Cross-section Measurements of the ^{94}Mo(γ,n) and ^{90}Zr(γ,n) Reactions Using Real Photons at the HIγS Facility

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The photodisintegration reaction cross-sections for ^{94}Mo(,n) and ^{90}Zr(,n) have been experimentally investigated with quasi-monochromatic photon beams at the High Intensity γ-Ray Source (HIγS) facility, Triangle University Nuclear Laboratory (TUNL). The measurements were focused primarily on studying the energy dependence of the photoneutron cross sections, which is the most direct way of testing statistical models, and were performed close to the respective neutron thresholds and above up to about 14 MeV. Neutrons from the (γ,n) reactions were detected using a 4π assembly of ^{3}He proportional counters developed at Los Alamos National Laboratory, presently available at TUNL. The ^{94}Mo(γ,n) and ^{90}Zr(γ,n) cross section measurements aim to contribute to a broader investigation for understanding the p-process, the mechanism responsible for the nucleosynthesis of p-nuclei. Our results help to constrain QRPA calculations of γ-ray strength functions in this mass region and show how sensitive the photoneutron rates of astrophysical interest can be to experimental data in the vicinity of the neutron threshold.