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Development of a GPU-Accelerated 3-D Full-Wave Code for Electromagnetic Wave Propagation in a Cold Plasma[1] D. WOODBURY, Brigham Young Univ - Provo, S. KUBOTA, UCLA, I. JOHNSON, PPPL — Computer simulations of electromagnetic wave propagation in magnetized plasmas are an important tool for both plasma heating and diagnostics. For active millimeter-wave and microwave diagnostics, accurately modeling the evolution of the beam parameters for launched, reflected or scattered waves in a toroidal plasma requires that calculations be done using the full 3-D geometry. Previously, we reported on the application of GPGPU (General-Purpose computing on Graphics Processing Units) to a 3-D vacuum Maxwell code using the FDTD (Finite-Difference Time-Domain) method. Tests were done for Gaussian beam propagation with a hard source antenna, utilizing the parallel processing capabilities of the NVIDIA K20M. In the current study, we have modified the 3-D code to include a soft source antenna and an induced current density based on the cold plasma approximation. Results from Gaussian beam propagation in an inhomogeneous anisotropic plasma, along with comparisons to ray- and beam-tracing calculations will be presented. Additional enhancements, such as advanced coding techniques for improved speedup, will also be investigated. [1] K.S. Reuther, et al., Poster JP8.00021, APS DPP13 Meeting, Nov. 11-15, 2013, Denver, CO

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