NUCLEAR SEMINAR SERIES

Prof. Thomas Clegg

Triangle Universities Nuclear Laboratory

University of North Carolina

Monday, October 8

4:00 pm - Rm 123 NSH

A Laboratory for Experimental Nuclear Astrophysics as a Hands-On Educational Environment

Improving models of stellar evolution depends on having accurate nuclear reaction rates at energies where primary nucleosynthesis processes occur. To improve such measurements, we have created within TUNL over the last 17 years a Laboratory for Experimental Nuclear Astrophysics (LENA) to produce beams for very accurate 80 keV to 1 MeV (p,γ) cross section measurements. As the beam energy drops through the Gamov window, where most important stellar nucleosynthesis reactions occur, resulting count rates can be under 10/day because cross sections drop exponentially from Coulomb repulsion. Measurements at our lowest energies are feasible only with very high beam intensities to maximize the real count rate, and with very well shielded detectors and innovative data extraction techniques to pull tiny signals from continuous environmental backgrounds. Our laboratory provides unique opportunities for exceptional student training in designing, building, maintaining, and using accelerator, ion source, detector, and computational systems. A description of our laboratory's development and an overview of specific student experiences gained while working on hardware projects there will be provided.

PHYSICS

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