Abstract Submitted
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Solar Wind Magnetic Fluctuations Diagnosing Local Reconnection Currents[1] CHARLES DRISCOLL, University of California, San Diego — The 20 years of ACE satellite measurements of B(t) at 1AU enable detailed spectral and dynamical analyses, here supplemented by radial dependencies from Ulysses and Mariner from 0.3 - 5 AU. 1) Variable-duration spectral analyses clearly show that there is no persistent magnetic "spiral" at 1AU, merely the statistical fluctuations of "random walk" dynamics. Similarly, spectral components B(f) above f$\cong 50\mu$Hz clearly show the $\sqrt{}$N scaling of random noise. 2) Pervasive dynamical "arc" events are observed on time-scales 10ˆ3$<\tau<$10ˆ5 sec, presumably related to spiky "switchbacks" observed by PSP at 0.1AU. The dynamics appears as Bθ-Bz, Br-Bz, and Br-Bθ temporal arcs, with occurrence rates differing by direction. The observed dynamics is closely modelled by finite-duration "pinched" +/- current filaments, representing charge non-neutrality of 10ˆ-5 of the e-/p+ flux over distances d$\cong$10ˆ3Mm and times $\tau\cong$2000s. 3) The Br and Bθ (but not Bz) spectral components at the solar rotation frequency f_{rot} are quite exceptional, varying between 0% and 30% (average 17%) of the total Brmsˆ2 magnetic energy. In *only* these variable components (with differing radial dependencies) is there a Br-Bθ anti-correlation, which is traditionally mis-interpreted as a persistent spiral. These f_{rot} components probably reflect z-currents, arising from θ-z-dependent electric potentials from exceedingly small differences in e-/p+ ejection from the rotating solar surface.

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