ROLE OF ENTRANCE CHANNEL ANGULAR MOMENTUM ON THE MASS-ENERGY DISTRIBUTIONS OF ^{224}Th

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In heavy-ion induced reactions, the interaction mechanism is primarily governed by the projectile beam energy and angular momentum (L) of the composite system. The angular momentum brought in by the projectile have significant influence on the fission barriers [1-3]. The effects of L on fission have been less investigated due to the difficulty of producing the same compound nucleus (CN) via different projectile-target combinations [4]. Therefore, an attempt has been made to produce a fissioning nucleus through different entrance channels at similar excitation energies in order to investigate the role of entrance channel angular momentum.

The experiments were performed at the Flerov Laboratory of Nuclear Reactions (FLNR), JINR, Russia, using energetic beams of ^{16}O and ^{48}Ca delivered from the U400 cyclotron. The thin targets of ^{208}Pb and ^{176}Yb were bombarded with the ^{16}O and ^{48}Ca beams, respectively at different energies above the Coulomb barrier to produce the fissioning nucleus, ^{224}Th. The measurements of the reaction binary products were carried out by utilizing the double-arm time-of-flight (TOF) spectrometer CORSET [5]. Assuming the conservation of mass of the composite system of projectile and target, the double-velocity method was employed to determine the mass and energy of the reaction products.

The reactions, ^{16}O + ^{208}Pb and ^{48}Ca + ^{176}Yb, lead to the formation of the same composite system, ^{224}Th above the Coulomb barrier. The Mass-Total Kinetic Energy (M-TKE) distributions of the primary binary fragments from ^{224}Th has been obtained from the present measurement. The latter reaction is subject to significant influence of quasifission reaction mechanism in addition to fusion-fission process. Subsequently, the events corresponding to fusion-fission process only were selected on the measured M-TKE distribution profiles to investigate the role of angular momentum on the fission reaction mechanism. Detailed multimodal analysis has been carried out on the experimental mass and energy distributions of the fission fragments.

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