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Gamma spectroscopy in the fermium region at SHIP

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Besides the synthesis of new superheavy elements detailed nuclear structure investigations are an important tool helping to reveal information on the location and strength of the next spherical proton and neutron shells above the 208Pb (Z=82, N=126). Of specific interest are well prolate deformed nuclei beyond the deformed neutron shell N=152 and Z=100 (fermium) where levels relevant for an expected shell gap at Z = 114 come close to the Fermi level.
Recent developments of alpha, gamma and conversion electron (CE) spectroscopy techniques opened the door to investigate the structure of heaviest nuclei (A>250). The results of those experiments provide crucial information on the structure of these nuclei and are stringent tests for nuclear models.
At the velocity filter SHIP at GSI Darmstadt we performed an extensive program aimed at nuclear structure studies of trans-fermium isotopes using CE-gamma and alpha-gamma spectroscopy. Besides single particle isomers we observed or investigated in details several K isomers having high spins and excitation energies [1-4].
In this contribution the main results from these measurements will be presented and discussed, in particular those from the gamma-spectroscopy measurements of 253No and 253Md [4]. The contribution will aim also at possibilities and limits of the used detector setup. An example is the gamma-decay spectroscopy of heavier nuclei at the focal plane of the separator, for example K isomers in rutherfordium isotopes, which would require the use of larger germanium arrays.

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