Abstract Submitted
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Full-wave simulations of lower hybrid wave propagation in toroidal plasma with nonthermal electron distributions[1] E.J. VALEO, C.K. PHILLIPS, PPPL, Princeton, NJ, J.C. WRIGHT, P.T. BONOLI, PSFC, MIT, Cambridge, MA, R.W. HARVEY, CompX, Del Mar, CA, R. BILATO, IPP, Garching, Germany — The computational challenge in simulating heating and current drive in the lower hybrid frequency range is formidable, because the perpendicular wavelength is very much shorter than the plasma size ($k_\perp R \sim 10^3$ in current devices, approaching 10^4 in ITER). Furthermore, when driven current and plasma heating are significant, wave-induced electron velocity space diffusion considerably alters the shape of $f_e(\psi, \mu, \epsilon)$ from a Maxwellian. Results from combined ray tracing / 3D Fokker Planck codes have provided considerable insight. However, in order to assess the importance of diffraction, caustics, focii, etc, a more general description is required. The full-wave, parallelized, TORIC-LH code solves the linearized Maxwell-Vlasov equations to compute the vector wave field $\mathbf{E} = \mathbf{E}(\mathbf{r}_\perp) \exp i(n\phi - \omega t)$ in an axisymmetric ($\partial/\partial\phi = 0$) toroidal plasma, with general, non-Maxwellian, distribution functions. Results using model nonthermal distributions will be presented for Alcator C-MOD experimental parameters. Efforts underway to include self-consistently computed distributions will be described.

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