Graphics Processing Unit Acceleration of Gyrokinetic Turbulence Simulations BENJAMIN HAUSE, SCOTT PARKER, Univeristy of Colorado, Boulder — We find a substantial increase in on-node performance using Graphics Processing Unit (GPU) acceleration in gyrokinetic delta-f particle-in-cell simulation. Optimization is performed on a two-dimensional slab gyrokinetic particle simulation using the Portland Group Fortran compiler with the GPU accelerator compiler directives. We have implemented the GPU acceleration on a Core I7 gaming PC with a NVIDIA GTX 580 GPU. We find comparable, or better, acceleration relative to the NERSC DIRAC cluster with the NVIDIA Tesla C2050 computing processor. The Tesla C 2050 is about 2.6 times more expensive than the GTX 580 gaming GPU. Optimization strategies and comparisons between DIRAC and the gaming PC will be presented. We will also discuss progress on optimizing the comprehensive three dimensional general geometry GEM code.

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