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**The Spatial Core-edge Coupling of Particle-in-cell Gyrokinetic Codes GEM and XGC**[1] JUNYI CHENG, CU-Boulder, J. DOMINSKI, PPPL, Y. CHEN, CU-Boulder, C.S. CHANG, S. KU, R. HAGER, PPPL, E. SUCHYTA, K. KLASKY, ORNL, A. BHATTACHARJEE, PPPL, S. PARKER, CU-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 dynamics from the core to edge of Tokamak. To permit such simulations, different gyrokinetic codes need to be coupled, which will take advantage of the complementary nature of different applications to build the most advanced and efficient whole volume kinetic transport kernel for WDM. Here we present that the two existing particle-in-cell (PIC) gyrokinetic codes GEM and XGC have been successfully coupled, where GEM is optimized for the core and XGC is optimized for the edge plasma. The current GEM-XGC coupling adopts a coupling scheme, which is initially developed using XGCcore-XGCedge coupled simulations [1]. In this scheme, the time-stepping of the global core and edge distribution functions is achieved by pushing the composite distribution function independently in each code, but using the common global potential field solution for the whole domain. Due to the different grids, an interpolation scheme is used for transferring data back and forth between GEM's structured grid and XGC's unstructured grid. Meanwhile, the whole coupling framework is based on the high-performance ADIOS library with its state-of-the-art dataspaces in file/memory coupling capability. [1] J. Dominski, et al. Physics of Plasmas 25 (7), 072308

[1]Exascale Computing Project

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