FORMATION AND EVOLUTION OF CARBON-ENHANCED METAL-POOR STARS

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Carbon-enhanced metal-poor (CEMP) stars play a key role in characterising the star formation history of the Galactic halo. In particular, the fraction of CEMP stars among extremely metal-poor stars (EMP stars, defined by [Fe/H] < -2.5) is useful information in constraining the stellar IMF in the early universe. In our previous work, it is proposed that the typical mass of EMP stars should be around 10 Msun at [Fe/H] < -2 under the assumption that all the CEMP stars belong to binary systems and originate from a mass transfer from the former AGB stars [1-5].
In this paper, we explore the origin of CEMP stars without the enhancement of *s*-process element abundances (so called CEMP-no stars) that dominate the CEMP population at [Fe/H] < -3.5. The reason for the large CEMP-no fraction is currently an important issue to elucidate the star formation history in the early universe in terms of the chemical evolution of the Galaxy, the contribution of AGB stars to the CEMP populations, and the IMF of first stars and EMP stars.
We will discuss the reason for the increasing CEMP-no fraction (or decreasing CEMP-*s* (CEMP stars with *s*-process element enhancement) fraction) with decreasing metallicity, using binary population synthesis based on the stellar evolution and nucleosynthesis of first stars and EMP stars, taking into account the possible effect of mass loss and the hot bottom burning at low-metallicity.

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