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Estimation of longitudinal momentum distributions of exotic nuclei in the fragmentation reaction from 10 to 50 MeV/nucleon

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The current level of development of experimental facilities makes it possible to conduct studies of both relatively long-lived nuclei forming the valley of stability and exotic nuclei lying outside this region. The production of exotic nuclei is a rather difficult task, one of the solutions of which was the using radioactive isotopes beams accelerated to energies above the Coulomb interaction barrier in the experiments.

To obtain beams of radioactive isotopes, the In-Flight method, in which radioactive isotopes are obtained in fragmentation reactions is currently widely used. Beams of radioactive isotopes are formed using fragment separators. The efficiency of the fragment separator depends on the relative yield and momentum distributions of radioactive isotopes. In this regard, predictive calculations of these characteristics are of particular importance. Despite the fact that the yields and momentum distributions of radioactive isotopes in fragmentation reactions have become the subject of systematic studies for high and medium energies (more than 100 MeV per nucleon), In-Flight complexes for the production of radioactive beams work not only at high, but also at low energies. However, there are no detailed studies of fragmentation reactions for low energies (from 10 MeV per nucleon). Thus, it is important to investigate both the fragmentation mechanism itself and its features at low energies, and it is also important to develop a method for evaluating various characteristics of fragmentation products.

In this work the primary results of estimating the longitudinal momentum distributions of fragmentation reaction products in the energy range from 10 to 50 MeV/nucleon are presented.

Primary author(s) : ISMAILOVA, Arailym (Al-Farabi Kazakh National University); Mr. DANIYAR, Janseitov (Institute of Nuclear Physics, Almaty, Kazakhstan)

Presenter(s) : ISMAILOVA, Arailym (Al-Farabi Kazakh National University)

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