Abstract Submitted
for the DPP09 Meeting of
The American Physical Society

GPU-Accelerated FDTD Full-Wave Codes for Reflectometry Simulations[1] B.C. ROSE, Purdue U., S. KUBOTA, W.A. PEEBLES, UCLA — Recently, GPGPU (General-Purpose computing on Graphics Processing Units) has been gaining popularity in many engineering and science fields as an inexpensive platform for accelerating compute-intensive codes. Here, we report on the application of GPU-computing to microwave reflectometry simulations for NSTX (National Spherical Torus eXperiment) plasmas. Reflectometry is a widespread diagnostic for studying both coherent and turbulent electron density fluctuations in fusion plasmas. A suite of FDTD (Finite-Difference Time-Domain) full-wave microwave propagation codes has been ported to utilize the massively parallel processing capabilities of the NVIDIA C870 GPU. The C for CUDA (Compute Unified Device Architecture) extension of the C programming language was used. For the 1-D FDTD code, it was found that the parallel version ran roughly 6 times faster than the linear equivalent. A more detailed benchmarking of both 1-D and 2-D codes for the GPU and traditional multicore processors will be presented.

[1]Supported by U.S. DoE Grant DE-FG03-99-ER54527 and the DoE National Undergraduate Fusion Fellowship.

S. Kubota
UCLA

Date submitted: 15 Jul 2009 Electronic form version 1.4