Title: Exploration of solar coronal jets and associated small-scale flaring processes during solar cycle 24 and 25

Introduction: Solar coronal jets are the collimated ejection of plasma and magnetic field from the solar atmosphere into the heliosphere. These small-scale explosive phenomena are thought to originate due to magnetic reconnection in the solar atmosphere. The energy released in reconnection is responsible for the acceleration of solar jets and local heating of the surrounding plasma. Therefore, solar jets are believed to be responsible for transporting mass and energy through different layers of the solar atmosphere.

Aim: In this project, we will explore the physics of the origin and evolution of solar jets using the high spatio-temporal resolution data from the existing and upcoming solar facilities. We will perform coronal magnetic field modelling in order to understand the magnetic topology and configuration of the region surrounding solar jets which will shed light on their origin and subsequent evolution along the guiding/constraining magnetic field lines. We will study the small-scale energy releases associated with solar jets using X-rays data and investigate the role of these explosive transients in heating the solar corona. The study proposed in this project require observational data analysis from different solar space- and ground-based facilities and coronal magnetic field modeling. We will primarily use the data from Extreme Ultraviolet Imager (EUI)/Solar Orbiter (SolO), IRIS, AIA/SDO, Multi Application Solar Telescope (MAST), e-Callisto, XSM/Chandrayaan-2 and ADITYA-L1 (after its launch).

Expected outcome: The proposed studies on solar coronal jets, described in this project, are highly relevant to the upcoming Aditya-L1 mission to be launched in near future. This work will allow us to explore the origin and evolution of solar jets using multiwavelength observations and coronal field modelling. It will improve our understanding about the role of coronal jets in mass and energy transport through different layers of the solar atmosphere

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Number of JRF positions: 01

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