
Investigation of neutron-induced reaction at the Goethe University Frankfurt

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Neutron-induced reactions are relevant for many astrophysical scenarios. The involved isotopes can be stable as during the s-process or radioactive as during the p-, i- or r-process. The different scenarios are characterized by different temperatures and neutron densities. Direct measurements of the relevant cross section are therefore ideally performed for many different energies. The most general method is the time-of-flight method, which typically requires large samples of isotopically enriched material, intense neutron sources and sophisticated detectors.

The activation method alleviates many of these costly requirements at the cost of integral measurements. The Van de Graaff accelerator at the Goethe University Frankfurt provides unpulsed proton beams of up to 20 microA in the energy regime between 1.5 and 2.5 MeV. This is ideally suited for the production of neutrons via the ${}^7\text{Li}(p,n)$ reaction. Many different energy spectra can be produced depending on the proton energy, the thickness of the lithium layer and the position of the irradiated sample.

I will present first results and plans for future neutron activation measurements at the Goethe University Frankfurt.