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Interplay of MHD turbulence and discontinuities in the solar wind[1] M.V. MEDVEDEV, U.Kansas, P.H. DIAMOND, UCSD — Solar wind MHD turbulence has been studied for several decades, yet it still escapes full and unambiguous understanding. In particular, whether MHD discontinuities are "intrinsic" turbulent structures or "fossils" of initial conditions in the solar corona is a point of debate nowadays. Understanding of this issue is crucial for the correct interpretation of the solar wind turbulence in the inertial range, as the discontinuities can make a non-negligible contribution to the observed spectra. Here we will discuss a simple *"structure-based"* model of collisionless, compressible MHD (Alfvénic) turbulence. In contrast to more familiar paradigms of turbulence, dissipation of nonlinear Alfvénic structures arises from collisioless dissipation of the associated (driven) compressible mode. The theory predicts that two different regimes or phases of turbulence are possible, depending on the ratio of the rates of nonlinear wave steepening and collisionless damping. The phases represent (1) a smooth turbulence dominated by the usual wave-wave cascade when damping is strong, and (2) a spiky turbulence dominated by small-scale structures (e.g., discontinuities) when damping is weak. The T_e/T_p–β phase diagram of the solar wind turbulence will be presented. The turbulent spectrum is computed and shows a broken power-law structure.

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