Fragmentation reaction studies of high-spin isomeric states

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Abstract

The population of high-spin isomeric states in neutron-deficient N$\sim$126 nuclei has been studied in order to further understand the reaction mechanism of projectile fragmentation. The nuclei of interest were produced in the fragmentation of a 1 GeV/u ^{238}U beam impinging on a ^{9}Be target. The reaction products were selected and separated in the FRagment Separator [1] and brought to rest in a passive stopper placed at the focus of the RISING gamma-ray detector array. The intensities of the gamma-rays emitted in the decay of the isomeric states were measured and used to obtain the corresponding isomeric ratios. Such ratios provide information on the probability of nuclei produced in a reaction in a given state, and will be of great interest for the production of radioactive beams in an isomeric state in present and future nuclear physics facilities.

These data will be used to test the predictions of theories of peripheral fragmentation, such as the abrasion-ablation model. The experimental isomeric ratios will be compared with those predicted by the ABRABLA code [2,3], which assumes that only the abrasion stage contributes to the angular momentum population. There also exists the possibility of testing a more recent model [4], in which both the abrasion and ablation stages of the reaction are considered to contribute to the angular momentum.

References:

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