Abstract Submitted
for the DPP19 Meeting of
The American Physical Society

Influence of collisions on sheath profile YUZHI LI, BHUVANA SRINIVASAN, Virginia Tech, XIANZHU TANG, JUN LI, Los Alamos National Lab — When a plasma is in contact with solid boundaries, due to the greater mobility of electrons, a sheath forms in front of the wall. In the classical sheath model, many assumptions are made in order to obtain a simplified analytical model. The ion exit flow speed is characterized by the Bohm criterion, which is used as a boundary condition for simulations that do not resolve the sheath region. Generally, the Bohm speed equals the sound speed when the plasma is collisionless in the presheath region. However, at the tokamak edge, where sharp temperature gradients, strong inelastic collisions, and high recycling regime exists, the sheath profile may have some collisional dependence. Thus, a kinetic study of divertor sheaths will be helpful to understand the physics. In the present work, we developed a Monte Carlo Collision (MCC) package for vector particle in cell (VPIC) code, where elastic and inelastic interactions between charged particles and neutrals are included. Simulation results of plasma distribution profile and sheath parameters will be presented.

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Date submitted: 03 Jul 2019 Electronic form version 1.4