

CEMP Stars as Probes of First-Star Nucleosynthesis, the IMF, and Galactic Assembly



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The binarity of dwarf carbon stars and their possible role as main sequence counterparts to CEMP stars

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Contrary to expectations, the most abundant carbon stars in the Galaxy are long-lived, main-sequence stars. The origin of these dwarf carbon (dC) stars is an astrophysical curiosity that is 40 years(!) old, and the mechanisms for enhancing their observed C/O above unity are poorly constrained. Intriguingly, a significant fraction of the dC stars have clear halo kinematics, and are thus almost certainly related to the carbon enhanced, metal-poor (CEMP) stars observed in the Galactic halo.

We will present a search for evolved binary companions via radial velocity measurements of these chemically peculiar dwarf stars, all of which are currently in the solar neighbourhood. Over several years, we observed a few dozen dC stars with the ISIS spectrograph on the WHT, and 22 stars with sufficient data are consistent with a 100% binary fraction. We hypothesise these main-sequence stars are essentially CEMP-r or CEMP-s stars of relatively low mass, and are ancient and relatively pristine sites for stellar archaeology.

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