

UNIVERSITY OF NOTRE DAME
DEPARTMENT OF PHYSICS

NUCLEAR SEMINAR

Monday, October 31

Structure of Light Exotic Nuclei and Nuclear Astrophysics Through the Lens of Nuclear Reactions

Prof. Grigory Rogachev
Texas A&M University

Atomic nuclei provide a rich laboratory to study quantum physics in mesoscopic systems. Development of a comprehensive, self-consistent and unified understanding of nuclear structure and nuclear interactions is the major challenge. An important step in this direction is an attempt to make predictions using an "ab initio" approach - solving a quantum many body problem starting from bare nucleon-nucleon and three-nucleon interactions or by applying methods of Effective Field Theory. Including effects related to continuum coupling is another challenge. Detailed experimental knowledge of nuclear structure of the lightest exotic nuclei has a special significance for this effort as "ab initio" approaches are computationally difficult to implement for nuclei with more than 16 nucleons and effects of the continuum are more important for nuclei near or beyond the drip line. I will discuss some of the recent advances and surprises in experimental studies of the lightest exotic nuclei.

Cross sections for some key nuclear reactions at extremely low, sub-Coulomb energies are important input parameters for astrophysics, and are necessary to constrain various nucleosynthesis processes. At these low energies cross sections are extremely small, making direct measurements very difficult. I will discuss several examples of indirect nuclear reaction studies that allowed us to bypass the low cross section problem and constrain several astrophysically critical reaction rates.

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