Fast Wave Evanescence in Intermittent Edge Plasmas*

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Radio frequency waves used for heating and current drive in magnetic confinement experiments must traverse the strongly turbulent and intermittent scrape-off-layer (SOL) and edge plasma before reaching the core. In recent work [1] the scattering of rf waves by individual turbulence-generated blob-filaments was studied. Here, we address the related question of the effective scale length for evanescence of an incident fast wave (FW) when there is a significant disparity between the average density, the density between blobs, and the peak blob density. This is the case of strong edge intermittency, which is typical in tokamak experiments. Several analytical models are explored. It is found that although the FW wavelength is long compared with the dimensions of the turbulence, the FW does not simply average over the turbulence, rather the evanescence is essentially controlled by the density between blobs. This effect, which can decrease antenna coupling to the core plasma, is expected to be significant when the distance between the antenna and the nominal FW cutoff (where propagation begins) is long.

[1] J.R. Myra and D.A. D'Ippolito, Phys. Plasmas **17**, 102510 (2010).

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