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Theory     Experiment

**Modeling of Toroidal Rotation in Low Torque DIII-D Discharges with TGLF+NEO,\*** G.M. Staebler, J.E. Kinsey, R.E. Waltz, and E.A. Belli, *General Atomics* — Momentum transport due to gyrokinetic turbulence is now included in the Trapped Gyro-Landau Fluid (TGLF) quasi-linear transport model. The TGLF model includes the following causes of momentum transport: Parallel velocity shear, parallel velocity, ExB Doppler shift shear, up/down asymmetry of flux surfaces, and diamagnetic velocity shear. For discharges with significant unbalanced neutral beam torque the diamagnetic level flows can be neglected compared to the ExB toroidal velocity. The predicted toroidal rotation in these cases agrees well with data for the limited survey completed so far. For low-torque balance NBI injection cases, the ExB velocity is of the same size as the diamagnetic velocity. Even for zero external torque, there can be a toroidal rotation generated by the Reynolds stresses due to all of the contributions other than the parallel velocity shear. Results for a low-torque DIII-D discharge will be presented using TGLF combined with neoclassical transport and poloidal flows computed using the high-accuracy NEO code. Density, temperature, and rotation are predicted.

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