Abstract Submitted
for the APR09 Meeting of
The American Physical Society

Self-consistent full wave simulations of lower hybrid waves JOHN WRIGHT, PAUL BONOLI, PSFC-MIT, CYNTHIA PHILLIPS, ERNEST VALEO, PPPL, ROBERT HARVEY, Comp-X, RF-SCIDAC TEAM[1] — Lower hybrid (LH) waves have the attractive property of damping strongly via electron Landau resonance on relatively fast tail electrons. These waves are well-suited to driving off-axis current profile control in reactor grade plasmas. The break down of WKB techniques at reflections from the plasma cutoff make traditional ray tracing techniques unreliable in the weak absorption limit. A massively parallel version of the TORIC full-wave electromagnetic field solver valid in the LH range of frequencies has been developed [Wright, et al. *CCP*, **4**, 545 (2008)] and applied to scenarios at the density (10^{14}/cc) and magnetic field (5T) characteristic of devices such as Alcator C-Mod [Wright, et al. *PoP*, **16**, TBP (2009)]. We find that retaining full wave effects due to diffraction and focusing at caustics and reflections has a strong effect on the location of wave absorption. Lower hybrid waves strongly modify the electron distribution and form a quasilinear plateau. In order to include this effect and field solutions consistent with the distribution function, we have coupled the CQL3D Fokker-Planck code to the lower hybrid solver, TORLH [Valeo, et al. *17th RF Topical Conf.*, n933, p. 297, New York, 2007]. Through iteration, a self-consistent solution is obtained. We discuss the effects off the non-Maxwellian distribution on power deposition and HXR spectra.

[1]DoE Contract No. DE-FC02-01ER54648

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Date submitted: 09 Jan 2009 Electronic form version 1.4