THE ANOMALOUS GIANT BRANCH OF ω CENTAURI

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ABSTRACT

The giant branch of ω Cen is much narrower in the I, (V-I) diagram than in the V, (B-V) diagram but at least 24 stars which lie on the red side of the giant branch are radial velocity members (Lloyd Evans 1977), (Lloyd Evans, to be published). Spectra of these stars show, with only one exception, stronger metal lines than stars of similar (V-I) color on the main giant branch (comparable to stars in 47 Tuc), strong CN bands where the stellar temperature allows and strong Ba II 4554 Å. The Ba II star RGO 371 (Dickens and Bell 1976) is a typical member of the group. The Cepheid V29 also shows strong CN bands and strong Ba II. A start has been made on a spectroscopic search for stars on the main giant branch showing these anomalies and the sample of stars with VI photometry is being enlarged. An explanation of the properties of these stars would appear to require both a large primordial metal content and mixing of processed material to the surface.

REFERENCES

Dickens, R.J. and Bell, R.A. (1976). Astrophys. J. 207, 506.
Lloyd Evans, T. (1977). Mon. Not. R. Astron. Soc. 178, 345.

A. G. Davis Philip and D. S. Hayes (eds.), The HR Diagram, 205-206.

DISCUSSION

KRAFT: You find some stars with over-all metal abundance (average Fe-group) looking about the same in 47 Tuc and ω Cen?

LLOYD EVANS: That's correct.

KRAFT: But you find stars with evidence of mixing in ω Cen and not 47 Tuc.

LLOYD EVANS: That's correct. Essentially all of the stars below the giant branch in ω Cen have rather strong CN and strong Ba II.

NORRIS: I don't think that Lloyd Evans' results are necessarily inconsistent with primordial abundance variations. If one has different mass functions for the first generation of stars one might envisage a situation in which C, N and O and the heavy elements are present in considerably different proportions in ω Cen than in 47 Tuc.

LLOYD EVANS: One might need to consider a local event, perhaps involving supernova ejecta retained by ω Cen, as the source of enriched material. Presumably Ba might be one of the elements involved as it is correlated with metals and CN in these stars.

BIDELMAN: There is a rather unlikely but perhaps not impossible way to explain non-evolutionary abundance differences among stars of the same cluster; the differential accretion of interstellar matter by the different stars during passage through the galactic plane.

LLOYD EVANS: The high velocity of the cluster relative to interstellar clouds in the galactic plane makes accretion unlikely.