SPECTROSCOPY OF THE ISOTOPES OF TRANSFERMIUM ELEMENTS IN DUBNA: PRESENT STATUS AND PERSPECTIVES

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Important information on the structure of Super Heavy Elements (SHE) can come from the study of lighter deformed transfermium ($Z \sim 100$–106) elements. The cross-section for the formation of these nuclei is many orders of magnitude higher than for $Z \geq 110$ so that detailed spectroscopy becomes possible.

The opportunity to have high intensity (> 1 pμA) accelerated beams with $A \leq 50$ together with the use of exotic targets provide the possibility to study many aspects of heavy ion induced reactions exploiting new generation of high efficiency, high resolution experimental setups.

In recent years α-, β- and γ- spectroscopy of heavy nuclei at the focal plane of recoil separators ("decay spectroscopy") has been very intensively developed. The mixing of α decay with γ and β decay spectroscopy allows to investigate single particle states behavior as well as the structure of little known elements in the $Z = 100$–104 and $N = 152$–162 region.

In the years 2004–2019 using the GABRIELA (Gamma Alpha Beta Recoil Investigations with the ELectromagnetic Analyser) set-up the experiments aimed to the gamma and electron spectroscopy of the Fm–Db isotopes, formed at the complete fusion reactions with heavy ions ^{22}Ne, ^{48}Ca, ^{50}Ti and ^{54}Cr were performed at FLNR JINR.

At the years 2017–2019 we performed model experiments using method of high resolution alpha spectroscopy and gamma quanta detection to study decay properties of ^{254,255,256,257}Rf in the reactions ^{50}Ti + ^{206,207,208}Pb → ^{256,357,258}Rf*, ^{250,252,254,2565}No in the reactions ^{48}Ca + ^{204,206,208}Pb → ^{252,354,256}No* and ^{256}No in the reaction ^{22}Ne + ^{238}U → ^{260}No*.