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Experimental β-decay and β-delayed neutron branching ratios for Se and Br isotopes at N≈60

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The understanding of abundances of elements heavier than iron originating from the r-process nucleosynthesis in neutron star mergers and core collapse supernovae requires experimental information from the involved neutron-rich nuclei from close to the neutron-dripline to the line of stability. The β-delayed neutron emission plays important roles in this process shifting the decay chain to lower masses and increasing the neutron density in the environment. The β-delayed neutron branching ratio and the respective β-decay half-life are also important for improving theoretical models, and to achieve more realistic models of the decay heat in a fission reactor.

In order to provide new experimental data of half-lives and β-delayed neutron branching ratios, since 2016 the BRIKEN campaign based at the RIB facility of RIKEN, Japan, has allowed the measurement of hundreds of nuclei with unknown or incomplete decay information. The use of a fragmentation facility such as RIKEN allows to reach the most neutron-rich exotic nuclei that were not accessible before. The Advanced Implantation Detector Array (AIDA) based on silicon DSSDs was used to register implants and β-decays with high position resolution. Surrounding AIDA, a 4π array of ^{3}He neutron counters embedded in a polyethylene moderator matrix, and two HPGe clovers inserted in this matrix registered the neutrons and γ-ray emitted after nuclei decays in AIDA.

This contribution will report on the results of decay studies around the doubly-magic ^{78}Ni region. The focus of our data analysis are deformed neutron-rich Se and Br isotopes around N=60.

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