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Understanding the Physics of solar coronal jets and surges: Unified approach with high resolution observations and numerical modelling

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Solar coronal jets are observed as collimated plasma flows with high velocity along magnetic field lines in a wide wavelength range, from X-rays to EUV. Occasionally these hot jets are closely related to cool surges, which are chromospheric ejections that emerge in the form of unwrinkled threads. Though these phenomena have been studied over the past few decades with different instruments and models, their physical origin is still actively debated. To have a deeper understanding of the origin and driving of solar coronal jets, we analyze several jet and surge events with very high-resolution observations from the Swedish 1-m Solar Telescope (SST) and the Interface Region Imaging Spectrograph (IRIS). Deeper physical understanding is developed with the aid of radiative MHD models using the Bifrost code. The different data sets constrain the numerical models as they provide details on different aspects of the origin and propagation of jets at different heights from the photosphere to the corona. It is anticipated that the unprecedented capabilities of MUSE will provide new insights in the physics of solar coronal jets.

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