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## CFA LECTURES

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# Experiments relevant to the astrophysical p-process nucleosynthesis

*- Abstract -*

The explanation of the origin of the heavy, proton rich isotopes (the so-called p-nuclei) is a long-standing problem of nuclear astrophysics. These isotopes are not produced by neutron capture reactions in the s- and r-processes and their synthesis requires special conditions. Although different processes are considered which might contribute to the p-isotope nucleosynthesis, models are not able to reproduce well the p-isotope abundances as observed in the solar system. These processes are in general referred to as the astrophysical p-process. Perhaps the most important sub-process of the p-process is the so-called gamma-process which operates through gamma-induced reactions on pre-existing heavy seed nuclei in an explosive astrophysical event. Huge reaction networks are involved in gamma-process models and the necessary reaction rates are taken from theory in lack of experimental information. If the theoretical reaction rates are not accurate, this may contribute to the poor predictive power of the gamma-process models. The experimental check of the relevant reaction rates is therefore very important. This can be achieved by the cross section measurement of the gamma-induced reactions or, preferably, of the inverse particle induced reactions. At the Institute for Nuclear Research (Atomki, Debrecen, Hungary) an extensive research program is in progress to systematically study charged particle induced reactions for the astrophysical p-process. In this talk some details of the experiments, the results and the astrophysical consequences are reviewed.

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