Contribution ID : **183** Type : **not specified**

4.6 Turbulence level effects on conventional reflectometry measurements observed in 2D full-wave simulations

Monday, 16 April 2018 20:30 (120)

Numerical simulations are critical in improving the capabilities of microwave diagnostics. In this work, the 2D finite-difference time-domain full-wave code REFMUL [1] has been applied on broadband turbulent plasmas using the conventional reflectometry set-up.Simulations were performed with O-mode waves, fixed frequency probing and I/Q detection. Determining O-mode propagation, the plasma density ne was modeled as the sum of a mean component of constant radial gradient and a fluctuating component following the Kolgomorov-like amplitude k-spectrum. Constant plasma velocity, in either radial or poloidal direction, and two different ne gradients were considered. In each case, the turbulence level δne /ne was scanned over several orders of magnitude.Simulations show trends, such as spectral broadening of the complex A(t)eiφ(t) signals with increasing δne/ne, that are discussed taking into account geometrical and scattering efficiency competing effects. Variations in A(t) and φ(t) proportional to δne/ne are also shown, for low δne/ne as previously observed with other 1D and 2D codes. The onset of non-linear effects and association with phase jumps and runaway as well as Doppler effects, is also observed and discussed. [1] F. da Silva et al, J. Comput. Phys., 203 (2005), 467-492

Primary author(s) : VICENTE, José (Instituto de Plasmas e Fusão Nuclear, Instituto Superior Técnico, Universidade de Lisboa)

Co-author(s) : DA SILVA, Filipe (Instituto de Plasmas e Fusão Nuclear, Instituto Superior Técnico, Universidade de Lisboa); RIBEIRO, Tiago (Max-Planck-Institut für Plasmaphysik); HEURAUX, Stéphane (Institut Jean Lamour, UMR 7198 CNRS - Université de Lorraine); SILVA, Carlos (Instituto de Plasmas e Fusão Nuclear, Instituto Superior Técnico, Universidade de Lisboa); CONWAY, Garrard (Max-Planck-Institut für Plasmaphysik)

Presenter(s) : VICENTE, José (Instituto de Plasmas e Fusão Nuclear, Instituto Superior Técnico, Universidade de Lisboa); DA SILVA, Filipe (Instituto de Plasmas e Fusão Nuclear, Instituto Superior Técnico, Universidade de Lisboa); RIBEIRO, Tiago (Max-Planck-Institut für Plasmaphysik); HEURAUX, Stéphane (Institut Jean Lamour, UMR 7198 CNRS - Université de Lorraine); SILVA, Carlos (Instituto de Plasmas e Fusão Nuclear, Instituto Superior Técnico, Universidade de Lisboa); CONWAY, Garrard (Max-Planck-Institut für Plasmaphysik)

Session Classification : Session #4, Monday Night Poster Session