

Fundamentals and progress of theoretical models for the evaluation of photonuclear reaction data in CNDC

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Abstract:

The photonuclear reaction cross section is important for energy security and medical applications, as well as for nuclear and astrophysics. Firstly, by investigating the widely used methods for calculating photon absorption cross sections in the international arena and taking into account our progress in photon absorption cross section. We decided to use a simplified version of the modified Lorentzian model (SMLO) and the microscopic relativistic quasiparticle random phase approximation (RQRPA) method to calculate photon absorption cross sections. Secondly, to calculate the sub-photon neutron emission cross section, we adopt the MEND-G photonuclear reaction program which has been jointly developed by the China Nuclear Data Centre and Nankai University. By taking the photon absorption cross sections calculated by the SMLO and RQRPA methods as input quantities. Then, the optical model parameters and the corresponding energy level density and pair correction parameters of the reaction channel are adjusted using the automatic parameter tuning procedure.