New Galactic Wolf-Rayet Stars

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Over the course of 6 months in 2013, we observed nearly 400 Wolf-Rayet candidates in the Galactic plane. Preliminary results from this dataset are presented.

1 Introduction

In 2005–2006, our group conducted a 300 deg^2 NIR narrowband survey of the Galactic plane (first described in Shara et al. 2009). The vast majority of WR candidates from this survey, at magnitudes of $K \geq 13.5$, still await spectroscopic follow-up. In 2013, nearly 400 WR and PN candidates ($K \leq 13.5$) were observed on the SMARTS 1.5m telescope at CTIO with the Université de Montréal's SIMON spectrograph, and an additional 8 candidates of $14.3 \leq K \leq 14.7$ on the VLT with ISAAC. Reduction and analysis of this large dataset is ongoing; preliminary results are presented here.

2 Candidate Selection

Candidates were selected using a combination of colors from 2MASS (Skrutskie et al. 2006), WISE (Wright et al. 2010), and this NB survey, as per Faherty et al. (2014) and Kanarek et al. (2015) (the latter shown in figure 1), a method that identifies PNe as easily as WR stars.

3 Preliminary Results

Preliminary results are very promising. A number of new objects displaying WR or PN spectral characteristics have been identified; one is shown in figure 2. We have a preliminary success rate of $\sim 75\%$ for PNe and $\sim 50-60\%$ for WCs and [WCs]. The full dataset of 400 spectra will comprise a complete catalogue of the remaining WCs in the Galactic plane from $l = -90°$ to $+60°$, $b = \pm 1°$, to a limit of $K = 13.5$. These preliminary results show that future spectroscopic surveys with large NIR telescopes will be able to probe the far side of the Galaxy and identify WR stars and PNe at $K \geq 14$.

References

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Skrutskie, M. F., Cutri, R. M., Stiening, R., et al. 2006, AJ, 131, 1163

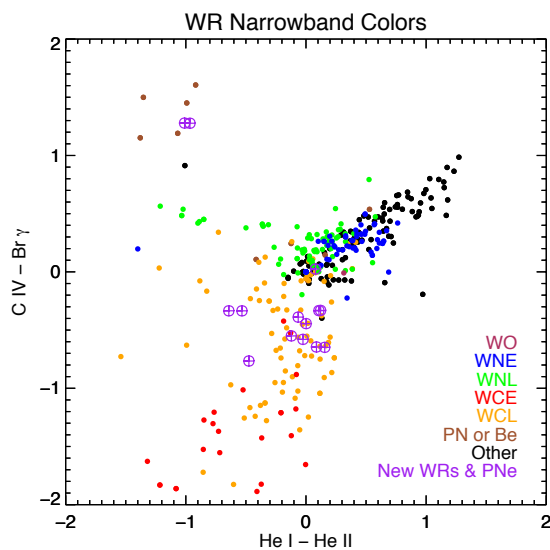Wright, E. L., Eisenhardt, P. R. M., Mainzer, A. K., et al. 2010, AJ, 140, 1868

Fig. 1: Color-color plot using the NB magnitudes from the Shara et al. survey. WC stars in particular are very easy to identify.
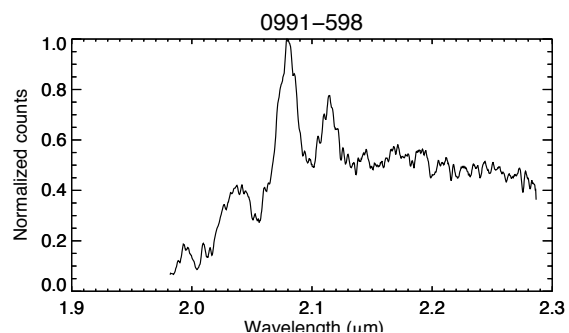

Fig. 2: An example preliminary spectrum of a new WC star (before telluric correction) from the CTIO dataset.