Abstract Submitted
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Calculation of Intrinsic Edge Rotation Using XGC0[1] D.J. BATTAGLIA, C.S. CHANG, B.A. GRIERSON, W.M. SOLOMON, Princeton Plasma Physics Laboratory, J.A. BOEDO, University of California San Diego, J.S. DEGRASSIE, General Atomics — XGC0 is used to interpret Mach probe measurements on DIII-D indicating a main-ion co-current rotation layer near the plasma separatrix. This intrinsic edge rotation could have multiple sources, including non-isotropic loss of ions on collisionless orbits, turbulent Reynolds stress, finite-orbit effects, neutral charge-exchange and sheath-driven potentials. The sources and sinks are explored using XGC0, a 5D full-f gyrokinetic code that self-consistently computes particle transport (electrons, main-ions and impurity ions) in the pedestal and scrape-off layer for a realistic diverted plasma geometry with divertor recycling. A small amount of anomalous ambipolar diffusion is added to the computed neoclassical transport to improve agreement between simulations and experiment. Preliminary results indicate good quantitative agreement between XGC0 and Mach probe measurements when the gyro-viscosity is on the order of the effective heat diffusion near the separatrix. The gyro-viscosity reduces the poloidal flows, leading to a non-ambipolar loss of counter-I_p ions through the X-point, which is balanced by a pinch of isotropic cold ions from the SOL.

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