Chemically Self Consistent Isochrones of the Globular Cluster NGC 2808

Emily M. Boudreaux[1], Renata Edeas Hoh[1], Brian C. Chaboyer[1], & Gregory Feiden[2]
Department of Physics and Astronomy, University of North Georgia, Dahlonega, GA 30533, USA

A Multi-wavelength View
On Globular Clusters Near and Far
From JWST to the ELT

Abstract

The inferred helium mass fraction of multiple populations in globular clusters can vary signifigantly from older to younger populations. As the origin of these MPs remains an open question, and one which is sensitive to the population - population compositional differences, the extent of the composition variations is a key parameter when constraining formation channels. Many metal abundances may be directly measured spectroscopically; however, helium abundances are not directly observable in GCs. Instead, helium abundances are inferred from stellar models. It is therefore important to build stellar models which are chemically self-consistent between the structure, atmosphere, and opacities. In this work we present the first chemically self-consistent stellar models of the Milky Way Globular Cluster NGC 2808. We find that the helium abundance of the second generation of stars is higher than the first generation by SOME AMOUNT

Updating Opacities

For much of a stars radius ($\log(R) \approx -1.5$), OPAL and OPLIB opacities vary by up to approximately 2%. We calibrate a solar model (above) to confirm that variations of this order do not dramatically alter a solar model's evolutionary path.

These small variations may be more impactful for stars at or near the convective transition mass. The interior structure, which is believed to result in the Jao Gap, of such stars is very sensitive to temperature; therefore, small changes in opacity may be more impactful than in higher mass models.

References

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