PHYSICS AND ASTRONOMY COLLOQUIUM

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"Looking Inside Neutron Stars: Astrophysical Transients and The Nature of Dense Matter"

Abstract

Studies of neutron stars lie at the intersection between astrophysics, nuclear physics, and condensed matter physics. Theory developed over many decades tells us that neutron stars should contain an incredible variety of states of matter, from a solid crust permeated by superfluid neutrons, to the pasta regions with non-spherical nuclei, to the dense core with matter up to several times nuclear density. We are now beginning to test this complex picture thanks to observations of a range of astronomical sources, including isolated neutron stars such as radio pulsars and magnetars, accreting neutron stars in close binary systems, and now merging neutron stars. Particularly important are transient events in which we can look at the response of the star to some kind of abrupt change. In this talk, I will discuss what we are learning and the open questions. I will focus on accreting neutron stars in particular, which are fascinating nuclear astrophysics laboratories in which matter traverses the nuclear chart from the proton drip line to the neutron drip line and beyond.

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