

Abstract Submitted  
for the DPP08 Meeting of  
The American Physical Society

**Overview of Physics Research in the SciDAC Center for Simulation of Wave-Plasma Interactions**<sup>1</sup> PAUL BONOLI, MIT Plasma Science and Fusion Center, RF SCIDAC TEAM — By taking advantage of massively parallel computing platforms and algorithmic advances we have advanced our physics understanding of wave-plasma interactions in present day (*e.g.*, DIII-D and Alcator C-Mod) and reactor-sized tokamak plasmas. We have simulated the evolution of non-thermal ion distributions generated by waves in the ion cyclotron range of frequencies (ICRF) and the interaction of these waves with non-thermal ions from neutral beam injection (NBI) and from fusion processes (alpha particles) by self-consistently coupling a zero orbit width Fokker Planck code and full-wave solver. Finite ion orbit width effects are also being investigated for these interactions using a Monte Carlo orbit code and by direct integration of particle orbits using the ICRF full-wave fields. We have also simulated the evolution of non-thermal electron distributions in the lower hybrid range of frequencies (LHRF) using a full-wave field solver and Fokker Planck code. Finally we shall report on work to simulate the linear and non-linear interaction of ICRF antennas with the tenuous edge plasma.

<sup>1</sup>Supported by US DoE Contract No. DE-FC02-01ER54648.

Paul Bonoli  
MIT Plasma Science and Fusion Center

Date submitted: 22 Jul 2008

Electronic form version 1.4