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Fast Wave Evanescence in Intermittent Edge Plasmas[1] J.R. MYRA, Lodestar Research Corp. — Radio frequency waves used for heating and current drive in tokamaks must traverse the strongly turbulent and intermittent scrape-off-layer (SOL) and edge plasma; however, usually propagation characteristics are assessed using smooth time-averaged one-dimensional plasma profiles. Here, we address the question of the effective scale length for evanescence of an incident fast wave (FW) between the antenna and the core plasma when there is strong SOL intermittency, i.e. 2D density profiles varying perpendicular to B, with a significant disparity between the average density, the density between intermittent blob-filaments, and the peak blob-filament density. Although the FW wavelength is long compared with the dimensions of the turbulence, the FW does not simply average over the turbulent density, rather the evanescence is usually controlled by the density between blobs. This effect can decrease antenna coupling to the core plasma relative to average-profile estimates. It is expected to be significant when the distance between the antenna and the nominal FW cutoff (where propagation begins) is long, such as in some ITER scenarios.

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