



भारतीय खगोलभौतिकी संस्थान  
**INDIAN INSTITUTE OF ASTROPHYSICS**  
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स्नातक अध्ययन मंडल **Board of Graduate Studies.**

**IIA - CU - PhD (Tech) Seminar.**

**Speaker:** Mr Harsh Mathur

**शीर्षक Title:** Probing Chromospheric Magnetic Field Through Multi-line Spectropolarimetry.

**सार Abstract**

Understanding the magnetic coupling between the chromosphere and the solar atmospheric layers is crucial in understanding the mechanisms that drive energy and mass transfer to the corona and solar wind. In this context, multiline spectropolarimetry is a powerful observational technique, allowing for simultaneous inference of magnetic fields at various heights in the solar atmosphere. In this presentation, we will discuss our observational efforts to explore the diagnostic potential of the H $\alpha$  line for probing the chromospheric magnetic field together with Ca II 8542 Å and Ca II 8662 Å lines. To carry out simultaneous multi-line spectropolarimetric observations, we have upgraded the Kodaikanal Tower Tunnel Telescope (KTT) to record three spectral lines simultaneously. Additionally, we will discuss the development and installation of an image stabilization system, incorporating a tip-tilt and autoguider system, designed to effectively reduce seeing-induced spatial and spectral smearing of the polarimetric signal for an extended duration of approximately one hour. Using this enhanced setup, we conducted simultaneous spectropolarimetric scans of the H $\alpha$  and Ca II 8662 Å lines. We will present findings from an observation of a complex sunspot recorded from KTT on May 27, 2023, which exhibited multiple umbrae, a light bridge, and a region where the Ca II 8662 Å line core appeared in emission. Correspondingly, the H $\alpha$  line core image revealed brightening in the emission region, with spectral profiles displaying elevated line cores. Our results indicate that the H $\alpha$  line core consistently probes the chromospheric line-of-sight magnetic field at higher heights than those probed by the Ca II 8542 Å (and 8662 Å) line.

शुक्रवार Friday 7, मार्च March 2025

Venue: प्रेक्षागृह Auditorium

Time: 11:30 AM

सभी का स्वागत है All are welcome.