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Anisotropic fluxes of energy and cross-helicity to smaller scales in the solar wind MIRIAM FORMAN, Stony Brook University, BENJAMIN MACBRIDE, University of California, Berkeley, CHARLES SMITH, JOHN PODESTA, University of New Hampshire — The anisotropic MHD vector analog of Kolmogorov's 4/5 law for isotropic hydrodynamics describes transport of energy and cross-helicity to smaller scales by both velocity and magnetic fluctuations acting on both energy and cross-helicity. We have recently reported the first theoretical discussions of these fluxes in anisotropic context, and the first measurements of them in any plasma, using 8 years of magnetic and plasma data from the ACE spacecraft at L1 in the solar wind. These vector fluxes are signed third moments of fluctuations and are difficult to measure. Their scaling, magnitude and direction are the only direct measure of the existence and nature of a local anisotropic cascade of energy to smaller scales resulting from the non-linear terms in the MHD equations. *This revelation is independent of any theoretical model of MHD turbulence.* The scaling of the energy and cross-helicity fluxes also provide the only direct and model-independent way to measure the turbulent energy and cross-helicity dissipation rates.

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