XGC0 particle simulation of plasma transport in RMP in realistic edge geometry

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Physics of kinetic ion and electron transport in RMP is discussed in realistic edge geometries including the magnetic separatrix. XGC0 particle simulation is used under self-consistent radial electric field, neutral Monte Carlo recycling and transport, and heat and momentum flux from the core plasma. For the anomalous radial transport a radial random walk, based upon an experimentally validated anomalous transport, is superimposed on the Lagrangian particle motion. XGC0 simulation in the vacuum RMP yields qualitatively correct plasma behavior compared to experimental observations. XGC0 simulation using a rotation screened RMP model yields good quantitative agreement with DIII-D experiments, which includes the Ti, Te, n, Er and toroidal rotation profiles. [1]. XGC0 simulation using the ideal MHD RMP from the IPEC code yields a good quantitative agreement with NSTX experiment. The presentation may also include the XGC0-M3D coupled simulation in resistive rotating MHD RMP [3].

[1] Collaboration with R. Moyer and I. Joseph
[2] Collaboration with J. Park and J. Menard
[3] Collaboration with H. Strauss