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ICTS Astrophysics & Relativity Seminar

Title : Neutron stars and Gravitational waves: Decoding dense matter systems

Speaker : Ritam Mallick (Indian Institute of Science Education and Research Bhopal)

Date : Friday, 25 July 2025

Time : 2:00 PM (IST)

Abstract : The fundamental constituent of matter at high temperature and density has intrigued physicists for a long time. Notably, the phase at low temperature and finite (mostly intermediate) baryon density remains unexplored. QCD predicts a phase transition from hadronic to quark matter at such densities. Presently, the best labs available to probe such densities lie at the core of neutron stars. Recent NICER results have given some masses and radii of a few pulsars with reasonable accuracy. In the presentation, we will discuss how such measurement has constrained the EoS to a great extent. Moreover, the binary neutron star merger has opened the world of multi-messenger astronomy. The binary merger of GW170817 has emitted gravitational waves and electromagnetic waves in almost all spectra. However, detecting the signal and extracting the physics from it is a challenging task. The presentation will discuss recent developments and results regarding binary neutron star mergers. We will primarily focus on the post-merger signals yet to be detected by current and future detectors and how those results could answer some of the fundamental questions of physics.

Venue : Feynman Lecture Hall

Zoom Link: <https://icts-res-in.zoom.us/j/93649026348?pwd=WFXG6GU0a91lvvrTglyOmPyC64MNIC.1>

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