Abstract Submitted
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Alignment between velocity and magnetic field fluctuations in the inertial range of solar wind turbulence and comparison to Boldyrev's phenomenological theory J.J. PODESTA, A. BHATTACHARJEE, B.D. CHANDRAN, Center for Integrated Computation and Analysis of Reconnection and Turbulence, University of New Hampshire, Durham, NH 03824 — According to Boldyrev's phenomenological theory of incompressible MHD turbulence in a magnetized plasma the cascade of energy and cross-helicity from large to small scales is accompanied by an alignment between the vector velocity and magnetic field fluctuations. This alignment process is governed by the scale-by-scale conservation of energy and cross-helicity and predicts that the angle between $\delta\mathbf{v}_\perp$ and $\delta\mathbf{b}_\perp$ scales like $\lambda^{1/4}$, where λ is the length scale of the fluctuations perpendicular to the mean magnetic field. Solar wind observations show that this scaling law is approximately valid at the largest inertial range scales but breaks down at intermediate to small scales. Analysis of in-situ measurements from the Wind spacecraft at 1 AU are presented and theoretical implications of these results are discussed.

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