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Penning-Trap assisted β-decay studies of 87Br

This work is a continuation of our previous works devoted to studies of neutron-rich nuclei in the "north-east"of the 78Ni core. The main motivation of those studies is understanding structure of this very exotic nuclei. Large excess of neutrons modify shell structure compared to the structure close to stability line. It has been predicted by various calculations that large excess of neutrons affects neutron density resulting in quenching of shell effects. Precise modeling of the shell structure has a direct impact on different scenarios for the astrophysical r-processes occurring probably in type-II supernovae. Excited states in nuclei in this region provide information on single particle energies and development of collectivity just above closed shell.
In our recent work we have proposed single-particle energy for the g9/2 proton orbital, crucial for describing medium-spin levels in the region. It is of high importance to confirm this value, which may be achieved by studying 87Br nuclei. Preliminary results from neutron induced fission indicate the presence of 9/2+ level corresponding to the g9/2 proton orbital. To confirm this result we have measured β-decay of 87Se at IGISOL facility of Accelerator Laboratory of the University of Jyväskylä.
We will present new results from the Penning-trap-assisted measurement of β- decay of the neutron-rich 87Se isotope. Compared to previous β-decay studies in the region, the use of Penning trap allows the reduction of background and removal of isobaric contamination from the data. Excited levels in 87Br were studied by means of γ spectroscopy. Obtained data allowed to significant extension of excited states 87Br, where only few excited levels populated in β-decay of 87Se were known. Results were interpreted with large scale shell-model calculations.

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