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Level lifetimes determined with the DSAM after fast neutron scattering and relevance to neutrinoless double-beta decay[1] S.W. YATES, S. MUKHOPADHYAY, E.E. PETERS, A.P.D. RAMIREZ, University of Kentucky Depts. of Chemistry and Physics & Astronomy, B.P. CRIDER, Mississippi State University Dept. of Physics & Astronomy — Neutrinoless double-β decay ($0\nu\beta\beta$) has not been observed but is being sought in several large-scale experiments. The nuclear matrix elements for $0\nu\beta\beta$ cannot be determined experimentally and must be calculated from nuclear structure models. Our recent measurements have focused on providing detailed nuclear structure data to guide these model calculations. At the University of Kentucky Accelerator Laboratory (UKAL), we have performed spectroscopic studies with the (n,n$'\gamma$) reaction on ^{76}Ge, which is widely regarded as one of the best candidates for the observation of $0\nu\beta\beta$, and ^{76}Se, its double-β decay daughter. While ^{76}Ge can be well understood from shell model calculations,^{76}Se cannot. To better characterize this transitional region of triaxiality, studies of the lighter stable Ge nuclei, such as ^{74}Ge, have been initiated. From these measurements, new excited states were identified, level lifetimes were measured with the Doppler-shift attenuation method, multipole mixing ratios were established, and transition probabilities were determined. In the case of ^{74}Ge, a great deal of information is now available, and shell model calculations explain the low-lying, low-spin structure very well.

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