Recent results of neutron branching ratios for β-delayed neutron emitters

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The study of β-decay properties in the very neutron-rich region is important to improve the understanding of the elemental abundances of heavy elements in the Universe. When the nuclei involved in the decay have a Q_β value larger than the neutron separation energy, β-delayed neutron emission becomes an important decay mechanism in the region. Measurements of neutron-rich nuclei to determine their neutron-branching ratios provide an important input parameter for a better understanding of abundance distribution after the freeze-out back to stability in the *r*-process, and the particularities of the nuclear structure of the involved species.

Since 2009 several experiments have been performed in order to expand the data available regarding the neutron emission probabilities in different regions of the chart of nuclei, with a high efficiency 4Π neutron detector based on 3He counters named BELEN. Measurements at the IGISOL facility in Jyvaskyla, Finland and at the GSI facility in Darmstadt, Germany with BELEN detector provided important insight for the heaviest one- and two-neutron emitters [1,2,3,4], and the current experimental campaign BRIKEN at RIKEN, Japan, aims to determine hundreds of new P_n values, including multiple neutron emission probabilities [5].

This talk will include an introduction of the type of RIB facilities able to produce those neutron rich isotopes of interest, as well as a detailed explanation of the experiments performed so far. The achieved results with the BELEN detector will be discussed and a description of the BRIKEN setup will be presented. The BRIKEN campaign aims to determine the half-life and neutron-branching ratio for almost all of the presently known β-delayed neutron emitters, and approximately 200 new P_{1n} values will be added to the current list of 298 known neutron emitters, as well as ≈60 new β-decay half-lives. In addition, our knowledge of multiple neutron emitters (β2n, β3n, and β4n) will be greatly extended.

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