Solar wind discontinuities spatial evolution and energetic ion scattering

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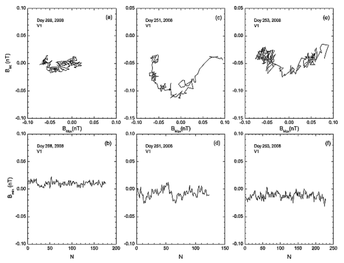
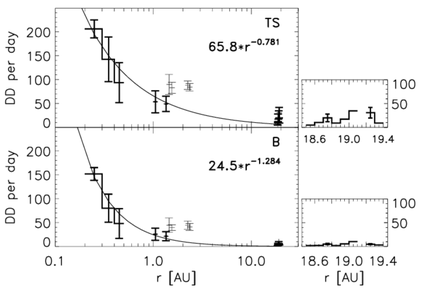
Introduction & Motivation

'Discontinuities' are discontinuous spatial changes in plasma parameters/characteristics and magnetic fields (Colburn and Sonett 1966). They are observed across the heliosphere from inner heliosphere (Liu et al. 2022) to the heliosheath (Burlaga and Ness 2011).



Current sheets in the heliosheath: Voyager 1, 2009

Söding et al. (2001) studied the radial distribution of discontinuities in the solar wind.

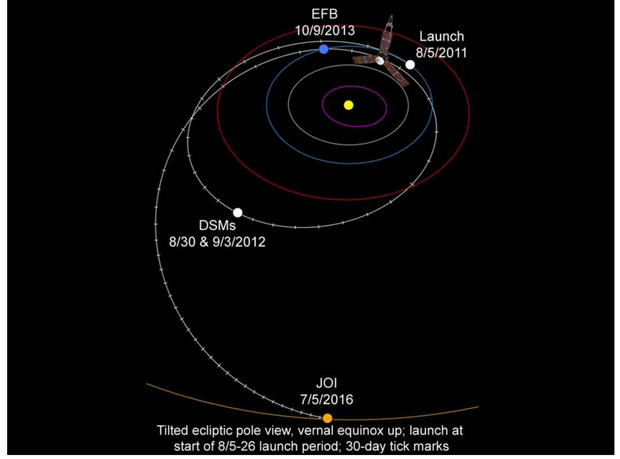


Discontinuities between 0.3 and 19 AU

Joint observations of JUNO & ARTEMIS & Other missions really provides a unique opportunity!!!

Solar wind discontinuities evolve in space with occurrence rate decreasing, **thickness increasing** and **current density decreasing** with distance from the Sun. And they are probably **generated locally** beyond 1 AU.

Background sheared magnetic field plays an important role in determining the efficiency of ion pitch angle scattering, and characterize three ion populations: **transient, trapped, regular.**



Method

Conclusion

{{< qrcode https://beforerr.github.io/ids_finder >}}

Burlaga, L. F., and N. F. Ness. 2011. "Current Sheets in the Heliosheath: Voyager 1, 2009." *Journal of Geophysical Research: Space Physics* 116 (A5). https://doi.org/10.1029/2010JA016309.
Colburn, D. S., and C. P. Sonett. 1966. "Discontinuities in the Solar Wind." *Space Science Reviews* 5 (4): 439–506. https://doi.org/10.1007/BF00240575.
Liu, Y. Y., H. S. Fu, J. B. Cao, Y. Yu, C. M. Liu, Z. Wang, Z. Z. Guo, and R. J. He. 2022. "Categorizing MHD Discontinuities in the Inner Heliosphere by Utilizing the PSP Mission." *Journal of Geophysical Research: Space Physics* 127 (3): e2021JA029983. https://doi.org/10.1029/2021JA029983.
Söding, A., F. M. Neubauer, B. T. Tsurutani, N. F. Ness, and R. P. Lepping. 2001. "Radial and Latitudinal Dependencies of Discontinuities in the Solar Wind Between 0.3 and 19 AU and -80° and +10°." *Annales Geophysicae* 19 (7): 667–80. https://doi.org/10.5194/angeo-19-667-2001.