

Abstract Submitted
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Total-f gyrokinetic edge physics from XGC in realistic diverted geometry¹ C.S. CHANG, Princeton Plasma Physics Laboratory and the SciDAC HBPS Team — Tokamak edge plasma is in a non-Maxwellian state, dominated by multiscale multi-physics kinetic dynamics. Pedestal has steep gradient with its width comparable to the ion orbit width. Neoclassical, micro-turbulence, MHD/fluid type long wavelength modes, and neutral particle physics are all coupled together in complicated geometry that includes divertor and magnetic X-point. The collisionality changes from banana regime at the pedestal top to highly collisional regime in scrape-off layer. Impurity particles are also important players. We will present the current status of the edge gyrokinetic solutions from XGC in the present tokamaks and the future ITER plasmas: including the L-H bifurcation dynamics, divertor heat-flux width, neutral particle effect on edge turbulence, RMP physics, electromagnetic effect, importance of the X-point orbit loss physics, pedestal shape, toroidal rotation source at edge, blob physics, etc. We will also present the future plans.

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