

The possibility of applying unfolding techniques to photo-nuclear reactions

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Unfolding numerical techniques are developed primary for use in neutron induced reactions. In this work two possible applications of standard unfolding procedures are demonstrated: for determination of cross section for photon-induced nuclear reaction, as well as for determination of energy spectra of incident photons. Cross-section function for the $^{115}\text{In}(\gamma,\gamma')^{115\text{m}}\text{In}$ reaction was determined in the energy range up to 10 MeV using the bremsstrahlung beam of MT25 Microtron, JINR, Dubna. The obtained results were compared with TALYS 1.9 calculation and published experimental data. Preliminary photo-activation data of ^{209}Bi exposed by bremsstrahlung during commissioning of LINAC200 Laboratory of Nuclear Problems, JINR, Dubna were used to reconstruct energy spectra of used photon beams. Four different energies were used: 40 MeV, 60 MeV, 80 meV and 100 MeV. Reconstructed photon spectra were compared with Monte-Carlo simulation of bremsstrahlung spectra of thick target. Obtained results suggests that the application of unfolding technique opens possibility to acquire unknown excitation functions of photon-induced reactions and can provide reliable information about photon spectra as well.