

Abstract Submitted
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Angular momentum sources in tokamak plasma edge CHOONG-SEOCK CHANG, New York University — Computational study of spontaneous rotation phenomena in a diverted tokamak edge plasma is performed using an edge kinetic code XGC. XGC is capable of simulating the whole edge plasma (including the closed and open magnetic field regions) in the presence of magnetic separatrix and material wall. Full function ions, electrons, and Monte Carlo neutrals are followed in the Lagrangian equation of motion. Conserving Coulomb collisions are used. Three spontaneous rotation sources have been identified in a turbulence-free edge plasma: 1) Electrostatic sheath interaction with material wall in the scrape-off region, 2) Particle orbit loss through the magnetic separatrix and X-point, and 3) steep plasma gradient in the edge pedestal. These three rotation sources combine to produce a 2D spontaneous edge rotation profile. Neutral particle interaction is observed to modify the edge plasma rotation profile. XGC finds that the resonance magnetic perturbation (RMP) can also change the spontaneous edge rotation significantly.

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