भारतीय खगोलभौतिकी संस्थान

INDIAN INSTITUTE OF ASTROPHYSICS

कोरमंगला **Koramangala,** बेंगलूरु **Bengaluru – 560034.**

स्नातक अध्ययन मंडल Board of Graduate Studies.

Ph. D Synopsis Seminar

Speaker: Mr. B. Manjunath

शीर्षक Title: Multi-Object High-Resolution Transmission Spectroscopy: Instrumentation and Observations

सार Abstract

Ground-based exoplanet transmission spectroscopy is limited by time-variable Earth's atmospheric conditions and instrumental systematics, which often prevent the precision from improving as expected with increasing telescope aperture, indicating the need for improved observing strategies and instrumentation. Detecting atmospheric species using low-resolution transmission spectroscopy in hot Jupiters requires measuring wavelength-dependent variations in transit depth at the level of a few hundred parts per million. In contrast, high-resolution transmission spectroscopy is less sensitive to absolute photometric precision, as it detects spectral features relative to the continuum. In this talk, we present low- and high-resolution transmission spectroscopy observations obtained with the Himalayan Chandra Telescope at Hanle, along with instrumentation concepts designed to enable the simultaneous low- and high-resolution transmission spectroscopy. We present the case for high-resolution multi-object spectroscopy for the Thirty Meter Telescope. A broadband atmospheric dispersion corrector designed for a multi-object fiber positioning system, and atmospheric dispersion at Hanle is measured to support the development of future instruments at the site. We analyze possible sources of systematic error in low-resolution transmission spectroscopy using HCT-HFOSC observations of WASP-33b and WASP-12b as case studies. High-resolution transmission spectroscopy observations of HD 209458b and KELT-9b obtained with the Hanle Echelle Spectrograph are also presented, including evidence for Fe II and Na I absorption in KELT-9b. Finally, we outline a framework for combining simultaneous low- and high-resolution transmission spectroscopy from single observations to improve constraints on exoplanet atmospheric properties.

सोमवार Monday 19, जनवरी January 2026

Time: 4:00 PM

Venue: प्रेक्षागृह Auditorium

सभी का स्वागत है All are welcome.