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स्नातक अध्ययन मंडल Board of Graduate Studies.

STUDENT SEMINAR
(Part of Comprehensive Examination)

Speaker: Gurwinder Singh

Title: Site Characterisation and Guide Star Selection for Adaptive Optics Systems.

सार Abstract

Adaptive Optics (AO) is a key enabling technology for ground-based astronomical telescopes, mitigating the effects of Earth's atmospheric turbulence and enabling near-diffractionlimited imaging of celestial sources. AO systems require both suitable natural guide stars and accurate characterization of atmospheric turbulence for effective AO correction. This work presents progress on two complementary projects addressing these requirements. The first project focuses on the availability of natural guide stars across different photometric bands within an isoplanatic patch, which is essential for assessing sky coverage and AO feasibility. This is particularly important for present and upcoming large optical telescopes such as the National Large Optical Telescope (NLOT), European Extremely Large Telescope (ELT), and Thirty-Meter Telescope (TMT), which require guide stars with different magnitude limits for high-order correction and tip-tilt sensing. A dedicated all-sky catalog optimized for AO applications is currently lacking. To address this, we are developing an allsky natural guide star catalog using Gaia DR3, providing visible and near-infrared guide star magnitudes and validating them against external surveys. The second project focuses on the design, development, and testing of an SLODAR (SLOpe Detection And Ranging) instrument for measuring the vertical distribution of atmospheric turbulence ($Cn\,2\,(h)$). This information will be useful for designing an AO system for the upcoming IIA facilities. The Instrument uses off-the-shelf components and was assembled in an IIA AO lab. First-light observations were carried out in May 2026 on the 50-cm telescope at Hanle. Currently, SLODAR is in the testing phase, with ongoing efforts focused on optimising the data reduction pipeline. In this talk, I will present the preliminary results obtained from SLODAR observations, ongoing work, and future plans.

मंगलवार Tuesday 18, अगस्त August 2026

Time: 11:00 AM

Venue: प्रेक्षागृह Auditorium