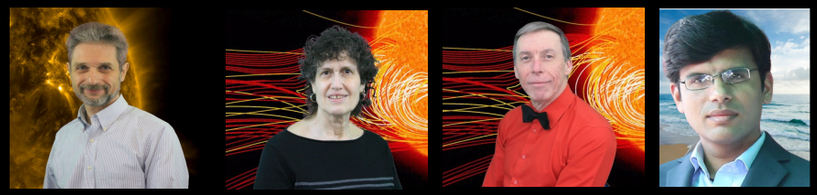
Exploring the Solar Wind with a New View of Small Sun Structures



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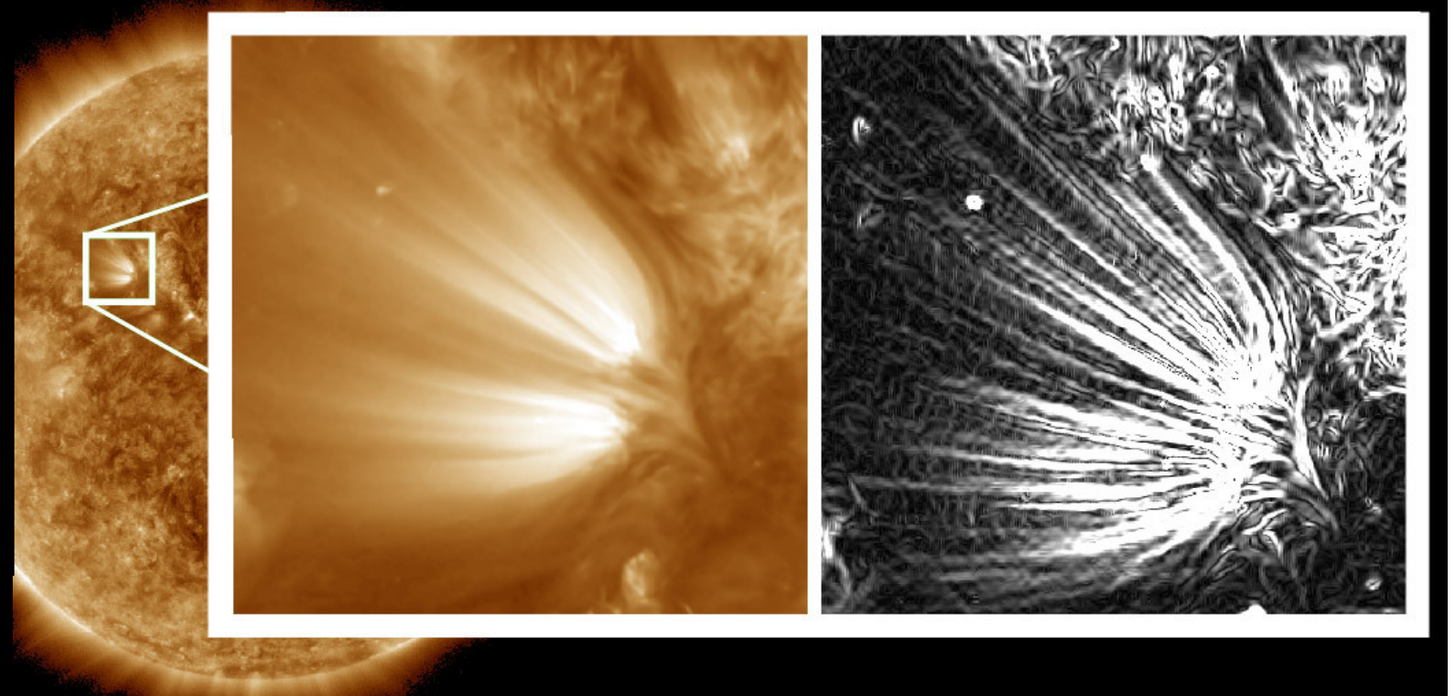
The solar wind is made of hot, electrically charged gas (plasma) and is controlled by magnetic forces. The Sun's atmosphere is particularly complex, with the surface threaded with constantly-changing closed loops of magnetic field and open magnetic field lines that stretch out into the solar system. The solar wind escapes into space along these open fields.

Areas of open magnetic field on the Sun can create coronal holes, patches of relatively low density that appear as dark splotches in ultraviolet views of the Sun. Often, embedded within these coronal holes are geysers of solar material that stream outward from the Sun for days at a time, called plumes.

Using high-resolution observations from NASA's Solar Dynamics Observatory (SDO), we found that these plumes are made up of much smaller strands of material, called plumelets. While the entirety of the plume stretches out across about 70,000 miles in SDO's images, the width of each plumelet strand is only a few thousand miles across.

The processes that create the solar wind often leave signatures in the solar wind itself — changes in the wind's speed, composition, temperature, and magnetic field that can provide clues about the underlying physics on the Sun. Solar plumelets may also leave such fingerprints, revealing more about their role in the solar wind's creation.



The left inset image was captured by NASA's SDO in extreme ultraviolet light and processed to reduce noise. The right inset has been further processed to enhance small features in the images, revealing the edges of the plumelets in clear detail.

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