Cross section measurements for the p-process

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Abstract

An accurate description of the nucleosynthesis of heavy, neutron-deficient stable isotopes known as p-nuclei remains a mystery. The current best models describing the production of the p-nuclei via the p-process, which consists of photodisintegrations of existing heavier seed nuclei, fail to explain the observed abundances of all the p-nuclei. As these models rely heavily on theoretical reaction rates, it is necessary to develop new experimental techniques to measure p-process reactions in an effort to constrain and verify the theory. The Summing NaI(Tl) (SuN) detector has recently been developed at Michigan State University to measure (p,g) and (a,g) reactions relevant to p-process nucleosynthesis utilizing the summing technique. Reaction cross sections at astrophysically relevant energies resulting from a successful experimental campaign at the University of Notre Dame will be presented and compared with theoretical calculations.

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