

Abstract Submitted
for the DNP10 Meeting of
The American Physical Society

High-Spin Isomeric States in Nuclear Reactions Induced by He Isotopes TATJANA CHUVILSKAYA, ALLA SHIROKOVA — The high-spin states production in nuclear reactions is reviewed. The analysis of various experiments, our estimates and calculations reveal that in different compound nucleus energy regions maximal relative yield of high-spin states can be realized by different projectiles: at low energies – by neutrons, in $\sim 20 - 50$ MeV region – by α -particles, at higher energies – by heavy ions. It was predicted [1] that there are energy ranges in which neutron-rich radioactive ions (${}^{6,8}\text{He}$, for example) are favorable. σ_m/σ_g (the ratio between the yields of high-spin J_m and low-spin J_g metastable states of a nucleus in one and the same reaction) e.g. the isomeric cross-section ratio is a very good indicator of high-spin states production capability of a nuclear reaction. These experiments demonstrate that maximal values of isomeric cross-section ratios (up to 30) are obtained in α -particle induced reactions. Experiment with ${}^6\text{He}$ beam [2] confirms the predictions of the work [1] concerning the prospects of neutron-rich radioactive-ion beams in high-spin states population. The results of calculations of the isomeric cross section ratios using the code EMPIRE-II-18 approach to statistical theory of nuclear reactions demonstrate rather good agreement with the experimental data. Due to that these prediction power of these calculation is confirmed. The results of widespread calculations of the isomeric cross-section ratios of the reactions with ${}^{6,8}\text{He}$ are presented. [1] T.V.Chvilskaya et al., AIP-Conference Proceedings ENAM-98 1998. V. 455. P. 482. [2] P.A.DeYoung et al., Phys.Rev.C. 2000. V. 62. P.047601.

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Date submitted: 02 Jul 2010

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