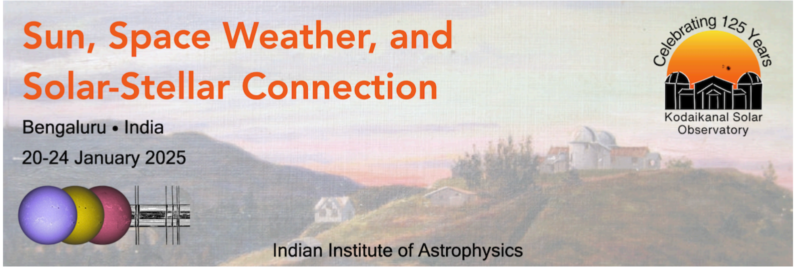

Contribution ID: **29** Type: **Poster**

Evaluating the Importance of High Resolution Active Region Data in the Large-scale Coronal Magnetic Field Evolution

Active regions are one of the primary sources of solar eruptive events like flares and coronal mass ejections, causing adverse space weather conditions. Complex magnetic field distributions of observed active regions are often quantified using diverse tools and techniques, which are later used for measuring the chance of their eruptivity. Similar tools are also utilised to validate magnetic field data generated from magnetohydrodynamic simulations of active region emergence and justify their similarities with observation. In both cases, the resolution of the active region plays a crucial role. However, there is a need for more generalised ways to evaluate how the active region magnetic field is distributed across different length scales.

We have developed a method characterising the active regions based on Zernike polynomial analysis, the Cartesian counterpart of spherical polar decomposition, which is applicable to most Cartesian solar active regions models and CEA magnetogram data. This framework for Zernike mode comparison provides a precise and straightforward method for quantitatively comparing magnetic fields whilst accounting for their complex spatial variations. Such a tool based on polynomial decomposition is also useful for identifying the relevant length scales of active-region-associated magnetic fields reaching the upper heights of the solar corona, thus guiding us in understanding the importance of high-resolution active region data.

Contribution Type

Theme

Solar Magnetism in High-Resolution

Primary author: BHOWMIK, Prantika (Department of Physics, Indian Institute of Science Bangalore)

Presenter: BHOWMIK, Prantika (Department of Physics, Indian Institute of Science Bangalore)