Contribution ID : **544** Type : **not specified**

Study of beta decay properties for Pr to Nd nuclei (A~160) relevant for the formation of the r-process rare-earth peak

Tuesday, 22 March 2022 10:45 (15)

Abstract

Around half of the nuclei heavier than iron are created via the rapid neutron capture process (r-process). For nuclear masses A>100, there are two main peaks in the r-process elemental solar system abundances, located at A~130 and A~195, which are associated with the neutron shell closure during the (n,γ)⟶(γ,n) equilibrium. In contrast, the rare-earth peak (REP) is a small - but clear - peak around mass A=160, which originates from the freeze-out during the late phases after neutron exhaustion. The formation of the REP offers a unique probe for the study of the late-time conditions on the r-process site. According to theoretical models and sensitivity studies, half-lives (T1/2) and beta-delayed neutron emission probabilities (Pn) of very neutron-rich nuclei for 55< Z<64 are the most influential ones on the formation of the REP [1,2].
The BRIKEN project [3,4], launched in 2016 at the RIBF in the RIKEN Nishina Center, aims to measure beta-decay properties for a large number of nuclei on the path of the r-process. Accordingly, T1/2 and Pn-values for the most influential nuclei to the REP formation from Ba to Eu (A~160) have been measured for the first time with BRIKEN. In this work, the measurements of T1/2 and beta-delayed neutron branching probabilities (P1n) for several Pr and Nd isotopes in the mass region A~160 will be discussed. Preliminary experimental results on P1n-values will be presented for the first time.

References
[1] M. R. Mumpower et al. Phys. Rev. C 85, 045801 (2012).
[2] A. Arcones and G. Martinez Pinedo, Phys. Rev. C 83, 045809 (2011)
[3] J.L. Tain et. al, Acta physica polonica B, 49(03) (2018) 417–428.
[4] A. Tolosa-Delgado and et. al, NIM A 925 (2019) 133 – 147

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Session Classification : Red FNUC (Red Temática de Física Nuclear)

Track Classification : Red Temática de Física Nuclear (FNUC)