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Improved Profile Diagnostics for the UCLA Tokamak L. SCHMITZ, T.A. CARTER, J.-L. GAUVREAU, P.-A. GOURDAIN, D.J. LAFONTEESE, W.A. PEEBLES, R.J. TAYLOR, University of California, Los Angeles — Ohmic plasmas in the UCLA tokamak (<n>< 2.7x10^{18}m^{-3}, kT$_e$(0), kT$_i$(0)< 250 eV) routinely exceed the Greenwald density limit and approach the beta limit with β_N ∼2. High quality profile data are important for planned detailed studies of density limit and beta limit physics. Equilibrium profiles are acquired using combined data from Thomson scattering (0 < r/a < 0.7), helium line ratio measurements with good spatial resolution (r/a > 0.5, based on localized inboard/outboard gas puffing), and swept Langmuir (Mach probe) array data for r/a > 0.8. Radial ion temperature profiles are obtained using a two-sided ion energy analyzer (r/a > 0.8). Doppler broadening data (using He gas puffing) will be used to obtain ion temperature profiles further into the core plasma. The use of swept probe arrays in the closed flux surface region permits systematic studies of the plasma momentum balance for r/a > 0.85. Spontaneous poloidal flow in the electron diamagnetic direction is observed in Ohmic plasmas and enhanced with ICRF heating. This rotation is believed to be driven by ion orbit loss. The edge electric field and poloidal flow can be reversed by electrode biasing. The scaling of the electric field and plasma rotation with neutral and ion collisionality (0.5< ν^*_{edge} <20) is investigated. Possible mechanisms for poloidal/toroidal flow generation are discussed.

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