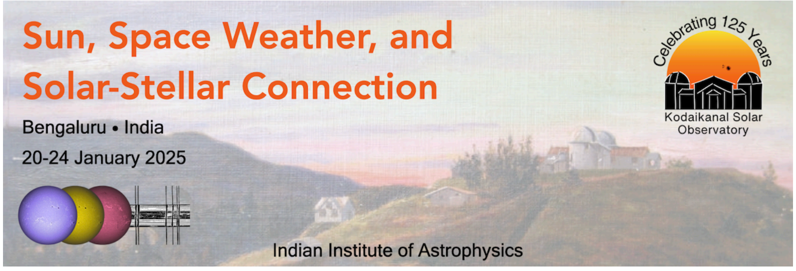

Contribution ID: **132** Type: **Contributed talk**

Onset, Eruption, and Thermal Properties of Coronal Jets via MHD Simulation

Wednesday, January 22, 2025 11:45 AM (15 minutes)

Jets are one of the eruptions which impact the solar atmosphere significantly along with other transients like solar flares and coronal mass ejections (CMEs). Magnetic reconnection is believed to be one of the reasons behind these transients. The onset and factors contributing to the morphology and thermal structures are still complex to comprehend. In order to understand them, we have studied a blowout jet using observations from AIA/SDO and employing the non-force-free-field (NFFF) extrapolation model. We then simulate the magnetic field evolution via EULAG-MHD model. We have compared the simulated dynamics to the observed features as well as the emission profile obtained from the differential emission measurement (DEM) analysis. We have utilized the HMI/SDO magnetogram as an input to the NFFF model. The simulation is initialized with the non-zero Lorentz force inherent to the extrapolated magnetic field with a line-tied bottom boundary condition. Interesting are the initial magnetic configurations, where we find a bald patch and a flux rope near the jetting region. The reconnections near the bald patch may trigger the onset of the jet. The untwisting of the flux rope channels the plasma material to escape. Further to supplement the study of the onset process and thermal changes, we have analyzed different parts of the jet in detail, where we find profiles of simulated current density, and energy densities (magnetic+kinetic), in congruent with the measured emissions. We have shown the role of Lorentz force in driving the jet and compared its effect over the plasma flow during the whole simulation period. In future, to understand the role of boundary in initiating such transients and the simultaneous thermal properties, we plan to carry out a complete magnetohydrodynamics study with a data-driven boundary approach aided with spectroscopic data with high-spatial and temporal cadence from instruments like IRIS, and SP/Hinode, SST.

Contribution Type

Theme

Energetic Phenomena

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