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s-Process Nucleosynthesis in the Progenitors of Carbon-Enhanced Metal-Poor Stars

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The first stars in the universe must have provided chemical imprints on the surface of observed metal-poor stars with [Fe/H]<-2. One of the most important signatures is the abundances of carbon-enhanced metal-poor (CEMP) stars, which is defined as [C/Fe]>=0.7. The origin of a CEMP star and its subclasses such as CEMP-s and CEMP-no stars, divided by the enhancement of s-process elements, engages the keenest attention of those who work on first stars and stellar archaeology. However, in spite of the obvious importance of the role of the s-process in AGB stars at low-metallicity, theoretical models and their applications to CEMP stars with [Fe/H]<-2.5 are not well investigated, while it is established that metal-poor AGB stars undergo a proton ingestion episode that triggers the s-process. In this paper, three modes of the s-process, the convective 13C burning triggered by the proton ingestion episode, the convective 22Ne burning, and the radiative 13C burning, are considered, using a detailed nucleosynthesis code customised to compute the s-process in metal-poor AGB stars. We argue that the abundance distribution of neutron-capture elements can be interpreted as that of a contribution from the s-process, and hence, Ba in CEMP-s and CEMP-no stars share the same nucleosynthetic origin.

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Talk/Poster

Talk

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