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Sub-barrier Photofission and Beam Diagnostics at HI γ S

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The High Intensity γ -ray Source (HI γ S) located at the Triangle Universities Nuclear Laboratory produces quasi-monoenergetic, 100% polarized γ -ray beams in the energy range of 2 to 100 MeV suitable for wide variety of experimental investigations in areas such as nuclear astrophysics, nuclear structure, few body physics and hadronic parity violation. Earlier this year an experiment was performed to measure sub-barrier photofission of ^{232}Th and ^{238}U with linearly polarized γ -ray beams. By detecting prompt fission neutrons, the neutron multiplicities, neutron angular distributions and photofission cross sections can be determined. A crucial part of any experiment at HI γ S is a thorough characterization of the γ -ray beam. This presentation will describe a typical experiment at HI γ S from the perspective of a graduate student user. The discussion will cover various systems available to experimenters for monitoring the flux, energy resolution and alignment of the γ -ray beam. Additionally a recent upgrade to one of the neutron detectors, a high efficiency $\sim 4\pi$ array of ^3He proportional counters, will be discussed.