

TUESDAY

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RM 184 NSH

In Search of the Site for r-Process Nucleosynthesis

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It has been known for more than half a century that about half of the elements heavier than iron are produced via rapid neutron capture in the r-process. Indeed, the basic physical conditions for the r-process are well constrained by simple nuclear physics. In spite of this simplicity, however, the unambiguous identification of the site for the r-process nucleosynthesis has remained elusive. Parametrically, one can divide current models for the r-process into three scenarios roughly characterized by the number of neutron captures per seed nucleus (n/s). This parameter, in turn is the consequence of a variety of conditions such as time-scale, baryon density, average charge per baryon, and entropy. In this talk we summarize various proposed sites for the r-process along with their short comings. Insight from a variety of nuclear physics measurements and astronomical observations is summarized. A paradigm is proposed whereby one may be able to quantify the relative contributions of each astrophysical site.