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Beta-decay spectroscopy of N=82 nuclei and the path of the r-process:

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The shell structure at N = 82 plays a crucial role for the rapid neutron capture (r-) process. For example, it determines the shape of the large A~130 peak in the solar system abundance pattern and affects the timescale of the r-process as well as the amount of neutrons later available for induced fission. However, below Z = 50 the evolution of the N = 82 gap is still unknown and, therefore, the predictions of neutron separation energies, half-lives, and neutron capture cross sections are uncertain making the location and duration of the r-process still an open question.
Clearly, more experimental data are needed to provide r-process calculations and nuclear models with experimental inputs.
To address this problem we have performed a decay-spectroscopy experiment at the Radioactive Ion Beam Factory (RIBF, RIKEN) in the neutron-rich region below 132Sn. The recent beam development of RIBF, along with the installation of the EURICA γ-ray detector have made this region accessible to decay-spectroscopy experiments.
The nuclei of interest were produced by fission of a 345A MeV 238 U primary beam colliding with a 9Be target. Beam purification was provided by the BigRIPS fragment Separator. The fragments of interest were unambiguously identified and their following β decays were recorded by the WAS3ABi silicon stopper in conjunction with the EURICA germanium array. Implantations were correlated with their subsequent decays on an event-by-event basis allowing for the measurement of half-lives, β-delayed γ rays, and γ rays from implanted microsecond isomers. In particular, about 30 new half-lives have been measured, including the r-process waiting point 128Pd.
In this contribution we will present the experiment and the preliminary results of the data analysis.
The astrophysical implications of these results will also be discussed.

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