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स्नातक अध्ययन मंडल **Board of Graduate Studies.**

Ph.D Synopsis Seminar

Speaker: Mr. Vishnu Madhu

शीर्षक **Title:** Measurement of Global Vector Magnetic Field of the Sun

सार Abstract

The global vector magnetic field of the Sun is the resultant vector sum of magnetic field over the visible solar disk (hereafter called SVMF: Solar Vector Magnetic Field). There have been no observations of the transverse component of the SVMF. However, the line-of-sight (LOS) component of the SVMF (called the Solar Mean Magnetic Field - SMMF) has been a subject of extensive investigation. However, the sources of the SMMF continue to be a subject of debate. We derived and analyzed the SMMF from full-disk LOS magnetograms observed by the Vector Spectromagnetograph (VSM) at the Synoptic Optical Long-term Investigations of the Sun (SOLIS) project. Our studies indicate that a significant part of the SMMF is a magnetic field that propagates outwards from the photosphere to the chromosphere and reaches interplanetary space. We also derived and analyzed disk-averaged Stokes V signals from full-disk Stokes maps observed by VSM and found evidence of an inverse relation between the amplitude and doppler shift of the signals. This could indicate that the SMMF is localized on the solar surface.

Precise observations of the LOS and transverse components of the SVMF are required to understand the sources behind the Sun's global magnetic field. In this context, we propose to build a Sun-as-a-star vector magnetometer for synoptic observations, which will be able to observe both the LOS and transverse components of the SVMF. Our calculations show that a polarimetric precision of 10^{-6} in the measurement of the normalized Stokes signals is adequate for the proper calculation of the SVMF. A low-noise photodiode-based detector was designed and fabricated to achieve this goal. We also explored different instrument concepts for spectroscopy and polarimetry for the instrument. The design and experimental characterization of these subsystems are described in this seminar.

सोमवार Monday 23, दिसंबर December 2024

Venue: प्रेक्षागृह Auditorium

Time: 11:30 AM

सभी का स्वागत है All are welcome.