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The active Sun and its implication for the heliosphere
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Magnetic Kelvin-Helmholtz Instability at the Sun

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Flows and instabilities play a major role in the dynamics of magnetised plasmas including the solar corona, magnetospheric and heliospheric boundaries, cometary tails and astrophysical jets. The non-linear effects, multi-scale and microphysical interactions inherent to the flow-driven instabilities are believed to play a role, e.g., in plasma entry across a discontinuity, generation of turbulence and enhanced drag. However, in order to clarify the efficiency of macroscopic instabilities in these processes, we lack proper knowledge of their overall morphological features. Here we show the first observations of the temporally and spatially resolved evolution of the magnetic Kelvin-Helmholtz instability. Unprecedented high-resolution imaging observations of vortices developing at the surface of a fast coronal mass ejecta are taken by the new Solar Dynamics Observatory, validating theories of the non-linear dynamics involved. The new findings are a corner stone for developing a unifying theory on flow-driven instabilities in rarefied magnetised plasmas, important to shed light on the fundamental processes at work in key regions of the Sun-Earth system.