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XGC developments for a more efficient XGC-GENE code coupling JULIEN DOMINSKI, ROBERT HAGER, SEUNG-HOE KU, CS CHANG, Princeton Plasma Phys Lab — In the Exascale Computing Program, the High-Fidelity Whole Device Modeling project initially aims at delivering a tightly-coupled simulation of plasma neoclassical and turbulence dynamics from the core to the edge of the tokamak. To permit such simulations, the gyrokinetic codes GENE [1] and XGC [2] will be coupled together. Numerical efforts are made to improve the numerical schemes agreement in the coupling region. One of the difficulties of coupling those codes together is the incompatibility of their grids. GENE is a continuum grid-based code and XGC is a Particle-In-Cell code using unstructured triangular mesh. A field-aligned filter is thus implemented in XGC. Even if XGC originally had an approximately field-following mesh, this field-aligned filter permits to have a perturbation discretization closer to the one solved in the field-aligned code GENE. Additionally, new XGC gyro-averaging matrices are implemented on a velocity grid adapted to the plasma properties, thus ensuring same accuracy from the core to the edge regions.\[1] F. Jenko, W. Dorland, M. Kotschenreuther, and B. Rogers 2000 Phys. Plasmas 7 1904 \cf2 [2] Ku S, Chang C and Diamond P 2009 Nucl. Fusion 49 115021

Julien Dominski
Princeton Plasma Phys Lab

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