Abstract Submitted
for the DPP17 Meeting of
The American Physical Society

Computational optimization of global gyrokinetic particle code GTS.[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 ˜20x, with an overall code speedup of ˜3x. These and further improvements to the filtering capability, along with linear benchmarks of electromagnetic instabilities such as MTM and KBM will be discussed.

[1]SERB Indo-US Research Fellowship

Aditya Krishna Swamy
Princeton Plasma Physics Lab

Date submitted: 14 Jul 2017 Electronic form version 1.4