Abstract Submitted
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GPU-Accelerated Full-Wave Calculations for Microwave and Millimeter-Wave Diagnostics on NSTX[1] T.A. BECHTEL, RPI, S. KUBOTA, W.A. PEEBLES, UCLA, W. GUTTENFELDER, PPPL — 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. Similar applications have seen order-of- magnitude increases in speed through GPGPU. Here we report on a 1-D finite-difference time-domain Maxwell code ported to utilize the massively parallel processing capabilities of the NVIDIA C1060 GPU. The C for CUDA (Compute Unified Device Architecture) extension of the C programming language was used. Detailed benchmarking between the GPU code and a version running on traditional multicore processors will be presented. The code will be utilized as a synthetic diagnostic for Frequency-Modulated Continuous-Wave reflectometry and backscattering, as well as radial polarimetry on NSTX (National Spherical Torus eXperiment). The response of these diagnostics to turbulence from gyrokinetic simulations will be explored.

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