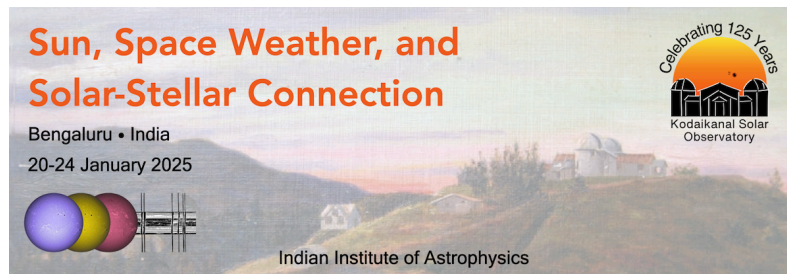


Sun, Space Weather, and Solar-Stellar Connection



Contribution ID: 123

Type: **Contributed talk**

Reconstruction of Interplanetary Magnetic Field: A Novel Approach to Constrain the Solar Source Surface and Its Response to Solar Activity

Friday, January 24, 2025 9:45 AM (15 minutes)

The Interplanetary Magnetic Field (IMF) plays a crucial role in shaping space weather and its impact on Earth's magnetosphere. However, the availability of direct IMF measurements is limited to recent decades, leaving a gap in our understanding of the Sun's magnetic behavior over longer timescales. To address this, we present a detailed reconstruction of the IMF over the past century by integrating a data-driven photospheric flux transport model, coronal magnetic field extrapolations, and historical geomagnetic data. We introduce a novel technique for optimizing polar flux to match observations to address the persistent challenge of solar open flux, which is critical for accurate IMF reconstruction. We also explore long-term variations in solar open flux across different phases of solar activity, offering improved physical constraints on the solar source surface height and its response to solar activity levels. This work enhances our ability to reconstruct and predict solar open flux and solar wind dynamics.

Contribution Type

Theme

Connecting Solar Corona to Heliosphere

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Session Classification: Solar Active Regions and Eruptions