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TATA INSTITUTE OF FUNDAMENTAL RESEARCH

ICTS Astrophysics & Relativity Seminar

- Title** : Precision Gravity: Gravitational waves using Feynman diagrams
- Speaker** : Raj Patil (Albert Einstein Institute and Humboldt University, Germany)
- Date** : Thursday, 12 March 2026
- Time** : 3:30 PM (IST)
- Abstract** : Observations of gravitational waves have the potential to unravel the mysteries of cosmic origin, constrain the equation of state of compact objects, and serve as a test of general relativity. To achieve these scientific goals, it is crucial to develop highly precise and accurate waveform templates to minimize systematic errors. My talk will focus on computing state-of-the-art effective two-body Hamiltonians and fluxes using techniques from quantum field theories in the post-Newtonian (PN) expansion. These quantities serve as fundamental building blocks for waveform templates, and dictate the accuracy of the waveform model. I will present recent results of the static potential at 6PN obtained from six-loop scattering amplitude, as well as Hamiltonians for spinning compact objects up to 5PN and tidally deformed compact objects up to 3PN. The latter is particularly interesting as it requires introducing counterterms to remove divergences, leading to a renormalization group flow of the post-adiabatic Love number
- Venue** : Feynman Lecture Hall
Zoom Link: <https://icts-res-in.zoom.us/j/97112954042?pwd=KOVezQjgymPqtnSwdobEclSZXeOQH0.1>
Meeting ID: 971 1295 4042
Passcode: 202040