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Between the s and r Process: Nuclear Data Needs of Radioactive Species to Understand Stellar Abundances from the Early Universe

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The observation of elemental abundances in the most metal-poor stars have revealed the operation of a neutron-capture regime intermediate between the familiar slow (s) and rapid (r) process regimes. This i process can be activated when the H- and He-burning shells interact convectively, which is possible in low-metallicity conditions found in the early universe. The i process is the result of a sequence of neutron captures that involves unstable species two to six mass numbers away from the valley of stability. I will report 3D stellar hydrodynamic simulations that are now revealing the complex stellar conditions under which the i process operates, and the substantial body of work that has quantitatively established which nuclear data is most urgently needed to enable realistic modeling and interpretation of i-process observations of early universe stars. This is needed to pin down the exact location of the i process, which remains uncertain.

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Please select: Experiment or Theory

Theory

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