

Abstract Submitted
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Development of GPU-Optimized EFIT for DIII-D Equilibrium Reconstructions¹ Y. HUANG, ASIPP, L.L. LAO, GA, B.J. XIAO, Z.P. LUO, ASIPP, X.N. YUE, USTC — The development of a parallel, Graphical Processing Unit (GPU)-optimized version of EFIT for DIII-D equilibrium reconstructions is presented. This GPU-optimized version (P-EFIT) is built with the CUDA (Compute Unified Device Architecture) platform to take advantage of massively parallel GPU cores to significantly accelerate the computation under the EFIT framework. The parallel processing is implemented with the Single-Instruction Multiple-Thread (SIMT) architecture. New parallel modules to trace plasma surfaces and compute plasma parameters have been constructed. DIII-D magnetic benchmark tests show that P-EFIT could accurately reproduce the EFIT reconstruction algorithms at a fraction of the computational cost. The acceleration factor continues to increase as the (R, Z) spatial grids are increased from 65×65 to 257×257 , suggesting there may be rooms for further optimization by further reducing the communication cost. Details of the P-EFIT optimization algorithms will be discussed.

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