

# Thomas Metcalf Travel Award Report

## SDO 2025 A Gathering of the Helio-hive! Boulder, CO (17-21 Feb 2025)



### Dr. Jonas Sinjan

Jonas is a Postdoc at the Max Planck Institute for Solar System Research in Göttingen, Germany. He is a member of the Polarimetric and Helioseismic Imager (PHI) instrument team. PHI is on board the Solar Orbiter spacecraft, and infers the photospheric vector magnetic field, doppler velocity and continuum intensity. He is involved in the operations, calibration and analysis of PHI data. Together with numerical simulations, he primarily explores the inference of the photospheric magnetic field at different viewing angles by combining PHI data with those from other spectropolarimetric telescopes.

### Oral Presentation:

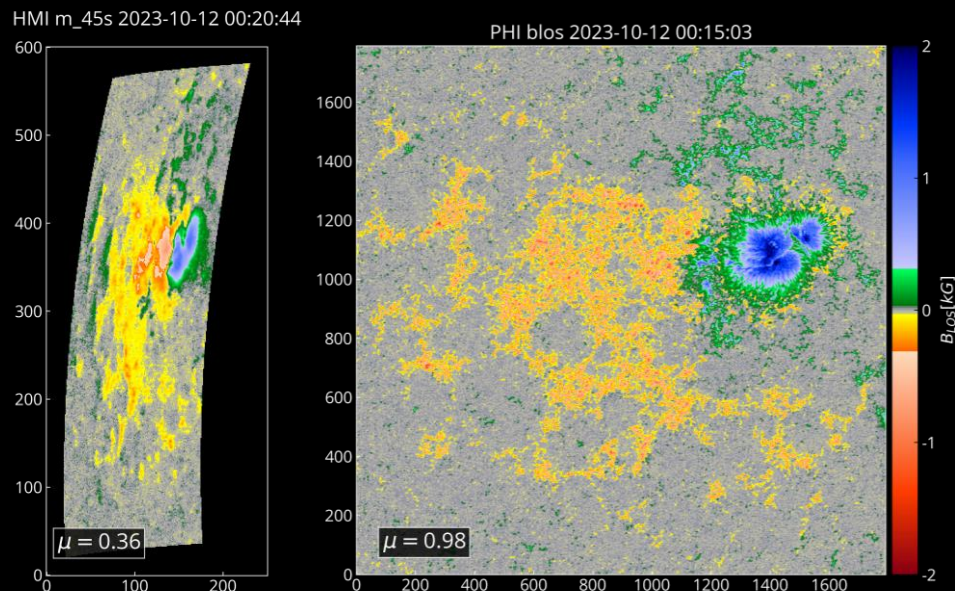
## The Inferred Active Region Magnetic Field: An Analysis with SO/PHI-HRT and SDO/HMI

J. Sinjan, J. Hirzberger, D. Calchetti, S.K. Solanki, G. Valori, Xiaohong Li, D. Orozco Suárez, H. Strecker, J. Blanco Rodríguez and the SO/PHI team

#### Abbreviated Abstract:

From 12 - 17th October 2023 Solar Orbiter observed an active region (NOAA 13465), separated from Earth by an angle of 60-80 degrees, which was just visible inside the East limb as seen by Earth at the start of the campaign. This dataset provides a broad range of different viewing angles ( $\mu = \cos(\theta)$ ) between SO/PHI-HRT and SDO/HMI, such that the  $\mu$ -correction (which assumes the field to be radial) can be directly tested with observations for the first time. A comparison will be shown of the evolution and magnitude of the magnetic field inferred by SO/PHI-HRT with that from SDO/HMI at these different vantage points.

Figure 1: The line-of-sight photospheric magnetic field of the NOAA 13465 active region as inferred by SDO/HMI (left) and the high resolution telescope of PHI (right) at 10/12/2023. The cosine of the heliocentric angle ( $\mu$ ) of the sunspot is shown in the bottom left corner, indicating the vastly different vantage points. Note how the magnetic polarity flips near the limb side of the plage region and sunspot in HMI, while it does not in PHI.



I'd like to thank the AAS/SPD Metcalf Award Committee and the SDO 2025 SOC for this award. Through productive discussions with other experts at this meeting and attending the mini-workshops, my research will be further enriched and new collaborations will develop as a result.