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Model of Magnetic Discontinuities in the Solar Wind VLADIMIR ZHDANKIN, STANISLAV BOLDYREV, University of Wisconsin-Madison, JOANNE MASON, University of Chicago — The statistical properties of magnetic discontinuities, as measured by fluctuations in the magnetic field direction, are studied in the solar wind and in direct numerical simulations of incompressible magnetohydrodynamic (MHD) turbulence. We find an excellent agreement in the probability density function (pdf) of angular fluctuations for the two cases if we choose the MHD guide field to rms fluctuations ratio to be approximately $B_0/b_{rms} = 0.3$. The strong agreement between the two cases suggests that there is a similar underlying mechanism describing them, possibly associated with turbulence. We develop an analytical model to describe the observed pdfs, and we address the scalings of the resulting pdfs with the point-separation in the solar wind observations and in the numerical simulations. This work was supported by the US DoE grants DE-FG02-07ER54932, DE-SC0003888, DE-SC0001794, the NSF Grant PHY-0903872, the NSF/DOE Grant AGS-1003451, and the NSF Center for Magnetic Self-organization in Laboratory and Astrophysical Plasmas at the University of Wisconsin-Madison and the University of Chicago, as well as by an allocation of advanced computing resources at the National Institute for Computational Sciences.

Vladimir Zhdankin
University of Wisconsin-Madison

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