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Decay spectroscopy of isotopes above the fermium ($Z > 100$) at SHIP

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The single-particle level structure is essential for the stability and decay properties of the heaviest nuclei. However, the prediction of low-lying single-particle states for heaviest elements remains a very challenging task nowadays (see for example [1 - 3]). Experimental data are scarce in this region and any new data serves as an important anchor for theoretical predictions and a possibility to predict the stabilized regions in the region of superheavy elements. The application of sensitive α -, γ - and conversion-electron (CE) spectroscopy methods allowed us to investigate the structure of very heavy nuclei ($A > 250$).

We performed an extensive program aimed at nuclear structure studies of isotopes above fermium ($Z=100$) using α -CE, α - γ and CE- γ spectroscopy at the velocity filter SHIP in GSI Darmstadt. In these measurements, we obtained enhanced data for many isotopes, which helped us to extend and improve the single-particle level systematics for $N = 149, 151$ and 153 isotones. Besides α -decay spectroscopy, we also performed the very first β -decay studies in this region of nuclide chart.

Our series of measurements at SHIP provided a substantial body of new data. The most recent results for selected isotopes in very heavy element region will be presented and discussed within different theoretical frameworks. In particular, the observation of new single and multi-quasi particle isomers in ^{255}Rf [4, 5] the very first EC-decay data for ^{258}Db and ^{254}Md will be discussed.

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