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RECURRENT CORONAL JETS INDUCED BY MAGNETIC EMERGENCE IN THE SOLAR ATMOSPHERE

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Jets are part of the observed phenomenology in the solar corona. They are thought to be a consequence of magnetic reconnection but the physics involved is not completely understood. We study some recurrent jetting events with unprecedented temporal and spatial resolutions.

Jets are commonly called surges when they are observed in cold lines (Hα). Hα surges and EUV/X-ray jets emanating from the same region tend to appear recurrently (Schmieder et al. 1995), but process involved in the quasi-periodicity is not yet clear. In this work we study three recurrent coronal jets observed on 2010 September 17 by the Solar Dynamics Observatory (SDO), based on computation of the EUV flux, the magnetic flux, the velocity field, and the electric current (Fig. 1).

By using a local correlation tracking analysis (LCT) we detect diverging flows in a region of continuous magnetic emergence at small-spatial scale (Fig. 2). We conclude that the observed recurrent behaviour of the jets is induced by magnetic reconnection occurring periodically in the current layer created between the emerging bipole and the large scale active region field. Electric current accumulates and jets are released, with a consequent decrease of the vertical electric current magnitude after every recurrent event (see Guo et al. 2013, for a complete description of the mechanism.)

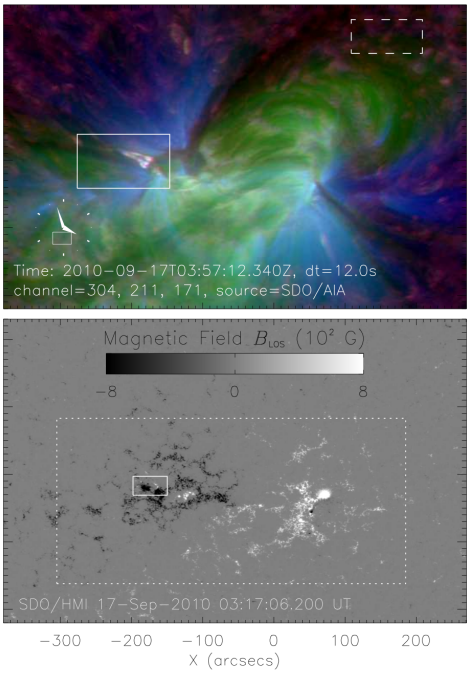

Fig. 1. *Upper*: SDO/AIA EUV composite images in channels 304 Å, 171 Å, and 211 Å (red, blue, and green). *Lower*: SDO/HMI line-of-sight magnetic field. Black/white color represents the negative/positive polarity. Solid box marks the region of the footpoints of the jets.

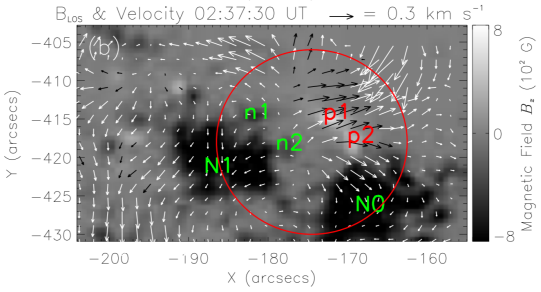

Fig. 2. Map of photospheric transverse velocities derived from LCT analysis on the magnetograms. Parasitic polarities involved in the jets (p1 and p2 for positive, n1 and n2 for negative) and main following negative polarities (N0 and N1) are labeled. Arrows represent velocities and the background is the line-of-sight magnetogram.

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