

Solar-Wind Fluctuations at 1 AU: Which Fluctuations Are Turbulence and Which Fluctuations Are Fossils from the Corona?

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Abstract:

In the solar wind at 1 AU there is an abundance of magnetic and plasma structure with advection timescales from 1 sec to beyond 1 hr. Perhaps the most ubiquitous structures are current sheets, which dominate the magnetic Fourier power of the solar wind. Current sheets can be formed by the action of MHD turbulence. Current sheets are also formed in the solar corona where they act as boundaries between flux tubes in the magnetic carpet. To understand the nature of the solar wind and its evolutionary processes, it is important to understand the origin of the ubiquitous current sheets. In this talk evidence will be presented indicating that a substantial fraction of the current sheets at 1 AU are fossils from the Sun. That evidence includes ion-composition changes across current sheets, strahl-intensity changes across current sheets, and the anisotropy of current-sheet orientations in compression and rarefaction regions.

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References: Borovsky, J. E., Solar wind structures that are not destroyed by the action of solar-wind turbulence. *Front. Astron. Space Sci.* 8, 721350, 2021.

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