

Abstract Submitted
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Langevin model of crossover in multiscale fluctuations: Substorm time-scales in Earth's magnetosphere A. SURJALAL SHARMA, VENKAT ANURAG SETTY, University of Maryland College Park — Multiscale fluctuations are usually characterized by a power law with a scaling exponent but many systems require more than one exponent and thus exhibit crossover behavior. The scaling exponents, such as Hurst exponents, represent the nature of correlation in the system and the crossover shows the presence of more than one type of correlation. An accurate characterization of the crossover behavior is thus needed for a better understanding of the inherent correlations in the system. A multi-step process is developed for accurate computation of the crossover behavior. First the detrended fluctuation analysis is used to remove the trends in the data and the scaling exponents are computed. The crossover point is then computed by a Hyperbolic regression technique, with no prior assumptions. The time series data of the magnetic field variations in the Earth's magnetosphere is analyzed with these techniques and yields a crossover behavior with a time scale of ~ 4 hrs. A Langevin model of the magnetospheric dynamics yields an excellent fit to the crossover in the scaling exponents and thus provide a good model of magnetospheric dynamics.

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