Contribution ID: **212** Type: **not specified**

EXPERIMENTAL STUDY OF BINARY PROCESSES IN THE ^{36}Ar+^{144}Sm, ^{56}Fe+^{124}Xe, ^{68}Zn+^{112}Sn, AND ^{90}Zr+^{90}Zr REACTIONS LEADING TO THE FORMATION OF ^{180}Hg

To study the impact of entrance channel properties on the dynamics of reactions leading to the formation of the same ^{180}Hg composite system, the mass and energy distributions of binary fragments formed in the ^{36}Ar+^{144}Sm, ^{56}Fe+^{124}Xe, ^{68}Zn+^{112}Sn, and ^{90}Zr+^{90}Zr, reactions were measured at energies close to and above the Coulomb barrier using the CORSET spectrometer [1].

The comparative analysis of the reactions under study was performed at similar excitation energies and mean angular momenta. It was found that the mass and energy distributions of fragments obtained in the ^{36}Ar+^{144}Sm reaction, where fusion-fission is the dominating process, differ significantly from the ones for the ^{56}Fe-, ^{68}Zn- and ^{90}Zr-induced reactions [2]. It can be explained by the large contribution of quasifission process for the latter reactions (more than 70% and 80% of all fissionlike fragments for ^{68}Zn and ^{90}Zr, respectively).

The shape of the quasifission fragments mass distributions in the reactions leading to the ^{180}Hg composite system depends on the reaction entrance channel properties, and the fragments are formed in the vicinity of the closed neutron and/or proton shells nearest to the neutron and proton numbers of interacting nuclei.

[1] E.M. Kozulin et al., Instrum. Exp. Tech. 51, 44 (2008).

[2] E.M. Kozulin et al., Phys. Lett. B 819, 136442 (2021).

Section

Nuclear physics (Section 1)

Primary author: Dr ITKIS, Yulia (Flerov Laboratory of Nuclear Reactions, Joint Institute for Nuclear Research)

Co-authors: BOGACHEV, Alexey (Flerov Laboratory of Nuclear Reactions, Joint Institute for Nuclear Research); KOZULIN, Eduard (Flerov Laboratory of Nuclear Reactions, Joint Institute for Nuclear Research); KNYAZHEVA, Galina (Flerov Laboratory of Nuclear Reactions, Joint Institute for Nuclear Research)

Presenter: Dr ITKIS, Yulia (Flerov Laboratory of Nuclear Reactions, Joint Institute for Nuclear Research)

Track Classification: The V International Scientific Forum "Nuclear Science and Technologies": Nuclear physics (Section 1)