

## An Empirical Analysis of the Stellar Wind and Planetary Nebulae of the [WC10] Central Stars CPD-56° 8032 and He 2-113.

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[WC] stars are H-deficient central stars of PN which have developed a dense, fast stellar wind. Their spectra can mimic the spectra of massive ( $M_{\text{in}} \sim 50M_{\odot}$ ) Wolf-Rayet stars of the carbon sequence. Deriving their parameters is of importance both in understanding the PN and the Wolf-Rayet phenomena. Spectra of both objects were obtained at the AAT in May 1993 with the UCL Echelle Spectrograph (3500–9200 Å,  $R=50,000$ ). The reddening, determined from comparing the  $H\beta$  nebular line fluxes with radio fluxes from Purton et al. (MNRAS 128, 321, 1982), yielded  $E(B-V)=0.68$  (CPD-56° 8032) and 1.00 (He 2-113). Distances are derived using two different methods and they agree within the relative uncertainties. They are 1.35 and 1.50 kpc for CPD-56° 8032 and He 2-113, respectively. The electron temperatures of the C II line formation region in the wind is derived from a recombination line analysis (20,000 and 17,000 K for CPD-56° 8032 and He 2-113, respectively). From the same stellar wind recombination line analysis, we find  $C/He=0.12$  and 0.16, together with  $O/He=0.19$  and 0.25, for CPD-56° 8032 and He 2-113 respectively.

Nebular temperatures (8800 K for CPD-56° 8032 and 8400 K for He 2-113), densities ( $\log(N_e)=4.8 \text{ cm}^{-3}$  for both objects) and abundances of N, S and C, are also obtained. N/H and S/H have solar values while C/H is considerably enhanced. Pre-COSTAR HST  $H\beta$  images were deconvolved and are presented below for the first time.

### III. Central Stars

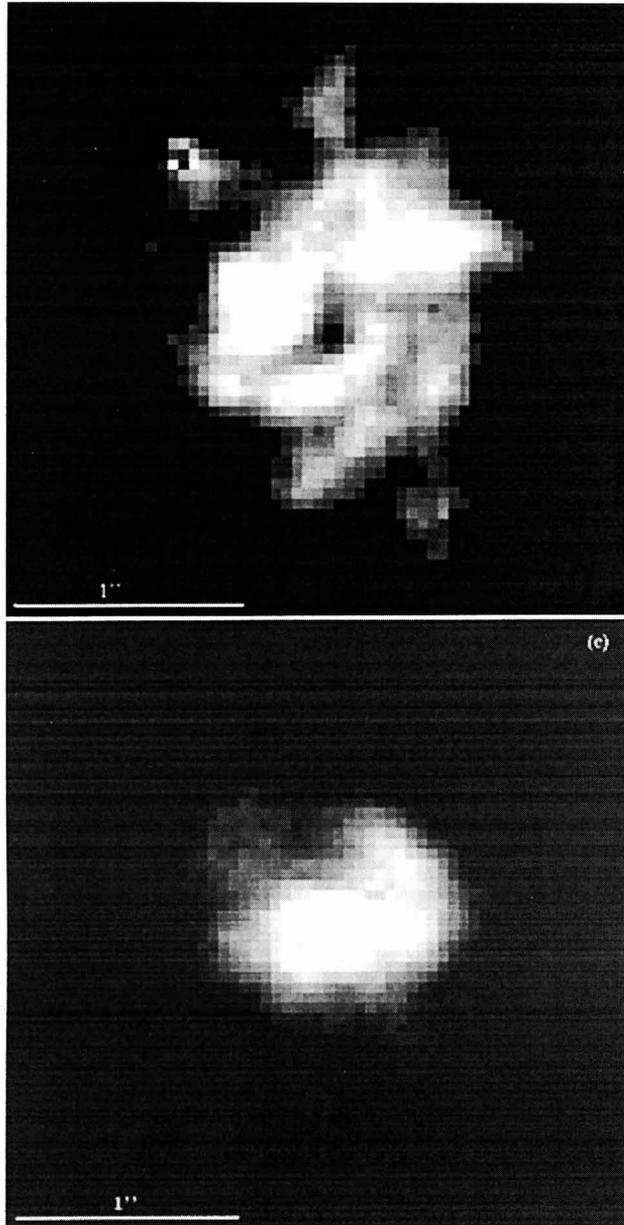


Figure 1: HST WFPC-1 images of the nebulae around CPD-56° 8032 (left) and He 2-113 (right). North is towards the upper left-hand corner in each case.