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Isotopic fission fragments yields in the Thorium region produced in inverse-kinematics with a 232Th beam.

A general description of the fission mechanism considers both microscopical quantities, such as nuclear structure of the fission fragments, and macroscopic effects, like the Coulomb repulsion between the nuclei. The interplay between both quantities prevents, so far, from a fully microscopical description of the interaction. Despite the development of different theoretical models [1] and simulation codes based on experimental data, such as GEF [2], the fission process is not reproduced with enough accuracy along the nuclear chart. A large set of experimental data is needed in order to constrain the models.

Using the inverse-kinematics technique and multi-nucleon transfer reactions, the fission process is studied at GANIL with the VAMOS++ spectrometer [3]. This enables the isotopic identification of complete fission fragment distributions [4]. Moreover, the coupling of this spectrometer to a highly stripped silicon detector (PISTA) allows the identification of the fissioning system and the reconstruction of its excitation energy with high resolution.

A new experiment was conducted at VAMOS++ with the newly accelerated ^{232}Th beam at Coulomb energies. Transfer reactions performed with a ^{12}C target permitted to populate fissioning systems from ^{230}Th up to ^{244}Cm. The produced nuclei lay on a region closer to the known transition between asymmetric to symmetric fission in the actinides [5]. This allows the systematic study of the shell-closure effects occurring for different deformation parameters, like octupolar deformation, recently proposed to be responsible for the asymmetric fission in the actinides region [6]. Moreover, experimental results show that the isotopic distributions around Th isotopes deviate from the general actinide behaviour [7].

The experimental setup included the VAMOS++ spectrometer, which was composed of a pair of magnetic quadrupoles and a dipole, and a set of Multi-Wire Proportional Counters (MWPCs) before and after the optical modules. An Ionization Chamber (IC) was also positioned at the end of the focal plane. Moreover, around the target position, PISTA detector was located, as well as another MWPC placed at 40° with respect to the VAMOS axis. This detector was included for the simultaneous measurement of the velocity of both fission fragments on an event by event basis. In this work, the isotopic and mass fission fragment yields will be presented as a function of the excitation energy of the fissioning system. On top of this, neutron excess of the fragments will be shown, as well as some correlations between both fission fragments.

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