

Strong one-neutron emission from two-neutron unbound states in beta decays of r-process nuclei, ^{86}Ga , ^{87}Ga

Tuesday, 26 June 2018 19:00 (1h 30m)

Beta-delayed one- and two-neutron branching ratios (P_{1n} and P_{2n}) are measured in the decay of ^{86}Ga and ^{87}Ga at the RI-beam Factory at RIKEN Nishina Center using a high-efficiency array of ^3He neutron counters (BRIKEN). Two-neutron emission is observed in the decay of ^{87}Ga for the first time. The large P_{1n} value of $^{87,86}\text{Ga}$ compared to P_{2n} is interpreted as a signature of dominating one neutron emission from the two-neutron unbound states in $^{86,87}\text{Ga}$. Combined shell model and Hauser-Feshbach statistical model calculations are performed in order to interpret the experimental results. The shell model predicts $P_{2n} > P_{1n}$ for ^{87}Ga decay and the observed $P_{1n} > P_{2n}$ is explained successfully only by including the statistical model. This result is the first experimental demonstration that statistical model has to be invoked to predict the decay properties of multi-neutron emitters and that it must be included in the r-process modeling.

Primary author: YOKOYAMA, Rin (University of Tennessee)

Co-authors: RASCO, Charlie (Oak Ridge National Laboratory); TAIN, Jose Luis (Instituto de Fisica Corpuscular); RYKACZEWSKI, Krzysztof (Oak Ridge National Laboratory); BREWER, Nathan (Oak Ridge National Laboratory); GRZYWACZ, Robert (University of Tennessee); NISHIMURA, Shunji (RIKEN Nishina Center)

Presenter: YOKOYAMA, Rin (University of Tennessee)

Session Classification: Poster session