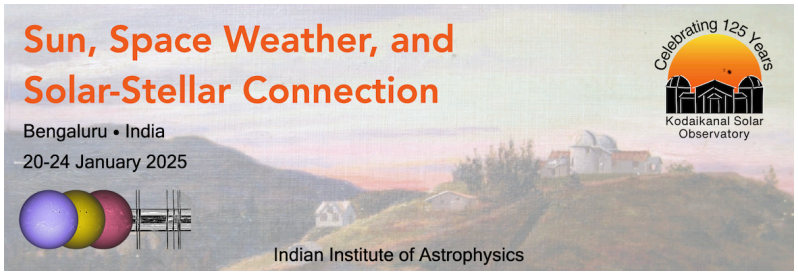

Contribution ID: **156** Type: **Contributed talk**

Bringing Together World's Best Radio Telescopes for Remote Sensing of Heliospheric Magnetic Field

Friday, January 24, 2025 2:25 PM (15 minutes)

Magnetic field measurements in the outer corona and inner heliosphere using remote sensing observations are crucial for improving space-weather prediction. However, routine observations using white-light heliospheric imagers cannot provide these measurements. At radio wavelengths, changes in the polarization angle of background linearly polarized astronomical sources can estimate line-of-sight (LoS) integrated magnetic fields when a plasma blob intercepts that LoS. To date, this technique has been limited at coronal heights <15 R_sun using high-frequency telescopes with lower sensitivity to magnetic field strength and narrow fields of view (FoV), such as the JVLA. Over the past two decades, new-generation ground-based radio telescopes like MWA, LOFAR, ASKAP, and MeerKAT have become operational. These telescopes offer wide FoVs and lower observing frequencies, which can overcome previous limitations. Despite their capabilities, these instruments face challenges in calibration and trigger time-of-opportunity observations for space-weather events. This talk presents our recent efforts to address these challenges by utilizing these leading radio telescopes and preparing for upcoming new-generation radio telescopes (like ngVLA, SKAO) for heliospheric magnetic field measurements using radio polarimetry, a technique we call "Heliopolarimetry." By leveraging these advancements, along with other white-light missions (like PUNCH), we aim to enhance space-weather research and prediction capabilities.

Contribution Type

Theme

Connecting Solar Corona to Heliosphere

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Session Classification: Radio Input to Heliospheric Studies and Space Weather