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Inferring neutron capture rates of short-lived isotopes[1]

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Neutron capture reactions on short-lived nuclei play an important role in astrophysical processes such as the rapid neutron capture process. However, these cross sections are difficult to measure in the laboratory. The so-called beta-Oslo technique has been developed for constraining the neutron capture cross sections of short-lived nuclei by combining beta-delayed gamma-ray spectroscopy and the Oslo method to extract nuclear level densities and gamma-ray strength functions. The two quantities are used within the framework of a Hauser-Feshbach model to constrain the neutron capture cross section. The technique will be described and the inferred neutron capture cross sections for a preliminary set of nuclei presented. The experimental reach of the technique at current facilities and eventually at the upcoming Facility for Radioactive Ion Beams (FRIB) as well as the overlap with astrophysical processes will be discussed.

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