Abstract Submitted
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Neoclassical Theory for Toroidal and Poloidal Rotation[1] C. BAE, W.M. STACEY, Georgia Tech, W.M. SOLOMON, PPPL — Rotation of tokamak plasmas is of intrinsic interest and also important for stabilization of MHD modes. Neoclassical rotation theory and gyroviscosity both depend on the poloidal dependence of the magnetic flux surface geometry. The circular [$R = R_\theta(1 + \epsilon cos\theta)$, $B = B_\theta cos\theta$] flux surface formulation [1] was found to overpredict toroidal rotation velocities in DIII-D by a factor of about 2. We now represent neoclassical plasma rotation theory in the more accurate "Miller equilibrium" flux surface geometry [2] for comparison with a pair of co- and ctr-injection DIII-D discharges. The Miller model takes into account Shafranov shift, elongation, and triangularity. Development of the neoclassical plasma rotation theory for either the circular or Miller equilibrium models is complete. Comparison of the new neoclassical calculation with experiment for the circular model shows the same factor of 2 over-prediction of the toroidal velocities found for previous shots [1]. Calculations based on the Miller equilibrium are in progress.

[1] H. Matsuura and Y. Nakao, Phys. Plasmas **13**, 062508 (2006).
[2] R.L. Miller et al., Phys. Plasmas **5**, 973 (1998).

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