5 stars in M33, from values  $\sim 30\text{\AA}$  (more typical of galactic WC8 stars) up to  $\sim 110\text{\AA}$  (typical for galactic WC4 stars). We confirm the corelation of the CIV FWHM with M33 galactocentric distance first reported by Schild, Smith & Willis (1990), suggesting a real physical relationship between WC4–5 stellar wind velocity and galactic location.

Smith & Maeder (1991) ascribed 5 stars in M33 as 'WO' (previously classified as WC) on the basis of the relative line strengths and line widths of the CIV  $\lambda 5808$  and C III-IV  $\lambda 4650$ , but without access to the O VI  $\lambda 3811$ ,  $3834$  transitions, the great strength of which led to the identification of the WO sequence (Barlow & Hummer 1982). We have spectra of 3 of these stars covering the O VI region and do not confirm their conclusion. MC 48 is found to be a WNE-CE star and not a WO star. MC 6 shows only very weak OVI, and is clearly a WC4–5 star. MC 78 does show significant OVI emission but with a factor of  $\geq 5$  smaller intensity than the weakest-lined WO star. It appears to be intermediate between WC4 and WO. These results lower the known WO population in M33 to  $\leq 2\text{--}3$ .

We have discovered that the 11th star in our new M33 sample, very close to MCA 1, is a likely Ofp/WN9 transition star, with its optical spectrum showing numerous, narrow emission lines in H I, He I, N II and N III, very similar to that of R 84 in the LMC. This is the first identification of such an object in M33.

A full report of our new WHT+FOS spectra will appear in *Astronomy & Astrophysics*

### References

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