Neutron Induced Reactions in Astrophysics

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Neutron induced reactions play an important role in the formation of elements heavier than iron. In particular, neutron capture cross sections are a key nuclear physics input to predict abundances produced in the slow neutron capture process (s-process), which is responsible for about half of the heavy element abundances. Stellar models require cross section data on stable isotopes with accuracies of only a few percent, as well as experimental data on some radioactive isotopes, which may act as branching points in the s-process. Also for lighter mass isotopes, neutron induced reactions may play a crucial role, for example for the abundance of the cosmic gamma ray emitter ^{26}Al, which is destroyed by ^{26}Al(n,p) and ^{26}Al(n,α) reactions. An experimental determination of these reactions is often challenging as only small amounts of sample material may be available (typically the case for radioactive species), or the reaction product may be hard to distinguish from background signals due to electronic noise or neutron scattering.
I will present techniques for measuring neutron induced reaction cross sections, recent results and their importance to stellar nucleosynthesis. I will also talk about experimental advances and future possibilities for measurements on radioactive nuclei.