Abstract Submitted
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XGC1 total-f simulation of electrostatic edge turbulence and neoclassical physics with kinetic electrons and ions[1] SEUNG-HOE KU, C.S. CHANG, Princeton Plasma Physics Lab., J. SEO, Korea Advanced Institute of Science and Technology, J. LANG, Princeton Plasma Physics Lab., S. PARKER, University of Colorado at Boulder — Understanding the turbulence phenomena at the edge region of tokamak plasma is one of the most important issues for magnetic fusion and ITER. XGC1 is a total-f gyrokinetic code working on realistic tokamak geometry including separatrix, and has been upgraded for kinetic electron capability. Neoclassical, X-transport (orbit loss) and turbulence physics are solved together. A stable logical sheath algorithm for the determination of wall sheath potential, without the actual resolution of the Debye sheath profile, has been a critical part of this development. Verification and validation activities will be reported on the electrostatic edge turbulence and neoclassical physics, with the kinetic electrons and ions. The present capability of the electromagnetic turbulence and kinetic neutrals in XGC1 will also be reported, with the near-future plans on resolving the existing issues. Discussions will also include the XGC1 application to the understanding of the pedestal structure, the L-H transition physics, and the divertor heat load width.

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