Wolf-Rayet Phenomena in Massive Stars and Starburst Galaxies
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HST-WFPC2 observations of Galactic Wolf-Rayet stars, preliminary results

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1. Introduction

We present preliminary results of our *HST*-WFPC2 PC-survey of Wolf-Rayet stars. Initiated in 1996, the goal was to discover new companions to, and cluster/association memberships of, known Galactic WR stars. From these results, Niemela *et al.* (1998) have already established a firm link between non-thermal radio emission and the location of binary wind-collision zones for WR 146 (confirming radio data of Dougherty *et al.* 1996) and WR 147 (confirming radio and IR data of Williams *et al.* 1997; see also Williams, these Proceedings), and confirmed the presence of a binary companion for WR 86 (listed by Jeffers *et al.* 1963). Here, for the first time, we present new information on WR 38, WR 38a, and WR 104.

2. Observations and poster display

For each target in our *HST* survey of Wolf-Rayet stars, we have taken wide-band U (F336W), B (F439W), and V (F555W) photometry. An analysis of the photometry, and a color comparison, allows us to establish a physical linkage between the WR stars and possible companions. WR 38 (WC4 without companion in van der Hucht *et al.* 1981) and WR 38a (WN5o) appear single in the Digitized Sky Survey, and in the original images of Shara *et al.* (1991). *HST* imaging at 45 mas/pixel resolves each star into a multiple system (see Figure 1) within a small cluster. WR 104 (WC9 without companion in van der Hucht *et al.* 1981), whose WFPC2 photometry data are not yet fully analyzed, is a close optical pair (see Figure 2).

3. Conclusions

The binary frequency among WR stars increases as function of improvements in data resolution. Binary companions within $0\farcs5$ of the WR star are traditionally unresolvable optically from the ground. These can be discovered with the WFPC2 PC to a lower limit of $\sim 0\farcs15$. As of 1999, the *HST*-FGS will resolve companions to within a separation of $\sim 0\farcs01$. We expect these data to place increasingly stringent limitations on the binary frequency of Wolf-Rayet stars.

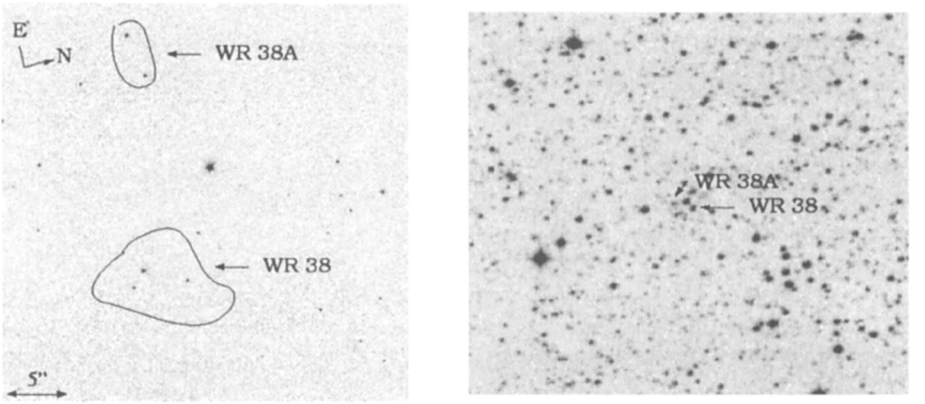

Figure 1. WR 38 and WR 38a: resolved from POSS data (*right*) into component systems with *HST*-WFPC2 PC imaging (*left*).

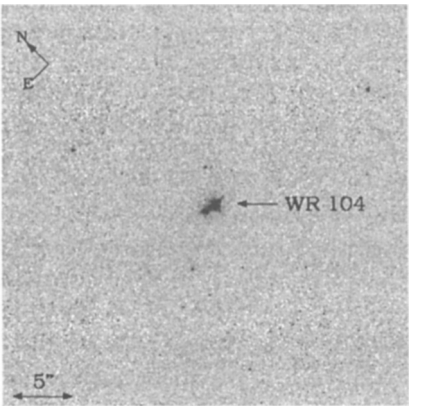

Figure 2. *HST*-WFPC2 PC imaging reveals WR 104 to be an optical pair.

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