# Scientists Propose Source of Unexplained Solar Jets

## Scientific Achievement

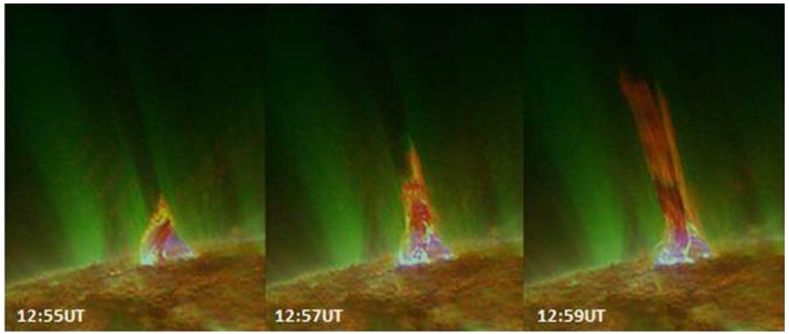
Using NERSC's Cori supercomputer to simulate the solar corona, an aura of plasma that surrounds the Sun, researchers found that swirls and flashes of X-ray light, together known as coronal jets, could be caused by globs of plasma emerging from the sun in ball shapes that resemble magnetic shapes known as spheromaks.

## Significance and Impact

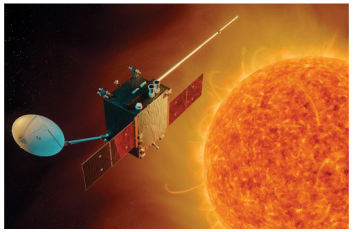
Large coronal jets contribute to outpourings of particles in the solar wind and can affect communications satellites and power grids on Earth. Recent studies have shown that the electric grid and satellites may be more vulnerable to extreme solar eruptions than previously believed, so insights into how the jets form are important to helping scientists predict their occurrence and prepare Earth for their impact.

## Research Details

The research was led by a team from the Princeton Plasma Physics Laboratory and utilized the HYM code, which was developed to study plasma stability in fusion energy reactors. The simulations indicate that a dome-shaped magnetic structure forms on the sun's surface prior to the coronal jets. When the structure detaches from the solar surface, it starts tilting. As it does so, the dome's magnetic field lines interact with the surrounding lines in a process known as magnetic reconnection, which releases the stored magnetic energy in a form of plasma jets.




The eruption of a coronal jet, as captured in an extreme ultraviolet composite by the Solar Dynamics Observatory's Atmospheric Imaging Assembly. Image: SDO/AIA/Solar Influences Data Analysis Center



Eruptions on the Sun can have grave impacts on satellites and electricity grids.

*Latham, J.; Belova, E. V.; Yamada, M., "Numerical study of coronal plasma jet formation"; Physics of Plasmas, 28:012901; 2021 Jan 6, 10.1063/5.0025136*

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