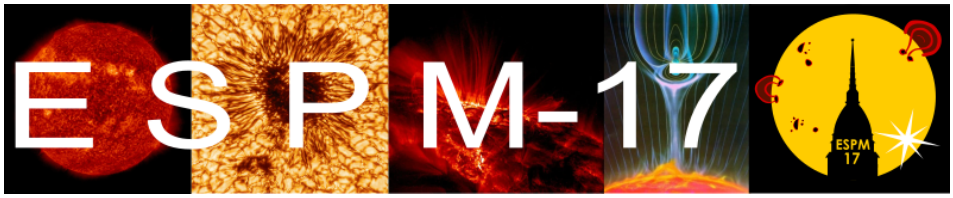

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Tracing magnetic switchbacks to their source: Are coronal jets the main switchback precursors?

The origin of the sudden deflections of the magnetic field, known as magnetic switchbacks, is still hotly debated. These structures, which are omnipresent in the in situ observations made by Parker Solar Probe (PSP), are likely to have their seed in the lower corona. There is an increasing consensus that small-scale energetic magnetic field reconnection plays a crucial role in establishing the conditions for generating switchbacks. We aim to present a rigorous way currently possible to compare in situ measurements of switchbacks with small-scale solar eruptions, in an attempt to demonstrate that these eruptions act as seeds in the solar atmosphere that evolve into switchbacks.

We implement a methodology that uses a backmapping strategy, including a parametric analysis of the usual assumptions on the magnetic connectivity. We then visually identify jets, from an equatorial coronal hole, estimated to be the source region for one of the corotating intervals of PSP. We perform jet identification in AIA 193Å images. Their occurrence rate is then compared with the number of switchbacks captured by PSP.

We observe similar trends in the number of jets from the estimated source region and the number of switchbacks measured by PSP. However, no clear matching correlation is found. This result may be due both to event detection limitations caused by instrumental constraints and the jet visual identification. Our limited knowledge of the evolutionary phenomena occurring during solar wind propagation may also influence the result.

Primary author: BIZIEN, Nina (LPC2E/CNRS/Univ. Orléans)

Co-authors: Dr FROMENT, Clara (CNRS/LPC2E); Prof. DUDOK DE WIT, Thierry (1. LPC2E/CNRS/Univ. Orléans 2.International Space Science Institute); MADJARSKA, Maria S. (1.Space Research and Technology Institute, Bulgarian Academy of Sciences 2.Max Planck Institute for Solar System Research 3.Korea Astronomy and Space Science Institute); VELLI, Marco (Institute of Geophysics & Planetary Physics, Department of Earth, Planetary & Space Sciences)

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Track Classification: Energy and mass transfer throughout the solar atmosphere and structures within