Abstract Submitted
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Large Scale Simulations of the Plasma-Material Interaction using Electrostatic Particle-in-Cell Code hPIC[1] RINAT KHAZIEV, STEVEN MARCINKO, CAMERON DART, ALYSSA HAYES, DAVIDE CURRELI, Univ of Illinois - Urbana — Advancements have been made in the development of the kinetic-kinetic electrostatic Particle-in-Cell code hPIC, designed for large-scale simulations of the Plasma-Material Interface. The Algebraic Multigrid Solver BoomerAMG from the PETSc library was utilized to achieve a weak scaling efficiency of 87% on more than 64,000 cores of the BlueWaters supercomputer at the University of Illinois at Urbana-Champaign. The code has been validated in two-stream instability simulations and can simulate a volume of plasma over several square centimeters of surface extending out to the pre-sheath of plasma in kinetic-kinetic mode. Results from a parametric study of the plasma sheath in fusion relevant conditions will be presented, as well as a detailed analysis of the plasma sheath structure at grazing magnetic angles. The distribution function and its moments will be reported for plasma species in the simulation domain and at the material surface for plasma sheath simulations.

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