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# Transfer-induced fission at the ISOLDE Solenoidal Spectrometer

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The study of nuclear fission remains a critical area of research, not only for understanding fundamental nuclear properties but also for its implications in the production of heavy elements in astrophysical environments. In r-process nucleosynthesis, fission plays a crucial role as it ultimately limits the mass of nuclei that can be produced. Currently, very limited data on fission barriers of neutron-rich nuclei are available. Moreover, studying fission barriers is essential for investigating the influence of nuclear structure on fission dynamics. The ISOLDE Solenoidal Spectrometer (ISS) offers a new approach to investigate fission probabilities of neutron-rich actinides via (d,pF) reactions using Radioactive Ion Beams. This approach utilises a novel setup designed to enhance the detection efficiency for fission fragments in coincidence with transfer-like protons in a solenoidal field. This optimised method provides access to the fission probability as a function of the excitation energy. Additionally, complementary γ-ray measurements offer insight into the total energy and multiplicity of γ-rays emitted during the fission process. In this context, the measurement of the fission barrier of 233U has been performed, as a first step to establish this new approach. This data might be also relevant for the thorium fuel cycle. In this contribution, the experimental setup will be presented, and preliminary results of the experiment will be discussed, highlighting its potential for advancing our understanding of nuclear fission. Beyond this study, this method has the potential to be extended to investigate even more exotic nuclei farther from the valley of stability, opening new opportunities to explore fission in regions of the nuclear chart that have so far remained experimentally inaccessible.

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