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Investigation of excited states in very heavy elements

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The search for new magic numbers beyond 208Pb, understanding the enhanced stability of superheavy nuclei (SHN) and their existence despite the repulsive Coulomb interaction is an active field of research in both theoretical and experimental nuclear physics. Precise structure studies of quasi-particle excitations in deformed actinide and transactinide nuclei are crucial to this understanding. In the last decades exhaustive investigations have been carried-out on the decay of deformed nuclei in the transfermium region around 254No.
In this contribution, I will first report on the recent results of in-beam spectroscopic studies on the 244Cf (Z=98) nucleus performed at the University of Jyvaskyla using the RITU gas-filled separator, the GREAT spectrometer and the Jurogam germanium array. The ground-state rotational band of the neutron-deficient californium isotope 244Cf was identified for the first time indicating that the nucleus is deformed. The kinematic and dynamic moments of inertia were deduced from the measured gamma-ray transition energies and are compared to theoretical calculations.
I will then present the investigation of the 250No isotope performed at the University of Jyvaskyla using the same set-up. Using fully equipped focal plane detector with digital electronics, we were able to give a definitive answer to the puzzling question concerning the decay path of the isomeric state and the ground state of 250No. Those results will be compared to configuration-constrained PES calculations performed for the 250No and other heavy nuclei.
Finally, I will briefly describe the new focal plane detection set-up SIRIUS that have been built in the framework of Spiral2 coupled with S3 spectrometer. The SIRIUS spectrometer, which has been designed for the identification of fusion-evaporation residue through decay tagging, will provide important information on nuclear deformation, single-particle properties.

Primary author: Dr SULIGNANO, barbara (barbara)

Presenter: Dr SULIGNANO, barbara (barbara)

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