UNIVERSITY OF NOTRE DAME
DEPARTMENT OF PHYSICS

NUCLEAR SEMINAR

Monday, October 10

Multiphonon Configurations and Lifetime Measurements in ^{162}Dy

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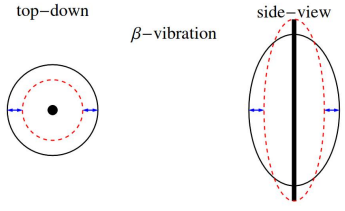
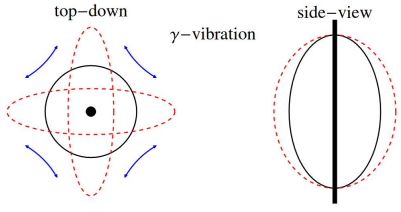
One of the many paradigms of nuclear structure involves the coupling of dynamic quadrupole, octupole & hexadecapole vibrations superimposed to a well-deformed ground state. Historically, the nature and feasability of collective vibrational degrees of freedom in deformed nuclei have garnered significant skepticism and experimental/theoretical interest, yet the entire rare-earth region lacked the completeness and richness of data to fully understand the systematic behavior of low-lying excitations. Successful interpretation of quadrupole and octupole vibrational phonon states hinges upon measurement of E0 transition strengths, two-nucleon transfer reaction cross sections, and absolute transition probabilities, the latter equating to precision lifetime measurements of excited states. We have measured 47 new lifetimes in ^{162}Dy below 3.1 MeV excitation energy, including many potentially key vibrational phonon states at the University of Kentucky Accelerator Laboratory using the Doppler Shift Attenuation Method via Inelastic Neutron Scattering (DSAM-INS). I will discuss our observations in terms of the various collective multiphonon configurations in ^{162}Dy, with a first-of-its-kind measurement of 3 distinct modes of a two-phonon vibration, a $K^{\pi}=0^{+}$ γγ-type and 2 $K^{\pi}=4+$ γγ-type vibrations. This work is funded by the National Science Foundation (NSF) under grant numbers PHY-1068192, PHY-1205412, and PHY-0956310.





4 pm – 5 pm

Nuclear Science Laboratory

124 Nieuwland Science Hall

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All interested persons are cordially invited to attend

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Refreshments will be served prior to the seminar in room 124