Abstract Submitted
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Nuclear structure of 76Se from inelastic neutron scattering measurements[1] SHARMISTHA MUKHOPADHYAY, Department of Chemistry Physics Astronomy, University of Kentucky, Lexington, KY — The low-lying, low-spin levels of ^{76}Se were studied with the (n,n$'\gamma$) reaction. Gamma-ray excitation function measurements were performed at incident neutron energies from 2.0 to 3.5 MeV, and γ-ray angular distributions were measured at neutron energies of 2.4, 3.0 and 3.7 MeV. From these measurements, level spins, level lifetimes, γ-ray intensities, and multipole mixing ratios were determined. Interpreting the nuclear structure of the stable Se nuclei is challenging, with shape transitions, shape coexistence, and triaxiality in evidence. The low-lying structure of ^{76}Se appears to be the most vibrational of the Se isotopes, with a two-phonon (0^+, 2^+, 4^+) triplet of collective states. In addition to these clearly collective excitations, we have identified and characterized a $4^+ \rightarrow 2^+ \rightarrow 0^+$ cascade of two $E2$ transitions built on the first excited 0^+ state at 1122 keV. The picture for ^{76}Se thus differs from ^{72}Se and ^{74}Se, and indicates that the configuration mixing of this coexisting band is less than exhibited in the other Se nuclei. Comparison of the low-lying level schemes of ^{76}Ge and ^{76}Se, the double-beta decay daughter, shows a marked difference.

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