

Abstract Submitted
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Cross-verification of the GENE and XGC codes in preparation for their coupling¹ FRANK JENKO, GABRIELE MERLO, University of California Los Angeles, AMITAVA BHATTACHARJEE, CS CHANG, JULIEN DOMINSKI, SEUNGHOE KU, Princeton Plasma Physics Laboratory, Princeton University, SCOTT PARKER, University of Colorado, Boulder, EMMANUEL LANTI, Swiss Plasma Center, Lausanne CH — A high-fidelity Whole Device Model (WDM) of a magnetically confined plasma is a crucial tool for planning and optimizing the design of future fusion reactors, including ITER. Aiming at building such a tool, in the framework of the Exascale Computing Project (ECP) the two existing gyrokinetic codes GENE (Eulerian delta-f) and XGC (PIC full-f) will be coupled, thus enabling to carry out first principle kinetic WDM simulations. In preparation for this ultimate goal, a benchmark between the two codes is carried out looking at ITG modes in the adiabatic electron limit. This verification exercise is also joined by the global Lagrangian PIC code ORB5. Linear and nonlinear comparisons have been carried out, neglecting for simplicity collisions and sources. A very good agreement is recovered on frequency, growth rate and mode structure of linear modes. A similarly excellent agreement is also observed comparing the evolution of the heat flux and of the background temperature profile during nonlinear simulations.

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