Abstract Submitted
for the DNP12 Meeting of
The American Physical Society

Nuclear Structure Studies of ^{76}Se and ^{76}Ge with the $(n, n'\gamma)$ Reaction[1] B.P. CRIDER, A. CHAKRABORTY, A. KUMAR, E.E. PETERS, F.M. PRADOS-ESTÉVEZ, M.T. MCELLISTREM, S.W. YATES, University of Kentucky, Lexington, KY 40506 — Experimental confirmation of neutrinoless double-beta decay ($0\nu\beta\beta$) would provide evidence of physics beyond the standard model by identifying the neutrino as its own anti-particle, *i.e.*, a Majorana particle. Furthermore, such a confirmation would yield the absolute mass scale of neutrinos, provided that the nuclear matrix elements involved in the caculation are understood to a high degree of accuracy. A favorite candidate in the search for $0\nu\beta\beta$ is the decay of ^{76}Ge to ^{76}Se, since ^{76}Ge can act as a source of the decay as well as a high-resolution detector for the resultant events. In order to increase our knowledge of the structural properties of these nuclei, excitation function and γ-ray angular distribution measurements utilizing the ^{76}Ge$(n, n'\gamma)$ and ^{76}Se$(n, n'\gamma)$ reactions were performed at the University of Kentucky at neutron energies ranging from 2.0 MeV to 4.0 MeV. These measurements yield information on level spins and parities, level lifetimes, transition multipolarities, and transition probabilites. These results will be discussed in the context of structural features such as mixed-symmetry states and shape coexistence.

[1]This work is supported by the U.S. National Science Foundation under grant no. PHY-0956310.

Benjamin Crider
University of Kentucky

Date submitted: 30 Jun 2012 Electronic form version 1.4