Abstract Submitted
for the DPP15 Meeting of
The American Physical Society

Wave solutions of ion cyclotron heated plasmas with self-consistent velocity distributions in a tokamak[1] JUNGPYO LEE, JOHN WRIGHT, PAUL BONOLI, MIT Plasma Science and Fusion Center, Cambridge, MA, USA, ROBERT HARVEY, CompX, Del Mar, CA, USA — We describe a numerical model for the propagation and absorption of ion cyclotron waves in a tokamak with a non-Maxwellian velocity space distribution function. The non-Maxwellian distribution is calculated by solving Maxwell's equations and the Fokker-Plank equation self-consistently. This approach will be useful to interpret measurements of minority hydrogen tail formation during ICRF heating experiments in Alcator C-Mod [A. Bader et al, Nuclear Fusion **52**, 094019 (2012)]. To couple the Maxwell equation solver with Fokker-Plank equation solver, the quasilinear diffusion coefficients for the fundamental ion cyclotron absorption and the first harmonic absorption are calculated. In a previous study [Jaeger et. Al,Nuclear Fusion **46**, S396 (2006)], the all-orders spectral algorithm wave solver (AORSA) was coupled with the Fokker-Plank code (CQL3D) to find the self-consistent non-Maxwellian distribution. We derive the modified quasilinear diffusion coefficients for the finite Larmor radius (FLR) approximation using a significantly faster wave solver (TORIC) following the approach by Jaeger. The coupled TORIC-CQL3D model will be compared against results from AORSA-CQL3D in order to verify the accuracy of the reduced FLR physics in TORIC.

[1]Work supported by US Department of Energy Contract No. DE-FC02-01ER54648.

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Date submitted: 24 Jul 2015

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