"CARBON-RICH" WHITE DWARFS

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8 white dwarfs of spectral type λ4670, LP 93-21, EG182, BPM 27606, EG82, G257-38, EG148, G99-37 and L97-3, with more or less well observed carbon bands in their spectra, have been analyzed by detailed model atmosphere techniques. For the very strong band stars the blanketing effect of the molecular band systems of the Swan band and the Deslandres-d'Azambuja band had to be included in the computation of the models. The best fit of the fluxes with scanner observations and spectra is obtained for abundance ratios of $10^3 \leq He/H \leq 10^5$, $800 \leq He/C \leq 5000$, with LP 93-21 being the most carbon-rich object. The results are summarized in Table 1.

The λ4670 stars do not form a homogeneous group as expected by Eggen and Greenstein (1965), neither from abundance nor from velocity criteria. For the latter see Humphreys et al. (1979) and Wegner (1975). They seem to belong to a quite normal stage of white dwarf evolution. If they are related to the hotter helium-rich DB-stars the strongest CII line (λ4267Å) should show up in the spectra of the latter, but it is not observed in normal DBs. Detailed line calculations for model atmospheres with T_{eff} = 14200 K and 15500 K and the composition of LP 93-21 yield W_λ = 5Å and 8Å, respectively. The metallic line star GD 40 is discussed separately. It would be the only candidate to show the λ4267Å line with a model of 14200 K and a ratio of He/C = 1000. (A detailed analysis will appear in Astronomy & Astrophysics).

References

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Table 1: Results

WD	T_{eff}	log g	He/H	He/C	C/O	He/Ca	log $M/M_{\odot}$
EG 182	8800	7.5 ± .3	$\geq 10^4$	1000	> 10		-0.6
LP 93-29	8500	7.8 ± .3	$\geq 10^4$	800	≥ 10		
BPM 27606	8200	7.5 ± .3	10^5	1000	> 10	10^5	-0.45
L 97-3	9800	7.5 ± .5	10^5	2000	> 10		
L 145-41	7500	7.5 ± .3	10^5	3000	> 10	10^5	-0.58
EG 148	7500	7.8 ± .3	10^5	5000	> 10		
G 257-38	7000	7.5 ± .5	$> 10^5$	5000	> 10		
G 99-37	6000	7.8 ± .5	10^3	1000	> 10		

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