An analysis of lower hybrid wave diffraction and focusing with a 2D toroidal full-wave code.*

J. C. Wright[1], P. T. Bonoli[1], C. K. Phillips[2], M. Brambilla[3], and E. D'Azevedo[4]

[1]MIT Plasma Science and Fusion Center
Cambridge, MA

[2]Princeton Plasma Physics Laboratory
Princeton, NJ

[2]Max-Planck Institute for Plasma Physics
Garching, Germany

[4] Oak Ridge National Laboratory
Oak Ridge, TN

ABSTRACT

The increased availability of massively parallel processing (MPP) architectures has lead to the improved accessibility of some full-wave phenomena in ultra-short wavelength regimes [1]. In this work, we have modified the dielectric operator of an ion cyclotron range of frequencies (ICRF) full-wave code, TORIC [2], to be valid in the lower hybrid range of frequencies (LHRF). These new capabilities permit studies of diffraction and focusing effects at the very short wavelengths of lower hybrid (LH) waves. Results of full-wave LH calculations in the Alcator C-Mod geometry have been obtained (see Fig. 1) and have been compared with ray tracing analysis for the same parameters. Differences between the geometric optics and full-wave models have been found to be related to focusing, diffraction, and spectral broadening effects [3] not included in the eikonal method. These differences will be discussed at length.

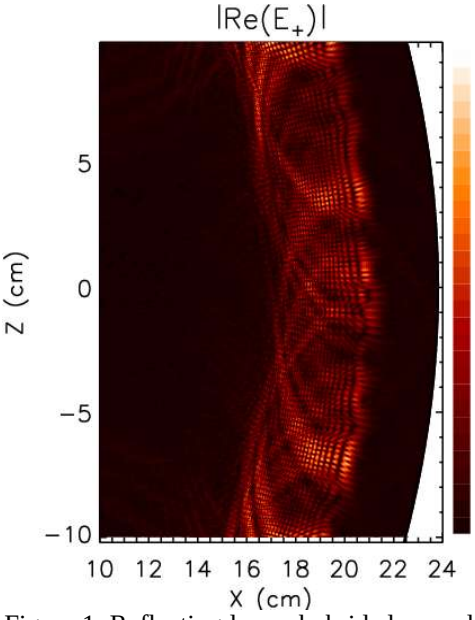

Figure 1. Reflecting lower hybrid slow and fast waves between an edge cutoff and mode conversion surface in the Alcator C-Mod geometry.

[1] J. C. Wright, e*t al.*,, Phys. Plasmas, accepted for publication Jan 2004.
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[3] G. Pereverzev, Nucl. Fusion 32, 1091 (1992)

*Work supported by SciDAC and USDOE Contract No. DE-FC02-01ER54648.