PHYSICS AND ASTRONOMY COLLOQUIUM

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"Rare Isotope Physics in the Era of Multimessenger Astronomy"

Abstract

The Joint Institute for Nuclear Astrophysics Center for the Evolution of the Elements is to connect research in experimental nuclear physics, observational astronomy, theory, and computational modeling to address major open questions related to the origin of the elements and the properties of dense matter in neutron stars. Rare isotopes play a key role in this endeavor. They govern the creation of the elements in extreme stages of stellar evolution, supernova explosions, and neutron star phenomena such as mergers, X-ray bursts, and hot crusts. While these isotopes only exist for fractions of seconds, their properties shape the resulting cosmic distribution of elements and the astronomical observables including spectra, neutrinos, and gravitational waves. The long standing challenge in nuclear astrophysics of the production of the relevant isotopes in the laboratory is now being overcome with a new generation of rare isotope accelerator facilities coming online. One example is the FRIB facility under construction at Michigan State University. These new capabilities in nuclear physics coincide with advances in astronomy directly related to the cosmic sites where these isotopes are created, in particular in time domain and gravitational wave astronomy. I will discuss the importance of rare isotope physics in interpreting multi-messenger observations and how advances in nuclear physics and astronomy when combined promise to lead us towards a comprehensive theory of the origin of the elements and neutron stars.

Wednesday, March 20, 2019
3:30 p.m.
Elliott Building Room 167