SAN DIEGO STATE UNIVERSITY DEPARTMENT OF PHYSICS AND DEPARTMENT OF ASTRONOMY COLLOQUIUM

Speaker: Dr. Milva Orsaria (National Scientific and Technical Research Council/National University of La Plata)

Topic: Quark Matter and its Role for the Core Compositions of Neutron Stars

Time: 3:00 PM, Friday, February 24, 2017 (refreshments served at 2:45 PM)

Place: Room 215, Physics-Astronomy Building (PA-215)

Abstract:

The study of neutron stars establishes a direct connection between astronomy and nuclear and particle physics, allowing a better understanding of the behavior of matter under conditions that are difficult to reach in the laboratory. Massive neutron stars provide very important constraints on high-density nuclear matter and its associated Equation of State (EoS), which is still essentially unknown. Depending on neutron star mass and rotational frequency, gravity may compress the matter in the core regions of such objects up to more than ten times the density of ordinary atomic nuclei, thus providing a high-pressure environment in which numerous subatomic particle processes are likely expected to compete with each other and phase transitions to new states of matter, foremost quark matter, may occur. In this colloquium, I will provide a general discussion of the properties of quark matter and explore its role for the core composition of neutron stars. Particular attention is paid to the two most massive neutron stars known to date, pulsar J1614-2230 and J0348+0432.