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# Recent β-delayed fission studies at ISOLDE

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In the process of βDF, an excited state populated in β decay close to the top of the fission barrier in the daughter nucleus undergoes fission (in competition with γ-ray or particle emission). The achievable excitation energy is limited by Qβ value of the parent nucleus, which is typically less than ~10 MeV in the lead region, or even less than ~5 MeV in actinides. Therefore, βDF represents the so called low-energy fission, which is sensitive to nuclear structure. It enables investigation of fission properties (such as fission fragment mass distributions, fission barriers, etc.) of isotopes for which other approaches to low-energy fission studies would be extremely difficult or currently impossible [1,2].

There is also a particular interest in βDF in the neutron-rich side of the nuclear chart, since alongside other types of fission, βDF is responsible for termination of r-process nucleosynthesis and for fission recycling, see for example Ref. [3]. This contribution will present our search for βDF in neutron-deficient 178Au [4] and neutron-rich 230,232,234Ac [5] isotopes performed at ISOLDE-CERN. For 178Au, presumed to be located in the new region of asymmetric fission discovered in the vicinity of 180Hg [1,2], we employed selective power of Resonance Ionization Laser Ion Source (RILIS) to study its high-spin and low-spin β-decaying state separately. In the case of actinium isotopes, we measured the whole Fr → Ra → Ac decay chain, thus, obtaining new data also for francium nuclei. No βDF events were observed for isotopes of interest despite collection of high statistics. Therefore, upper limits of βDF probabilities were determined. For 230Ac, where identification of βDF was reported in the past [6], the limit was more than order of magnitude lower than the literature value, thus, questioning the observation of this decay mode. The results will be discussed in the context of experimental systematics of βDF probabilities and partial half-lives, and compared with calculations using TALYS code [7].

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## Type of contribution

Regular Abstract

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