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Experimental study of multinucleon transfer reactions in the interaction of heavy ions with ^{238}U

Nowadays multinucleon transfer reactions (MNT) are considered as an alternative approach to produce and investigate of new nuclei, including far from the line of stability. The formation of new neutron-rich nuclei in the region of heavy and superheavy nuclei is of particular interest. The use of uranium as a target in the reactions with heavy ions is one of available methods for the production of such superheavy nuclei in MNT reactions.

In Flerov Laboratory of Nuclear Reactions of Joint Institute for Nuclear Research at modified Time-of-Flight (ToF) spectrometer CORSET [1] MNT reactions were experimentally investigated in collisions of heavy ions such as ^{136}Xe [2] and ^{209}Bi with ^{238}U at the incident energy ≈ 8 MeV / nucleon. Due to correlated measurements using ToF-ToF and ToF-E methods, mass and energy distributions of primary and secondary binary MNT fragments have been obtained in a selected angular range. Together with binary reaction products 3-body events have been registered, which originated from sequential fission of heavy excited MNT fragment. The analysis of such events allowed to restore primary mass distributions of fissioning heavy MNT fragments with masses up to $A = 279$. The obtained experimental results will be presented.

References:

- [1] E. M. Kozulin et al., Instrum. Exp. Tech. 51, 44 (2008).
- [2] E. M. Kozulin et al., Phys. Rev. C 109, 034616 (2024).

Notes

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