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Fragmentation-induced fission reactions of 236U in inverse kinematics to investigate the pre-fragment angular momentum parameterizations

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In the last decade, unprecedented fission experiments have been carried out at the GSI facility using the inverse kinematics technique in combination with state-of-the art detectors, especially designed to measure the fission products with high detection efficiency and acceptance [1,2]. For the first time in the long-standing history of fission, it was possible to simultaneously measure and identify both fission fragments in mass and atomic numbers and obtain many correlations among them sensitive to the fission dynamics [1,3] and the nuclear structure at the scission point [4,5]. In this talk I will show the results obtained during the 2014 experimental campaign at GSI, in which fragmentation reactions were used to induce fission on 236U at kinetic energies around 700A MeV. The yields of the fissioning systems and the widths of the fission fragment charge distributions will be used to investigate the effects introduced by the angular momentum gained by the pre-fragment or compound nucleus. Our findings indicate that the current parameterizations used to calculate the angular momentum gained by the pre-fragment after the abrasion process [6] would work for the description of fragmentation nuclear residues, but underestimate the angular momentum for fission reactions. Therefore, those parameterizations will need to be improved in future theoretical developments.

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Primary author: RODRIGUEZ SANCHEZ, Jose Luis (University of Santiago de Compostela)

Presenter: RODRIGUEZ SANCHEZ, Jose Luis (University of Santiago de Compostela)

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