Measurement of beta-delayed neutron emission probabilities of very exotic neutron-rich nuclei for nuclear astrophysics

Research Project / Research Group Description:
The main research lines of the Gamma and Neutron Spectroscopy Group at IFIC-Valencia are 1) the study of the beta decay of exotic nuclei by means of gamma spectroscopy and neutron counting, and 2) the measurement of radiative neutron capture cross sections.

The project proposed here deals with the first topic and more specifically aims at the determination of the probability of neutron emission after beta decay using BRIKEN, the largest neutron counter of its type that has been recently installed at the BigRIPS separator of the RIKEN Nishina Center (Japan), currently a unique facility for the production of the most exotic very neutron-rich nuclei.

These measurements would have an impact on the study of the abundance of chemical elements beyond iron produced in the astrophysical r-process (during supernova explosions or neutron star mergers) as well as on the understanding of the structure of these nuclei and the theoretical modeling of their behavior and on the discovery and study of rare multiple neutron emission processes.

Job position description:
The candidate will take part on the setting-up of the neutron detector and the associated ancillary detectors: gamma ray detectors and implantation and beta decay detectors, and data acquisition system. The candidate will participate on the data taking campaigns, within the international collaboration that is driving the BRIKEN project. The candidate will be responsible for the analysis of data taken in these campaigns and the development of the necessary software tools. The candidate role includes the interpretation of the data and together with other specialists will study the impact in r-process calculations and theoretical modeling.

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Research project/Research Group website
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