A New Proposal to the High-Intensity Gamma-Ray Source (HIγS) PAC-09

Measurement of the Two-Body Photodisintegration Cross Sections of $^4\text{He}$ between 22 and 30 MeV

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Abstract

We propose to measure the two-body photodisintegration cross sections of $^4$He in the incident photon-energy range between 22 and 30 MeV in 1 MeV steps. High-pressure $^4$He/Xe gas scintillators will be used as target and detector. A NaI detector in combination with the HI$\gamma$S scintillator paddle arrangement will provide the absolute photon flux determination. Our goal is to obtain absolute cross-section data with 10% uncertainty. As a by-product we will try to simultaneously measure the two-body photodisintegration cross-section data of $^3$He by placing a high-pressure $^3$He/Xe gas scintillator downstream of the $^4$He/Xe gas scintillator.