The neutron within the deuteron and neutron-induced reactions

Neutron induced reactions are of great relevance for nuclear astrophysics (I.e., r-processes), advanced fuel cycles, stockpile stewardship, and applications of nuclear science. However, it is quite difficult to perform direct measurements of neutron capture by nuclei. Moreover, theoretical models, mostly based on statistical theories often have difficulties reproducing experimental data. An alternative to direct experiments with free neutrons is the use of deuterons as a surrogate to induce neutron capture on a target. In this talk I will discuss benchmark calculations of (d,p) reactions and in particular I will discuss the reactions on 135Xe which has a neutron capture cross section of 6 million barns.

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