



ICTS

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TATA INSTITUTE OF FUNDAMENTAL RESEARCH

## ICTS Astrophysical Relativity Seminar

**Title** : Search for Evaporating Exoplanets and protoplanetary discs

**Speaker** : Joe P Ninan (Tata Institute of Fundamental Research, Mumbai)

**Date** : Friday, 09 May 2025

**Time** : 11:00 AM (IST)

**Abstract** : One of the most promising theoretical framework to understand the observed deficiency of close-in super-Earth/sub-Neptune planets in the Exoplanet "Radius Valley", is the atmospheric photo-evaporation model. Atmospheres of planets with low density and high enough ultraviolet irradiation will not have stable thermospheres. Instead, they will drive an outflow similar to Parker wind. These evaporating atmospheres will have an extended exosphere making them ideal for detection via transmission spectroscopy. Traditionally, excess Ly alpha absorption from the neutral Hydrogen was used to detect these exo-spheres during transit from the Hubble Space Telescope. Recently, resonant scattering absorption of meta-stable Helium atoms at 10830 Angstrom have become a powerful probe to detect these extended exo-spheres. This, being a near-infrared line observable from ground and unaffected by inter-stellar medium, has numerous advantages over Ly alpha. In this seminar, after an introduction to the topic, I shall talk about our results from our observational program to detect these evaporating exo-spheres using Habitable-zone Planet Finder (HPF) from Hobby Eberly Telescope. I shall also talk about our attempts to understand the temperature structure of the innermost protoplanetary disc atmosphere using the same instrument.

**Venue** : Feynman Lecture Hall

Zoom Link: <https://icts-res-in.zoom.us/j/99106965561?pwd=3Am6vFlcvjspyR22PeypvgWtshMjJk.1>

Meeting ID: 991 0696 5561

Passcode: 202030