ICTS Astrophysics & Relativity Seminar

Title : Model-Agnostic Identification of Compact-Binary Morphologies with Phenomenological Waveforms

Speaker : Shrobana Ghosh (Max Planck Institute for Gravitational Physics, Germany)

Date : Thursday, 04 December 2025

Time : 3:30 PM (IST)

Abstract : Gravitational wave (GW) astronomy has unveiled more than two hundred compact-binary coalescences (CBCs). All of the observed signals are consistent with mergers of isolated, quasi-circular black hole binaries (BBHs), neutron star binaries, or mixed systems; however, several of these invite consideration of alternative scenarios. Modeling such scenarios with numerical-relativity (NR) simulations alone is impractical, given computational costs and uncertainties in physics. I will discuss how the versatility of the Phenom family of models can be leveraged to construct agnostic frameworks. Complementary to tests based on parametric deviation of phase, this method targets universal features of CBCs and avoids scenario-specific tuning. As an example, I will introduce a parameter designed to track waveform morphology and quantify the degree to which a given signal conforms to the BBH hypothesis, present inference of the identifier on real GW events and discuss how targeted NR simulations can refine the identifier.

Venue : Feynman Lecture Hall
Zoom Link: https://icts-res-in.zoom.us/j/98288898385?pwd=ZuyadIfYeZdyrYon2BSSiSoJH0HXGa.1
Meeting ID: 982 8889 8385
Passcode: 424710