Abstract Submitted
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The Core-edge Coupling of the Particle-in-Cell Gyrokinetic Codes GEM and XGC[1] JUNYI CHENG, University of Colorado, Boulder, JULIEN DOMINSKI, Princeton Plasma Physics Laboratory, YANG CHEN, University of Colorado, Boulder, CHOONG-SEOCK CHANG, SEUNG-HOE KU, ROBERT HAGER, Princeton Plasma Physics Laboratory, SCOTT PARKER, University of Colorado, Boulder — Within the Exascale Computing Program (ECP), the High-Fidelity Whole Device Modeling (WDM) project aims at delivering a first-principle-based computational tool that simulates the plasma neoclassical and turbulence plasma dynamics from the core to the edge of a tokamak. To permit such simulations, the two existing particle-in-cell (PIC) gyrokinetic codes GEM and XGC are coupled together, where GEM is optimized for the core and XGC is optimized for the edge plasma. Due to the different grids, a mapping technique is developed for transferring the information between GEM's structured and XGC's unstructured meshes. Coupling with adiabatic electrons has been achieved with a spatial coupling scheme [1], and tested for the cyclone-based-case (CBC) equilibrium and for a DIII-D like plasma. A new coupling scheme with kinetic electrons, in which the particle distribution function is exchanged on a 5D grid, is being developed and progress will be reported. [1] J. Dominski, et al. Physics of Plasmas 25 (7), 072308

[1]US DOE Exascale Computing Project (17-SC-20-SC)

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