RING NEBULAE AROUND POPULATION I WR STARS: IS THEIR ORIGIN SIMILAR TO THE PNe?

TATIANA A. LOZINSKAYA
Sternberg Astronomical Institute, Moscow Lomonosov University, Russia
MICHAEL A. DOPITA
Mt. Stromlo and Siding Spring Observatories, The Australian National University, Australia
and
YOU-HUA CHU
Department of Astronomy, University of Illinois at Urbana-Champaign

Interference filter CCD images have been obtained in Hα and [O III] λ5007 for all population I WR stars in the LMC and SMC using the 2.4 m telescope at Siding Spring Observatory ANU. We have found new ring nebulae in the LMC around Br#13, 25, 31 and 56. Ring nebulae around Br 31 and Br 13 most probably represent stellar ejecta. Nebula around Br 56 is a filamentary wind-blown bubble type.

Our new deep survey of WR stars in the LMC confirms the statistics of galactic WR ring nebulae. Only about 16% of WR stars in the LMC are found to be associated with small-size shells of the ejecta and wind-blown types.

Why do we not see wind-blown ring nebula around every WR star? The most reasonable explanation is that a stellar shell is ejected at a velocity of about 100 km/s and a fast stellar wind of the central WR star sweeps up the ejected circumstellar material.

Statistics of WR-rings agree with the suggestion that all WR stars eject circumstellar shells, if taken into account is the detectability of ejected and swept up interstellar material in the LMC. Therefore we adopt a "two-wind model" for the origin of the small-size ring nebulae around population I WR stars. In terms of the model WR - ring nebulae represent a large-scale version of a PN. Most "big" shells and supershells in the LMC which contain a WR star could actually be created by common winds and SNe of the parental OB association.

https://doi.org/10.1017/S0074180900170810 Published online by Cambridge University Press