

EXPERIMENTAL STUDY OF RELATIVE PROBABILITY OF HIGH-SPIN ISOMERIC STATES POPULATION IN (α, n) -REACTIONS

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Activation techniques for studying nuclear reactions producing high-spin isomeric states are discussed. It is demonstrated that some specific properties of a beam of low-energy alpha particles that make this beam especially interesting for obtaining and studying these states.

Results of the investigations of the yield of high-spin and low-spin isomers in reactions $^{41}\text{K}(\alpha, n)^{44}\text{Sc}$, $^{86}\text{Sr}(\alpha, n)^{89}\text{Zr}$, $^{112}\text{Sn}(\alpha, n)^{115}\text{Te}$, $^{134}\text{Ba}(\alpha, n)^{137}\text{Ce}$ in the energy range of the alpha particles 15–31 MeV based on off-beam measurements of induced activity of members of the isomeric pair are presented as examples of such unique features. The anomalous behavior of the isomeric cross-section ratio (the presence of a pronounced maximum) for the first of these reactions is confirmed. Uniquely large isomeric cross-section ratios for the second and third ones are obtained. The features of the fourth reaction turned out to be promising for its application in fundamental research. Indeed, this reaction at an energy of 23–25 MeV provides the possibility of obtaining, using the secondary acceleration in the frame of the SPIRAL ISOLDE scheme of its products, the purest beams of high-spin isomeric nuclei.

Section

Experimental and theoretical studies of nuclear reactions

Primary author: Dr T. V. CHUVILSKAYA (Skobeltsyn Institute of Nuclear Physics, Lomonosov Moscow State University)

Presenter: Dr T. V. CHUVILSKAYA (Skobeltsyn Institute of Nuclear Physics, Lomonosov Moscow State University)

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