Mass measurement of neutron-rich nuclei using Experimental Storage Ring (ESR)

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Precision mass and half-lifetime measurements of exotic nuclei have always been crucial for understanding nuclear structure properties of bound nuclei. Storage ring mass spectrometry [1, 2] is one of the direct methods by means of which the masses and half-lifetimes of very exotic nuclei can be measured. The combination of FRagment Separator (FRS) and Experimental Storage Ring (ESR) at GSI Helmholtz Centre for Heavy Ion Physics, Darmstadt has been employed for past few decades for the purpose of mass measurements of exotic nuclei on both, neutron-rich and neutron-deficient sides of the nuclear chart.

With the motivation for the better understanding of the properties of short-lived exotic nuclei, an Isochronous Mass Spectrometry (IMS) experiment was performed using a 410-415 MeV/u ^{238}U projectile beam at GSI, Darmstadt by M. Matos et al. [3] in 2002. Many neutron rich nuclides were produced via abrasion-fission of the projectile beam with isochronous settings on $^{130,133,135}Sn^{50+}$ isotopes. However, except for the PhD thesis [3], the results of the experiment remained unpublished. We reanalyse the data by using improved analysis procedures developed at Institute of Modern Physics (IMP), Lanzhou. In this poster, we discuss some new and improved results from the revised data analysis of the above mentioned experiment.

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[1] B. Franzke et al., Mass Spectrom. Rev. **27**, 428 (2008).

[2] Yu. A. Litvinov et al., Nucl. Phys. A **756**, 3 (2005).

[3] M. Matos, New mass measurements of short-lived neutron rich ^{238}U fission fragments at the FRS-ESR facilities. Ph. D. Thesis, Justus Liebig University Giessen, 2004.