Abstract Submitted
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Relation of anomalous resistivity and current intensity in turbulent collisionless plasma cascades in the geospace[1] GIOVANNI LAPENTA, KOEN KEMEL, KU Leuven, PIERRE HENRI, CNRS, FRANCESCO CALIFANO, University of Pisa, STEFANO MARKIDIS, KTH — Using the full kinetic implicit PIC code, iPiC3D, we studied the properties of plasma kinetic turbulence, such as would be found at the interface between the solar wind and the Earth magnetosphere at low latitude during northwards periods. In this case, in the presence of a magnetic field oriented mostly perpendicular to the velocity shear, turbulence is fed by the disruption of a Kelvin-Helmholtz vortex chain via secondary instabilities, vortex pairing and non-linear interactions. We found that the magnetic energy spectral cascade between ion and electron inertial scales is in agreement with satellite observations and previous numerical simulations; however, in our case the spectrum ends with a peak beyond de due to the occurrence of the lower hybrid drift instability. The electric energy spectrum is influenced by secondary instabilities: anomalous resistivity, fed by the development of the lower hybrid drift instability, steepens the spectral decay and, depending on the alignment of B and the shear vorticity, peaks due to ion-Bernstein waves may dominate the spectrum around di. A key conclusion of the study is that the anomalous resistivity produced by these complex wave and instabilities can indeed very accurately be described in terms of a proportionality with the current.

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