Potential Application of a Graphical Processing Unit to Parallel Computations in the NUBEAM Code[1] J. PAYNE, MIT-PSFC, D. MCCUNE, PPPL, R. PRATER, GA — NUBEAM is a comprehensive computational Monte Carlo based model for neutral beam injection (NBI) in tokamaks. NUBEAM computes NBI-relevant profiles in tokamak plasmas by tracking the deposition and the slowing of fast ions. At the core of NUBEAM are vector calculations used to track fast ions. These calculations have recently been parallelized to run on MPI clusters. However, cost and interlink bandwidth limit the ability to fully parallelize NUBEAM on an MPI cluster. Recent implementation of double precision capabilities for Graphical Processing Units (GPUs) presents a cost effective and high performance alternative or complement to MPI computation. Commercially available graphics cards can achieve up to 672 GFLOPS double precision and can handle hundreds of thousands of threads. The ability to execute at least one thread per particle simultaneously could significantly reduce the execution time and the statistical noise of NUBEAM. Progress on implementation on a GPU will be presented.

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