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ICTS Astrophysics & Relativity Seminar

Title : Lensing of gravitational waves by Globular clusters and dark matter

Speaker : Sreekanth Harikumar (Nicolaus Copernicus Astronomical Center, Poland)

Date : Thursday, 11 December 2025

Time : 3:30 PM (IST)

Abstract : Gravitational waves (GW) can be distorted by intervening massive structures, a phenomenon known as GW lensing. This effect provides a novel way into the nature of dark matter (DM) and the properties of dense star clusters. In this talk, I will present two complementary applications of GW lensing.

First, I will focus on long-duration, quasi-monochromatic GW signals from rapidly rotating, neutron stars - a promising yet undetected source of GWs. When microlensed by DM, these signals acquire a characteristic time-dependent amplification, known as the Paczyński curve. Using a Time-Domain F-Statistic framework, I will show how this microlensing imprint can serve as a probe of the fundamental nature of dark matter.

In the second part, I will discuss the lensing of compact binary merger signals by globular clusters (GCs). Such lensing events may encode information about the internal dynamics of GCs, including their velocity dispersion. I will discuss how lensed GW events could be used as a complementary tool to study GC.

Venue : Feynman Lecture Hall

Zoom Link: <https://icts-res-in.zoom.us/j/93555246640?pwd=puKgHnhiZOSERCADa8YvNbRF5qD3Hf.1>

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