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Aspherical supernova explosions in the First Milky Way progenitors

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Elements heavier than hydrogen and helium were first produced in the universe within the first stars. After a few million years, these presumably massive stars exploded as the first supernovae, ejecting the newly forged elements. Theoretical investigations have long indicated that such supernovae would explode in an asymmetric fashion, but insufficient observational evidence has prevented in-depth studies. I will report on the first ever detection of a zinc line in the UV spectrum of an ancient hyper metal-poor second-generation star, HE 1327−2326 ([Fe/H]$= -5.20$), from which an abundance ratio of [Zn/Fe] = 0.80 ± 0.25 was obtained. Producing this large relative amount of zinc requires a high-entropy explosion environment, which could be achieved e.g., during an aspherical explosion with a bipolar outflow of a first star progenitor. Aspherical explosions in the early universe are in line with suggested fast rotational velocities of the First stars (Meynet 2006). I will discuss the consequent significant implications of such explosions on the the chemical enrichment across the early universe.

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Talk/Poster

Talk

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