1-28-2016

INPP Seminar | Experimental Level Densities and Gamma Strength Functions for Nuclear Astrophysics, Jan 28

Ohio University College of Arts & Sciences

INPP Seminar | Experimental Level Densities and Gamma Strength Functions for Nuclear Astrophysics, Jan. 28

January 28, 2016
Categories: Events
Tags: Ann-Cecilie Larsen, Institute of Nuclear and Particle Physics, NPP Seminar, physics and astronomy events

Ann-Cecilie Larsen

The Institute of Nuclear and Particle Physics (INPP) presents **Ann-Cecilie Larsen**, of the Oslo Cyclotron Laboratory, presenting **"**Experimental Level Densities and Gamma Strength Functions for Nuclear Astrophysics," on Thursday, Jan. 28, at at 4 p.m. in Edwards Accelerator Lab, Roger W. Finlay Conference Room.

Abstract: All elements found in our Universe, except for the very lightest ones, have been created during stars' lives and/or deaths. Fusion processes account for elements up to iron/nickel, while the major part of heavier elements must be formed through neutron capture.
To model the neutron-capture processes, the sheer amount of required nuclear input is overwhelming. For example, a reaction-network calculation for the r-process will typically involve ~5000 nuclei and ~50000 reaction rates. For the s-process, most of the relevant cross sections are accessible for direct measurements as it involves nuclei in the vicinity of the beta-stability line. For the r-process, on the other hand, almost none of the needed reaction rates are known experimentally. There is an urgent need to develop new approaches and techniques to constrain theoretical estimates for the desired rates.
The nuclear level density and the gamma ray strength function are two crucial quantities for calculating e.g. radiative neutron-capture cross sections. The newly invented beta-Oslo method is capable of extracting these quantities in neutron-rich nuclei. In this talk, the present experimental status of level density and gamma strength is summarized, and the relation to astrophysical neutron-capture rates is discussed. Challenges and questions that need to be resolved as well as future experiments are outlined.