

THE INTEGRATED SPECTRA OF METAL-RICH GALACTIC GLOBULAR CLUSTERS: A
TWO-PARAMETER FAMILY

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ABSTRACT. Integrated photographic image-tube spectra have been obtained for the central regions of a number of metal-rich Galactic globular clusters with a wavelength resolution of 2.5 Å over the wavelength region $\lambda\lambda 3400\text{--}4500$ Å. The spectra have been analyzed using a variety of quantitative spectral indices that compare the strengths of neighboring absorption features. Our main result is that two parameters are needed to describe the integrated spectra of metal-rich globular clusters. The second parameter is manifested in two ways:

(1) In a diagnostic diagram sensitive to surface-gravity the metal-rich clusters do not form a well-defined linear sequence. Instead, we find large differences from one cluster to another in the mean surface gravity of the stars contributing to the integrated light at 4000 Å. It appears that the relative amounts of light contributed by dwarfs and giants varies considerably from one cluster to another.

(2) In a diagram that discriminates CN strength we find large differences from one cluster to another in the mean CN strengths of clusters having similar "spectral type". It is inferred that the mean CN anomaly varies from one cluster to another and that the anomalous CN strengths are present in main sequence stars as well as in giants.

The above two second parameter effects are shown to be strongly correlated in the sense that the "dwarf-dominated" clusters have the largest CN anomalies. Hence, our study indicates that no more than two independent parameters are required to explain the integrated spectra of metal-rich globular clusters.

Details of the above findings can be found in Rose and Tripicco (1986, *A.J.* 92, 1610).