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Measurements of Prompt Neutron Emission from Photofission of ^{235}U , ^{238}U , and ^{239}Pu

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Photon-induced fission provides a mechanism for studying fission stimulated via the theoretically well understood electromagnetic interaction. The lack of hadronic processes in the entrance channel limit the angular momentum transferred to the excited nucleus prior to fission to typically 1 unit, i.e. either an electric or magnetic dipole excitation. We have performed extensive double differential (in neutron kinetic energy and angle) measurements of prompt neutrons emitted from photofission of ^{235}U , ^{238}U , and ^{239}Pu .

The nearly monoenergetic incident photon beam was produced by the High Intensity Gamma-ray Source (HIGS) from 5.0 to 13.5 MeV at the Triangle Universities Nuclear Laboratory (TUNL). Measurements from 5-10 MeV used thick targets to obtain sufficient luminosity, and fission neutrons were distinguished from photoneutrons by fits to the neutron energy spectra as measured by time-of-flight. Measurements above 10 MeV used multiple active targets to tag fission fragments and form timing coincidences to isolate neutrons produced by fission. In this presentation a brief review of past photofission measurements will be given, the experiment will be described, and our results will be discussed.

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