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Parallelization of the GKEM Electromagnetic PIC code using MPI and OpenMP MARK BENJAMIN, STEPHANE ETHIER, WEI-LI LEE, PPPL — GKEM is a legacy gyrokinetic PIC code in slab geometry that calculates anomalous transport in fusion plasmas due to drift wave microturbulence. It is currently being used to develop new algorithms for high-beta electromagnetic PIC simulations. This work focuses on the modernization and performance improvement of GKEM through the use of FORTRAN 90 language features and parallelization. MPI-based particle parallelization was implemented as well as loop-level multithreading using OpenMP directives. Performance improvements and speedup curves for the different stages of the code are discussed. Project supported by the DOE-PPPL High School Internship Program and DOE contract DE-AC02-09CH11466.

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