POLARIZATION VARIABILITY OF WOLF-RAYET BINARIES: CONSTRAINTS ON WR PARAMETERS

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OBSERVATIONS

We have recently used the PISCO and VATPOL polarimeters at the MPI (Chile) and CASLEO (Argentina) 2.2 m telescopes to monitor over several weeks the brightest WR+O systems fainter than 9^{th} magnitude in the Galaxy (V filter) and LMC/SMC (GaAs tube without filter). Each data point is accurate to $\sim 0.02\%$ in polarization P.

All systems observed show double-wave modulation of the polarization with orbital phase. The amplitude (typically several 0.1% in P) and relative phasing of the polarization modulation in Q and U can be used to derive WR mass-loss rates ($\dot{M}_{\rm WR}$; cf. St.-Louis *et al.* 1988) and orbital inclinations (i; cf. Brown *et al.* 1978, 1982; Drissen *et al.* 1986; St.-Louis *et al.* 1987), hence absolute masses $M_{\rm WR}$, when combined with $M_{\rm WR} \sin^3 i$ from the spectroscopic orbits, which are known for all the systems studied.

RESULTS

For all WR+O systems observed here and published previously (16 Galactic, 4 LMC, 3 SMC), we find the following:

a) $\dot{M}_{\rm WR}$ shows no obvious dependence on metallicity Z (= 0.02, 0.008, 0.002 for the Galaxy, LMC, SMC, respectively) as expected, since the main wind opacity elements in WR star winds are internally produced.

b) $M_{\rm WR}$ shows no evident trend with Z for a given subclass, in contrast with the new models of Maeder (1990) for single WR stars. We have no reason however to expect WR stars in all but the very closest binaries to behave differently from single WR stars, in view of the dominating effects of the hot, rapid stellar winds over gravitational perturbations.

c) $\dot{M}_{\rm WR}$ and $M_{\rm WR}$ vary systematically with subtype (hence with luminosity, such that both increase with $L_{\rm WR}$). We find $\dot{M} \sim M_{\rm WR}$, not $\sim M_{\rm WR}^{2.5}$, as currently proposed (cf. Langer 1989).

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