Abstract Submitted
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Fullwave Simulation of Doppler Reflectometry in Turbulent Plasmas CARSTEN LECHTE, ULRICH STROTH, Institut fuer Plasmaforschung, Universitaet Stuttgart, Germany, GARRARD CONWAY, Max-Planck-Institut fuer Plasmaphysik, EURATOM Assoziation — Doppler reflectometry is a microwave diagnostic for plasma density fluctuations and flow velocities. A meaningful interpretation of Doppler reflectometry measurements necessitates the analysis of the wave propagation in the plasma using simulations methods. While the beam path can usually be reconstructed with beam tracing methods, the modeling of the scattering process demands the use of wave simulation codes. Furthermore, in the presence of strong density fluctuations, the response from the plasma is dominated by dispersion and multiple scattering, and hence becomes non-linear. IPF-FD3D [1] is the finite difference time domain code used to investigate the dependence of the scattering efficiency on the various plasma conditions. It uses the full set of Maxwell equations and the electron equation of motion. First results in slab geometry indicate a strong dependence of the scattering efficiency on the density gradient, the turbulent fluctuation strength, and the wave polarisation. In addition, the actual plasma conditions in ASDEX-Upgrade are recreated in the simulation in order to interpret experimental measurements.

[1] C. Lechte, IEEE Trans. Plasma Sci. 37 (6), 2009

Carsten Lechte
Institut fuer Plasmaforschung, Universitaet Stuttgart, Germany

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