UNIVERSITY OF NOTRE DAME
DEPARTMENT OF PHYSICS

NUCLEAR SEMINAR

Monday, April 24

Nuclear Shapes at the Limits of Stability

Dr. Benjamin Crider
NSCL, MSU

One of the key questions the study of nuclear physics seeks to address is, "How does subatomic matter organize itself and what phenomena emerge?" One phenomenon that occurs is the bunching of single-particle orbitals to form "shells." Nuclei with filled shells are more stable relative to neighboring nuclei and are described as having spherical shapes. Rapid changes in nuclear structure can occur away from these closed shells and in certain regions of the nuclear chart, a single nucleus can exhibit both deformed and spherical shapes in a phenomenon known as shape coexistence. Understanding the components of this shape coexistence is important for connecting many ideas within the field, as shape coexistence lies at the intersection of single-particle (promotion of individual nucleons across shells) and collective nuclear behaviors. Recently, shape coexistence has emerged as a feature that perhaps exists in all nuclei rather than an isolated rarity in some nuclei. Experimentally establishing the shape of a nucleus and thus the presence of shape coexistence takes a wide range of experimental techniques. This experimental effort has been performed for ^{68,70}Ni at the National Superconducting Cyclotron Laboratory, and comparison of the results with large-scale shell-model calculations firmly identify shape coexistence between deformed and spherical shapes in ^{68}Ni and provide evidence for its extension along the isotopic chain to ^{70}Ni. This talk will focus on presenting signatures of shape coexistence and the experimental techniques used to identify its presence in the $Z = 28$ region.

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