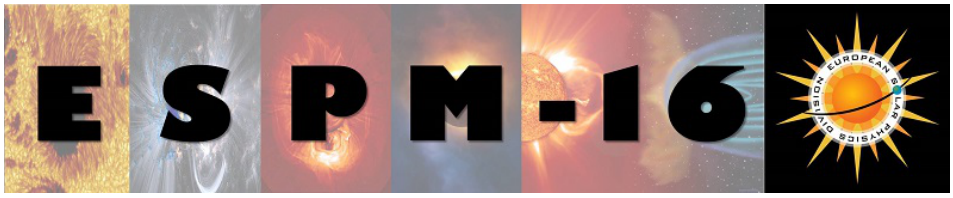

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Probing multiscale properties of plasma turbulence in space and time at sub-ion scales with Iterative Filtering.

Tuesday, 7 September 2021 09:13 (13 minutes)

Turbulence in space and astrophysical plasmas is an intrinsic multiscale phenomenon, which involves nonlinear coupling across different temporal and spatial scales. As a result, the physical mechanisms responsible for the turbulent dissipation and the heating of the plasma below the proton characteristic scales remain largely unknown. In this talk, we will present recent results from a statistical multiscale study of Hall-MHD and hybrid-kinetic numerical simulations of plasma turbulence, performed employing Iterative Filtering, a technique designed for the analysis of nonstationary nonlinear multidimensional signals. A spatial decomposition reveals that turbulence at sub-proton scales is highly intermittent, formed by localized magnetic structures and/or perturbations organized in a filamented network where dissipation is enhanced. Further spatiotemporal analysis shows that such perturbations (with temporal frequencies smaller or comparable to the ion-cyclotron frequency) cannot be described in terms of either kinetic Alfvén or ion-cyclotron waves. Implications of these results and comparison with solar wind turbulence observations will be discussed.

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