OVERVIEW

✦ Hyper Metal-Poor (HMP) stars are the local equivalents to the high-redshift Universe. In their atmospheres, they carry imprints of the nucleosynthetic signatures of their progenitors Pop III (“First”) stars [1]. They retain the chemical composition of the interstellar medium at the time and place of their birth.

✦ We compare the UV + Optical abundance signatures of the Hyper Metal-Poor star (HMP; [Fe/H] < -5.00 [2]) HE1327-2326 [3] to early low-mass stellar supernovae yields to provide empirical constraints on the properties of its progenitor “First” stars, including their masses and explosion energies.

ABSTRACT

We present new Near-UltraViolet (NUV) elemental abundance analysis, for the hyper metal-poor star HE1327-2326 ([Fe/H] = -5.2) using COS/HST data. We detect for the first time 4 Fe II lines, in addition to Zn I and Ni II absorption lines. Fitting the abundances to SNe yield models, lead to Pop III progenitor mass of 28 M_\odot and SNe explosion energy of 0.3 Bethe (B).

RESULTS

✦ We derive for the first time Fe II and Zn I abundances in HE1327-2316 and compare the full abundances pattern from Z=1-30 of available measurements and upper limits to theoretical model predictions for non-rotating single massive Pop III stars in the range 10–100 Solar masses [4].

✦ The best fit model shows that HE1327-2326 has a Pop III progenitor mass of 28 M_\odot and SNe exploding energy of 0.3 B (1B=10^{44} J).

✦ Detecting new Zn and Fe lines in UV spectrum of HE1327-2326 result in a larger Pop III progenitor mass (higher by 6.5 M_\odot) than previous result [5].

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