

The nature of the Boundary Turbulence in tokamaks and why it is not as you expect

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Fluctuations in the boundary region of tokamaks determine the interaction between the plasma and the walls of the device. Predicting, controlling, and tailoring the turbulence in this region is one of the major challenges in magnetic fusion physics. The nature of the plasma turbulence in this region, however, is quite different from the turbulence in the core region of the plasma, where reactions occur. In particular, large nonlinear coherent filamentary structures with weak interactions tend to dominate the transport of energy and particles towards the solid surfaces of the device. This contribution describes how the complex dynamics of the ensemble of these filaments contributes to generate the plasma density and temperature profiles. A statistical treatment will be introduced to describe the non-local behaviour of the plasma, which can be described using a non-diffusive paradigm