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Chemodynamical Analysis of Six Low-Metallicity Stars in the Halo System of the Milky Way

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In this work, we study the chemical compositions and kinematics of six metal-poor stars in the Galactic Halo. These stars were selected from the LAMOST survey and were followed up with high-resolution (R ∼˜110,000) with the Lick/APF. By investigating the chemical compositions and kinematics of this sample, we identified two carbon-enhanced metal-poor stars (J1630+0953 and J2216+0246) without enhancement in heavy elements (CEMP-no stars). By comparing the light-element abundances of these two stars with predicted yields from non-rotating zero-metallicity massive-star models, we find possible progenitors of J1630+0953 and J2216+0246 could be in the 13-25 $M_{\odot}$ mass range. In addition, there are no significant differences in the chemical abundances of light and heavy elements of the program stars when compared with data from the literature. We also present a kinematic analysis, which suggests most of our program stars are likely to belong to the inner-halo population, with orbits passing as close as ∼ 2.9 kpc from the Galactic center. The chemical and kinematic properties of this sample help place crucial constraints on the origin and evolution of low-metallicity stars in our Galaxy.

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