WR 120bb and WR 120bc: a pair of WN9h stars with possibly interacting circumstellar shells

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Two optically obscured Wolf-Rayet (WR) stars have been recently discovered by means of their infrared (IR) circumstellar shells, which show signatures of interaction with each other. Following the systematics of the WR star catalogues, these stars obtain the names WR,120bb and WR,120bc. In this paper, we present and analyse new near-IR, J, H, and K-band, spectra using the Potsdam Wolf-Rayet (PoWR) model atmosphere code. For that purpose, the atomic data base of the code has been extended in order to include all significant lines in the near-IR bands.

The spectra of both stars are classified as WN9h. As their spectra are very similar the parameters that we obtained by the spectral analyses hardly differ. Despite their late spectral subtype, we found relatively high stellar temperatures of 63 kK. The wind composition is dominated by helium, while hydrogen is depleted to 25 per cent by mass.

Because of their location in the Scutum-Centaurus arm, WR,120bb and WR,120bc appear highly reddened, $A_{K_{rm s}} approx 2$ mag. We adopt a common distance of 5.8,kpc to both stars, which complies with the typical absolute K-band magnitude for the WN9h subtype of -6.5 mag, is consistent with their observed extinction based on comparison with other massive stars in the region, and allows for the possibility that their shells are interacting with each other. This leads to luminosities of $log(L/L_odot) = 5.66$ and 5.54 for WR,120bb and WR,120bc, with large uncertainties due to the adopted distance.

The values of the luminosities of WR,120bb and WR,120bc imply that the immediate precursors of both stars were red supergiants (RSG). This implies in turn that the circumstellar shells associated with WR,120bb and WR,120bc were formed by interaction between the WR wind and the dense material shed during the preceding RSG phase.

Reference: 2012, MNRAS (astro-ph 1212.3727)
Status: Manuscript has been accepted

Weblink: http://arxiv.org/abs/1212.3727

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