

Results from a Parallel Full-Wave Lower Hybrid Solver*

J. C. Wright,¹ P. T. Bonoli,¹ E. Valeo², C. K. Phillips²,
M. Brambilla³, and the RF SciDAC Team.

¹*MIT Plasma Science and Fusion Center, Cambridge USA*

²*Princeton Plasma Physics Laboratory, Princeton USA*

³*Max-Planck Institute for Plasma Physics, Garching, Germany*

Alcator C-Mod is similar in density, field, and plasma shape to ITER and consequently, the lower hybrid (LH) wave dispersion is very similar. The differences in temperature between the two devices do affect the relation between n_{\parallel} and the location at which damping occurs. Even with a parallel code, LH on ITER is a petascale problem requiring on the order of 100 000 processor cores and 10 000 poloidal modes to complete in one hour. Alcator C-Mod is $1/10^{\text{th}}$ the scale of ITER requiring 1000 times less computation and simulations of LH in this machine have required on the order of 1000 cpu-hours. Therefore, we focus on analysis of full-wave physics effects in LH propagation in Alcator C-Mod using the LH version of the TORIC code[J. C. Wright *et al.*, Phys. Plasmas **11**, 2473 (2004)] and contrast those results with ray tracing calculations. Non-Maxwellian effects though development of the quasilinear plateau also play a role and both codes have a generalized dielectric using numerically calculated distributions (see Valeo poster at this meeting) to incorporate this effect. We will discuss issues of resolution requirements, algorithm improvements, and convergence as well, and speculate on further changes to the algorithms that may enable simulations of ITER with less than petascale requirements.

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