Computational optimization of global gyrokinetic particle code GTS.\textsuperscript{1} ADITYA KRISHNA SWAMY, STEPHANE ETHIER, WEIXING WANG, EDWARD STARTSEV, WEI-LI LEE, Princeton Plasma Physics Lab, RAJARAMAN GANESH, Institute for Plasma Research, Gandhinagar — Electromagnetic microturbulence is an important source of anomalous ion and electron transport in tokamak plasmas. Gyrokinetic Tokamak Simulation (GTS), a global PIC code presents a first-principles based method to understand and predict such transport. Recently, the double-split-weight scheme that avoids the high-beta “cancelation problem” has been developed and implemented in GTS to study electromagnetic turbulence. Use of magnetic coordinates and a field-line following grid in GTS provides a highly efficient means to resolve a relatively larger set of modes in the same run. The misalignment of the field-line following grid with cylindrical grid, however, makes Fourier-filtering of single mode highly inefficient, and therefore makes benchmarking of linear modes with other codes time consuming. Recent algorithmic optimizations to align this subroutine with the 2-d domain have resulted in a significant performance improvement of \textasciitilde20x, with an overall code speedup of \textasciitilde3x. These and further improvements to the filtering capability, along with linear benchmarks of electromagnetic instabilities such as MTM and KBM will be discussed.

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