

POSSIBILITIES OF PHOTONUCLEAR EXPERIMENTS AT $E_\gamma = (1-4)$ MeV ON COLLIMATED γ -SOURCES FROM COMPTON BACKWARD-SCATTERING

Tuesday 2 July 2024 15:00 (20 minutes)

The possibilities of photonuclear experiments at $E_\gamma = (1-4)$ MeV on collimated gamma-sources from Compton backward-scattering of laser radiation on beams of accelerated electrons are considered. The following items are discussed: operation parameters of such gamma-sources; monitoring of their gamma-beams; types of possible photonuclear experiments, including nuclear resonance fluorescence ones (see, e.g., [1]), total absorption ones using transmission method (see, e.g., [2]), and especially experiments on inelastic scattering of gamma-quanta with population of metastable states of nuclei. As an example, for the last case, there are considered cross-sections of the reaction $^{115g}\text{In}(\gamma, \gamma')^{115m}\text{In}$ ($E_{exc} = 336$ keV; $T_{1/2} = 4.486$ h) in dependence on E_γ obtained: a – in [3]; b – in [4] (see fig. 1).

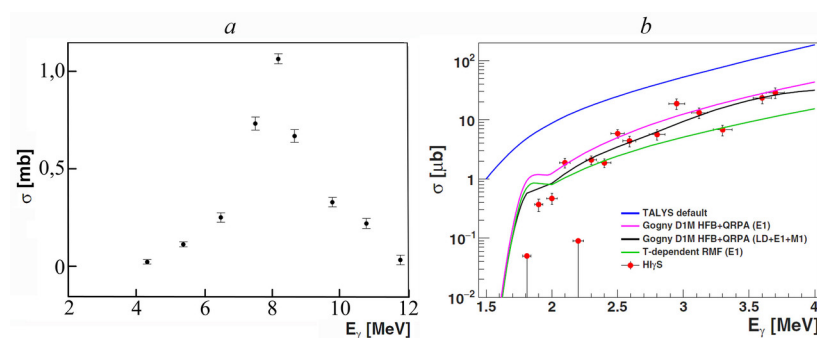


Figure 1: Fig. 1. Cross-sections of the reaction $^{115g}\text{In}(\gamma, \gamma')^{115m}\text{In}$ ($E_{exc} = 336$ keV; $T_{1/2} = 4.486$ h) in dependence on E_γ obtained: a – in [3]; b – in [4]

1. S.R.Johnson et al. // Phys. Rev. C. 2023. Vol. 108, 024315.
2. B.S.Dolbilkin et al. // Nucl. Phys. 1965. Vol. 72. P. 137.
3. L.Z.Dzhilavyan. // Phys. Atomic Nuclei. 2015, Vol. 78, P. 624.
4. W.Tornow et al. // Phys. Rev. C. 2018. Vol. 98, 064305.

Section

Experimental and theoretical studies of nuclear reactions

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Session Classification: Experimental and theoretical studies of nuclear reactions