

Abstract Submitted
for the DNP13 Meeting of
The American Physical Society

Exploring the Collective Properties of ^{160}Gd using the $(n, n'\gamma)$ reaction¹ ZACHARY TULLY, SHELLY LESHER, IAN MARSH, University of Wisconsin-La Crosse, BEN CRIDER, ERIN PETERS, FRANCISCO ESTEVEZ, STEVEN YATES, University of Kentucky, CLARK CASARELLA, MALLORY SMITH, ANI APRAHAMIAN, University of Notre Dame, J.R. VANHOY, United States Naval Academy — We have examined ^{160}Gd using the $(n, n'\gamma)$ inelastic scattering reaction to determine the collective nature of 0^+ excitations. Low-lying 0^+ excitations in deformed nuclei can be associated with quadrupole vibrations such as γ and β vibration. The γ -vibration occurs along the semi-major axis of the spheroidal nucleus and its decay scheme is well categorized. However the β -vibrational (quadruple major axis vibration) decays are undetermined. Because of this uncertainty, more knowledge of the collective 0^+ excitations is needed. Using the $(n, n'\gamma)$ reaction as a γ -ray spectroscopy method, we probed the nucleus in two experiments at the University of Kentucky using the 7MeV Van de Graff accelerator. The first experiment was an excitation function with energies of 1.5-2.8 MeV and the second being three angular distributions with neutron energies of 1.5, 2.0 and 2.8 MeV. The excitation functions allow us to confirm and categorize the overall level scheme and by using this information, the angular distributions will be used to obtain B(E2) values and lifetimes of the levels.

¹This project was funded by NSF grants PHY-1205412 and PHY-0822648.

Zachary Tully
University of Wisconsin-La Crosse

Date submitted: 30 Jul 2013

Electronic form version 1.4