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Measurement of the most exotic beta-delayed neutron emitters at N=50 and N=126[1]

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Beta-delayed neutron (βn)-emission will be the dominant decay mechanism of neutron-rich nuclei and plays an important role in the stellar nucleosynthesis of heavy elements in the "r process". It leads to a detour of the material β-decaying back to stability and the released neutrons increase the neutron-to-seed ratio, and are re-captured during the freeze-out phase and thus influence the final solar r-abundance curve. Thus the neutron branching ratio of very neutron-rich isotopes is a crucial parameter in astrophysical simulations. In addition, β-decay half-lives can be deduced from the time-dependent detection of βn's. I will talk about two recent experimental campaigns. The neutron detector BELEN was used at GSI Darmstadt to measure half-lives and neutron-branching ratios of the heaviest presently accessible βn-emitters at N=126. For isotopes between ^{204}Au and ^{220}Bi nine half-lives and eight neutron-branching ratios were measured for the first time and provide an important input for benchmarking theoretical models in this mass region. Its successor is the BRIKEN detector ("Beta-delayed neutron measurements at RIKEN for nuclear structure, astrophysics, and applications"), the most efficient neutron detector used so far for nuclear structure studies. In conjunction with two clover detectors and the "Advanced Implantation Detector Array" (AIDA) the setup has been used a few months ago to measure the most neutron-rich isotopes around ^{78}Ni, ^{132}Sn, and the Rare Earth Region. Some preliminary results are shown from the campaign covering the ^{78}Ni region where the neutron-branching ratio of ^{78}Ni and $\approx$28 more isotopes were measured for the first time, as well as the half-lives of $\approx$20 isotopes. The BRIKEN campaign aims to (re-)measure almost all βn-emitters between ^{76}Co and ^{167}Eu, many of them for the first time. An extension of the campaign to lighter masses is planned.

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