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Measurements of Internal Conversion Electron Emission Cross-Sections for 154, 156, 157Gd MARCUS LOWE, Univ of Wisconsin, LaCrosse, ANI APRAHAMIAN, WANPENG TAN, Univ. of Notre Dame, SHELLY LESHER, Univ of Wisconsin, LaCrosse, SABRINA STRAUSS, ARMEN GYURJINYAN, ANDRE BERMUDEZ-PEREZ, Univ. of Notre Dame — To study the nuclear structure of deformed nuclei, in particular, 0+ excited states in several gadolinium isotopes, we plan to perform (α, n) and (α, 2n) reactions on enriched samarium targets utilizing coincidence and time of flight techniques to measure conversion electrons, gamma rays and neutrons. As a preliminary experiment, natural samarium targets were used. Alpha particles, 16-21 MeV in energy, were incident upon a series of four natural samarium targets with the primary aims to measure cross sections of the selective (α, n/2n) channels and test the targets. Data were collected via an Internal Conversion Electron Ball array (ICEBall) containing six Si(Li) detectors and accompanying neutron and gamma-ray counters. Spectra were observed in ICEBall from electrons emitted from a range of reaction channels both in ground state and excited states of gadolinium. The focus was set on (α, n/2n) channels that were more easily observed and identified with conversion electron peaks emitted from gadolinium-154, 156 and 157. We will present the results on conversion electron emission cross-sections as well as neutron and gamma fluxes and compare with TALYS calculations. These data give insight for performing future experiments that will use enriched targets so as to allow optimum beam energy for particular reaction channels while maintaining a neutron flux that is non-destructive for HPGe detectors.

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