Institute for Space Weather Sciences Colloquium

Thursday, 17th of October 2024, 1pm ET

ECE 202 and via Zoom, meeting ID: 917 2169 7568, password: isws

Aabha Monga, NJIT

Toward Unveiling the Origins of Solar Geysers: Insights into Recurrent Jet Eruptions

In this talk, I will provide a brief overview of the properties of jet-like structures in the solar atmosphere. These reconnection-driven features play a key role in addressing unresolved questions in solar physics, such as coronal heating and solar wind acceleration. I will particularly focus on active- region jets, which occur at interaction sites between active regions and ambient magnetic fields. In some cases, these jets were found to be recurrent though the physical mechanism behind this observed behavior is not yet clear. I will present a case study of recurrent jets, or "geysers", originating from the periphery of active region NOAA AR12715 on 21 June 2018, using SDO and IRIS observations. The photospheric magnetic field near the jet footpoints showed small-scale moving magnetic features interacting with active region magnetic fields, producing the observed jets. The dynamics of fragmented flux structures were analyzed using the Yet Another Feature Tracking Algorithm (YAFTA), while corresponding changes in the magnetic topology were examined with a Non-Linear Force-Free Field (NLFFF) approximation based on a MHD relaxation method. Differential Emission Measure (DEM) analysis revealed that the recurrent jets are multi-thermal with discrete plasmoid structures. Our findings highlight the role of photospheric shearing motions near jet footpoints, that facilitate episodic interchange reconnection at regions of enhanced current density, contributing to the formation of active-region jets.

Aabha Monga is currently a Postdoctoral Research Associate at the Center for Solar-Terrestrial Research at the New Jersey Institute of Technology (NJIT). Prior to this, she earned her PhD from the Aryabhatta Research Institute of Observational Sciences, Nainital, India, in 2021, where she studied small-scale transients as precursors to large-scale solar eruptions. After her PhD, she joined the Indian Institute of Astrophysics, Bangalore, as a postdoctoral researcher, where she explored photospheric magnetic field parameters that contribute to solar flaring mechanisms. At NJIT, Aabha continues her research on reconnection physics, particularly on the triggering mechanisms of jet-like features in the lower solar atmosphere. In addition to her involvement in observational campaigns at the Big Bear Solar Observatory, she is working on BiFrost simulations to gain deeper insights into small-scale reconnection events and jets.


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