

Spring 2019 Colloquium

Department of Physics & Astronomy, TAMU-Commerce

April 4, Thursday, 4-5 PM in Science Building 127

(coffee and cookies will be served at 3:50 PM)

Nuclear Physics, Astrophysics

Nuclear Incompressibility: How Collective Excitation Modes of a Nucleus Characterize Astrophysical Processes

Dr. Umesh Garg

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Dr. Umesh Garg earned BS and MS degrees in Physics at the Birla Institute of Technology and Science, Pilani, India, and a Ph.D. degree in Physics at the State University of New York at Stony Brook. His Ph.D. research topic was on experimental investigation of collective properties of nuclei using techniques of in-beam gamma-ray spectroscopy. He worked as a post-doc at Texas A & M University Cyclotron Institute where he started working on nuclear incompressibility. His research has continued on both these topics since after his postdoc, Dr. Garg joined the University of Notre Dame as an Assistant Professor and has remained there. He is a Fellow of the American Physical

Society and the American Association for Advancement of Science, as well as a Fulbright Specialist. He is currently a Honorary Guest Professor at the Peking University and an Adjunct Professor at the Tata Institute of Fundamental Research, Mumbai, India. More information about Dr. Garg and his research can be found at: <https://physics.nd.edu/people/faculty/umesh-garg/>

Abstract

The Nuclear Incompressibility parameter is one of three important components characterizing the nuclear equation of state (EOS). It has crucial bearing on diverse nuclear and astrophysical phenomena, including radii of neutron stars, strength of supernova collapse, emission of neutrinos in supernova explosions, and collective flow in medium- and high-energy nuclear collisions. In this talk I will review current status of the research on direct experimental determination of nuclear incompressibility via the compressional-mode giant resonances. In particular, measurements on a series of Tin and Cadmium isotopes have provided an "experimental" value for the asymmetry term of nuclear incompressibility, which can provide constraints on the EOS of neutron stars.

