Abstract Submitted
for the DPP10 Meeting of
The American Physical Society

Simulations of ICRF Heating of Tokamak Core Plasma using δf Particles[1] TRAVIS AUSTIN, DAVID SMITHE, SCOTT SIDES, C.D. ZHOU, Tech-X Corporation — Heating and current drive using the ion cyclotron range of frequencies (ICRF) has been regarded as an important facet of ITER. ICRF power from the edge can be transferred to the core without destroying the favorable properties of the plasma. Most simulations of the core plasma use full wave codes like AORSA or TORIC which assume that the local plasma approximation is valid. When this approximation is not valid, a new approach is necessary. We employ a δf particle-in-cell method for ions and a fluid model for electrons that does not make this assumption. Here, we present recent progress on employing these tools in large scale tokamak simulations using the VORPAL computational framework. We illustrate our ability to model ion cyclotron waves and ion Bernstein waves which are key components for heating and current drive. Furthermore, we present recent work on computing quasi-linear diffusion coefficients which is a necessary prerequisite for coupling to a Fokker-Planck code that permits self-consistent simulations.

[1]Work supported by Department of Energy SBIR Grant DE-FG02-07ER84722.

Travis Austin
Tech-X Corporation

Date submitted: 14 Jul 2010 Electronic form version 1.4