

Editorial

Parker Solar Probe: Ushering a new frontier in space exploration

Launched in August 2018, NASA's Parker Solar Probe mission has now completed 8 of its 24 scheduled encounters with the Sun and has flown as close as 15 solar radii from its surface. The mission probes the processes behind coronal heating, the acceleration of the solar wind, and the energization of solar energetic particles. Its data have revealed new phenomena, some of which were quite unexpected.

This special issue presents nearly 40 articles, reporting new discoveries and progress on previous findings as well as describing data analysis, theory, and modeling. Major topics include magnetic switchbacks, waves and their roles in heating the solar plasma, the solar angular momentum, and the diversity of small energetic particle events. Dust dynamics is also becoming an important topic as more data are accumulated from the innermost heliosphere. Turbulence in the solar wind, which has long been a leading candidate for energizing the solar plasma, may play an even more prominent role than previously thought.

Parker Solar Probe is continuing its journey and will start making its closest approaches to our star by December 2024. At the same time, the Sun will pass from the solar minimum conditions sampled so far, and the rising solar cycle will no doubt provide new Parker Solar Probe discoveries in regions of increasingly complex solar wind and solar activity.

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