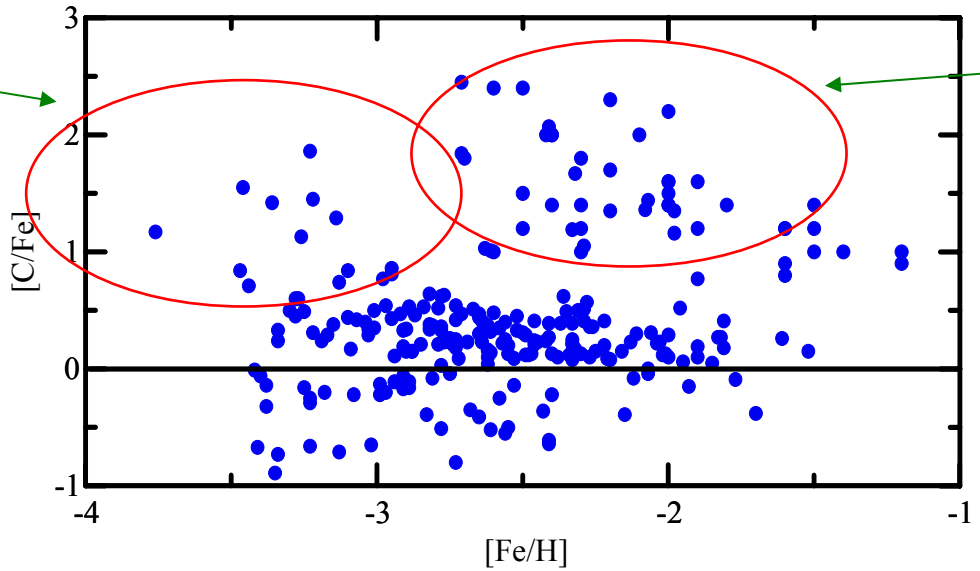
The Origin of Carbon in the Universe – New Insights from Carbon-Enhanced Metal-Poor Stars

Among the most metal-deficient (iron-poor) stars in the Galaxy, JINA scientists have discovered that a large fraction of them – on the order of 20-25% -- exhibit strong absorption lines due to the presence of molecular carbon. CH, CN, and C_2 bands are quite prominent in medium-resolution optical spectra of these objects.

Carbon in these stars is likely created by massive first-generation stars in the early Universe



Carbon in these stars is likely created by nucleosynthesis in intermediate mass Asymptotic Giant Branch stars

High resolution spectroscopy with the European VLT 8m telescope has been used to verify the carbon abundances of these stars, and to produce a sample from which the absolute frequency of their occurrence can be derived as a function of metallicity, [Fe/H]. The observed distribution of [C/Fe] vs / [Fe/H] is shown above, based on work by Barklem et al. (2005).