

Evidence of the scattering processes from edge density fluctuations on the lower hybrid waves in FTU

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The modification of the lower hybrid (LH) waves properties induced by the multiple scattering suffered from density fluctuations at the plasma edge can degrade the current drive (CD) efficiency η_{CD} , as shown in previous work on the tokamak ASDEX, where the LH power source frequency is $f_{LH}=2.45\text{GHz}$ [1]. Evidence of the scattering process in FTU at much higher f_{LH} (8GHz) has given in ref [2]. Here, the modification suffered by the LH waves is calculated on the basis of an analytical description of the scattering occurring in a turbulent layer given in ref [3]. The envelop of the scattering processes occurring on single points sampled along the poloidal profile of the launching antenna at step $\Delta\theta=15^\circ$ is considered. The trajectories and $N_{||}$ evolution of the corresponding ray bundles are followed using the fast ray tracing code FRTC, coupled to the transport code ASTRA in order to infer the radial absorption profile on a given target plasma [4]. Interpretative ASTRA simulations are presented in order to support the correctness of the scattering model assumed. The CD efficiencies calculated are then compared with that measured for the shots assumed as reference and with the scaling valid for FTU [2].

[1]V. Pericoli Ridolfini et al., *Nucl. Fusion*, **V. 34** p. 469 - 481 (1994)

[2]P. L. Andrews and F. Perkins, *Phys. Fluids* **26** (1983) 2537

[3]G. Calabrò et al., *Proc. of the 33rd EPS Conference* (2006), Europhysics Conference Abstracts, Vol. **301**, P-5.077

[4]V. Pericoli Ridolfini et al. *Nucl. Fusion*, **V. 45** p. 1386 - 1395 (2005)