

Abstract Submitted
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Multiscale phenomena and crossover in fluctuations in non-equilibrium systems A. SURJALAL SHARMA, VENKAT ANURAG SETTY, University of Maryland — Fluctuations in multiscale phenomena in natural systems, e. g., Earth’s magnetosphere, exhibit crossover behavior in the scaling exponents. These 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 model of the non-equilibrium system.

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