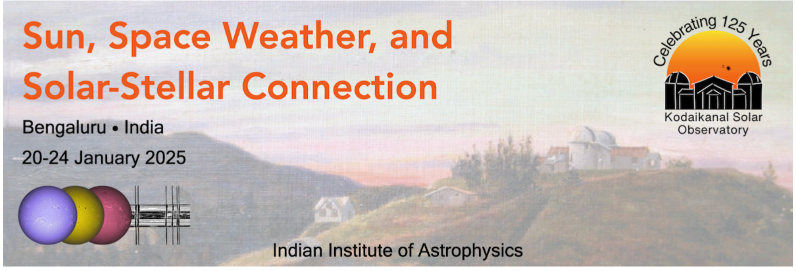

Contribution ID: **57**

Type: **Poster**

Modeling and Observation of Propagating Kink Waves in Coronal Open-field Regions

In the coronal open-field regions, numerous transverse waves propagate along coronal plumes, typically interpreted as kink or Alfvénic waves. Previous studies have emphasized their potential role in coronal heating, solar wind acceleration, and seismological diagnostics of various physical parameters. However, these propagating kink waves have rarely been investigated with both vertical and horizontal density inhomogeneity using advanced three-dimensional magnetohydrodynamic (MHD) simulations. In this study, we establish a 3D MHD model of a gravitationally stratified open flux tube, incorporating a velocity driver at the lower boundary to excite propagating kink waves. Our findings show that both resonant absorption and density stratification influence wave amplitude. Resonant damping must be carefully considered when diagnosing the relative density profile using velocity amplitude to avoid overestimation. Additionally, unlike standing modes, propagating waves are generally considered Kelvin-Helmholtz stable. However, in the presence of vertical stratification, phase mixing of Alfvénic motions near the tube boundary can still generate small scales, partially dissipating wave energy and leading to a slight temperature increase, particularly at higher altitudes. We also conduct forward modeling to synthesize observational signatures, highlighting the potential of future coronal imaging spectrometers, such as MUSE, to resolve wave-induced signatures. Furthermore, we analyze these waves observationally using Solar Orbiter/EUI data, which provides extreme ultraviolet images with unprecedented spatial and temporal resolution.

Contribution Type

Theme

Solar Magnetism in High-Resolution

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