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Kinetic-Alfven plasma turbulence mediated by magnetic reconnection STANISLAV BOLDYREV, University of Wisconsin - Madison, NUNO F. LOUREIRO, Plasma Science and Fusion Center, Massachusetts Institute of Technology — Recent measurements of plasma turbulence at scales smaller than the ion gyroscale in the earth magnetosheath by NASA's MMS mission, discovered small-scale reconnection events where only the electrons take part. We propose an explanation of this phenomenon. We investigate low-electron-beta plasma turbulence at sub-proton scales, the so-called inertial kinetic-Alfven turbulence. We argue [1] that the nonlinear dynamics tends to organize turbulent eddies into thin current sheets, consistent with the existence of two conserved integrals of the ideal equations, energy and helicity. The formation of strongly anisotropic structures triggers the tearing instability. We argue that the instability, in turn, governs the energy cascade and affects the statistical properties (energy spectrum, anisotropy) of small-scale kinetic-Alfven turbulence.
[1] S. Boldyrev, N.F.Loureiro, Phys. Rev. Res. (2019) to appear.

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