

Indirect measurements of neutron-induced cross sections at storage rings

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The synthesis of elements from iron to uranium (heavy elements) that takes place in stars can only be understood through the knowledge of neutron-induced cross sections on very short-lived nuclei. Nevertheless, these measurements can be extremely challenging or even impossible to perform due to radioactivity of the targets involved.

The most promising way to access neutron-induced cross sections is to use surrogate reactions in inverse kinematics, where the nucleus formed in the neutron-induced re-action of interest is produced by the interaction of a radioactive beam and a light target nucleus. The decay probabilities of the excited nucleus induced by the surrogate reaction are very useful to constrain model parameters and predict much more accurately the desired neutron cross sections. Storage rings offer the ideal conditions to perform high-precision decay-probability measurements.

In this contribution we will present the future plans and developments towards performing surrogate-reaction studies in inverse kinematics with radioactive-ion beams at storage rings. Such developments include the study of a new experimental set-up to be placed at the CRYRING storage ring at GSI and the investigations we have carried out regarding using solar cells as heavy ion detectors.