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Stochastic modeling of fluctuations in the solar wind and the Earth's magnetosphere.

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Astrophysical plasmas dominated by high Reynolds number flows exhibit complex multi-scale dynamics. Statistical properties of these systems appear as a unifying aspect of their behavior. The Fokker-Planck and Langevin equations offer an important link between statistical and dynamical studies of such plasmas. We demonstrate how the approximate mono-scaling of fluctuations found in some solar wind and magnetospheric parameters leads to a Fokker-Planck model and ultimately to a stochastic dynamical equations for these fluctuations. Functional forms of the diffusion coefficient and probability density function can be obtained from this model for mono-scaling fluctuations.