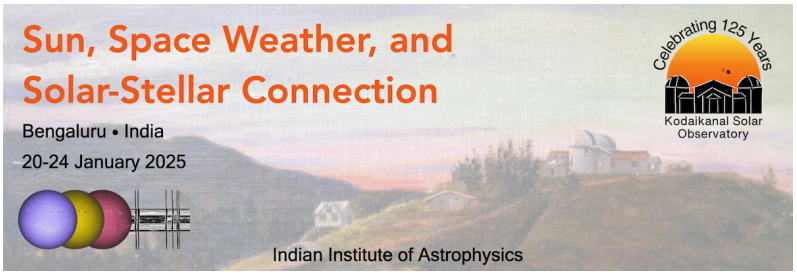

Contribution ID: **166** Type: **Poster**

Do BMRs emerge with tilts consistent with Joy's law?

The Bipolar Magnetic Regions (BMRs) are intense magnetic regions on the Sun's surface, separated by a neutral line. These regions are thought to emerge in the form of magnetic bundles (flux tubes) due to magnetic buoyancy, rising through the convection zone (CZ) in an east-west orientation with a tilt relative to the equator. It has been observed that statistically, BMRs emerging at higher latitudes exhibit larger tilts, Joy's law. According to the thin flux tube model, the tilt is produced by the Coriolis force acting on the diverging flows from the apex of the rising flux tube during its rise in the convection zone. Hence, BMRs are expected to emerge on the photosphere with a tilt. However, this idea has not been supported by any solid observations. In this analysis, using AutoTAB (Sreedevi et al., 2023, ApJS, 268, 58), we identify and track newly emergent BMRs on the solar surface from the time they first appear, using line-of-sight magnetogram observations from MDI and HMI over the past two solar cycles. We particularly examine the tilts during their emergent phase. Our initial analyses show that a large fraction of BMRs show a tilt consistent with Joy's law.

Contribution Type

Theme

Solar Magnetism in High-Resolution

Primary author: Mr GUPTA, Rambahadur (Indian Institute of Technology (BHU) Varanasi)

Co-authors: SREEDEVI, Anu (Indian Institute of Technology (BHU) Varanasi); KARAK, Bidya Binay (IIT (BHU) Varanasi); JHA, Bibhuti Kumar (Southwest Research Institute, Boulder, CO 80302, USA)

Presenter: Mr GUPTA, Rambahadur (Indian Institute of Technology (BHU) Varanasi)