HD137569, A POPULATION II REMNANT OF MASS EXCHANGE EVOLUTION

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The temperature, surface gravity, and abundances derived for this halo B star by Danziger and Jura (1970, Ap.J., 161, 997) show that it is a field suprahorizontal branch star very similar to B29 in M13. The only difference is that HD137569 has a higher (solar) C abundance. We find that HD137569 is a spectroscopic binary with P=529.8(2) days, V_o=45.0(2) km/s, K=16.2(3) km/s, e=0.12(2), ω=233°(10), and T=JD2441922(14). The parenthesized quantities are the uncertainties (probable errors) of the last digits of the elements.

These elements combined with the atmospheric parameters argue that the unseen secondary is probably the more massive. The evolutionary history of the system is difficult to derive because of the great uncertainty in the stellar models. The derived asini (=168 $R_\odot$) indicates that if the orbital elements have not changed during the evolution the primary probably filled its Roche lobe when it was near the tip of the asymptotic giant branch. Since mass exchange usually leads to a net increase in the semi-major axis, it could have started earlier on the asymptotic giant branch or at the tip of the giant branch. The normal C abundance suggests that mass exchange did not begin before the helium flash.

COMMENT FOLLOWING BOLTON AND THOMSON

Kwee: Where in the HR diagram are your stars situated with respect to the Cepheid instability strip?

Bolton: Most of them are on the blue side of the instability strip.

M. J. Plavec, D. M. Popper and R. K. Ulrich (eds.), Close Binary Stars: Observations and Interpretation, 575.