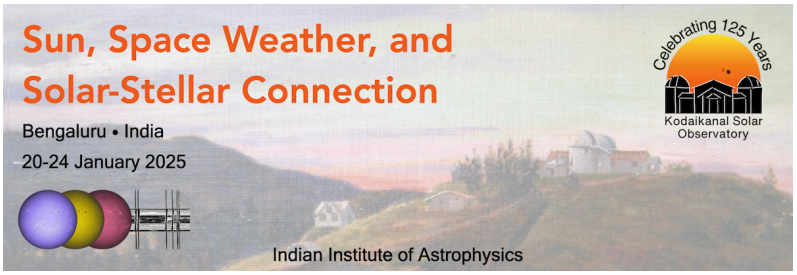

Contribution ID: **14** Type: **Contributed talk**

Coronal Structure and Rotation Enforced by Nested Active Region Emergence: Near-Continuous Monitoring of an Active Nest with Solar Orbiter

Friday, January 24, 2025 9:25 AM (15 minutes)

The formation of active nests/longitudes on the Sun may relate to instabilities at the base of the convective zone or the way in which magnetic flux emerges through the solar surface. Persistent hot spots of activity are frequently observed on other Sun-like stars, hinting that their formation may be universal for stars with dynamo-driven magnetic fields. Nested active region emergences contribute significantly to solar activity and modify the structure of the Sun's coronal magnetic field. As a large fraction, up to 50%, of active regions form in this way, a better understanding of their formation and evolution is needed to improve space weather forecasts as well as model the magnetic connectivity of spacecraft in the heliosphere. The strong magnetic fields that develop in active nests couple the surface rotation rate to the coronal plasma, leading to enhanced rotational flows in the solar wind. ESA's Solar Orbiter now acts as a far-side monitor of solar activity for several months each year. This facilitates near-continuous observations of long-lived active regions that span multiple solar rotations. We use these observations to build a complete record of activity for an active nest identified in 2022 (during the rising phase of activity for cycle 25). We constrain the influence this active nest had on the coronal magnetic field and solar wind outflow using measurements from NASA's Parker Solar Probe in the inner heliosphere.

Contribution Type

Theme

Connecting Solar Corona to Heliosphere

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Session Classification: Solar Active Regions and Eruptions