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Surrogate Reaction Measurement of Angular Dependent ^{239}Pu(n, f) Probabilities JOHNATHON KOGLIN, JASON BURKE, ROBERT CASPERSON, Lawrence Livermore National Laboratory, IGOR JOVANOVIC, Penn State University — The surrogate method has previously been used to measure (n, f) cross sections of difficult to produce actinide isotopes. These measurements have inaccuracies at excitation energies below 1.5 MeV where the distribution of angular momentum states populated in the compound nucleus created by neutron absorption significantly differs from that arising from direct reactions. A method to measure the fission probability of individual angular momentum states arising from ^{239}Pu(d, pf) and ^{239}Pu$(\alpha, \alpha' f)$ reactions has been developed. This experimental apparatus consists of charged particle detectors with 40 keV FWHM resolution at 13 angles up and downstream of the particle beam. A segmented array of photovoltaic (solar) cells is used to measure the angular distribution of fission fragments. This distribution uniquely identifies the populated angular momentum states. These are fit to expected distributions to determine the contribution of each state. The charged particle and fission rates matrix obtained from this analysis determines fission probabilities of specific angular momentum states in the transition nucleus. Development of this scheme and first results will be discussed.

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