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Anomalous Ion Heating, Intrinsic and Induced Rotation in the Pegasus Toroidal Experiment[1] M.G. BURKE, J.L. BARR, M.W. BONGARD, R.J. FONCK, E.T. HINSON, J.M. PERRY, A.J. REDD, K.E. THOME, University of Wisconsin-Madison — Pegasus plasmas are initiated through either standard, MHD stable, inductive current drive or non-solenoidal local helicity injection (LHI) current drive with strong reconnection activity, providing a rich environment to study ion dynamics. During LHI discharges, a large amount of anomalous impurity ion heating has been observed, with $T_i \sim 800$ eV but $T_e < 100$ eV. The ion heating is hypothesized to be a result of large-scale magnetic reconnection activity, as the amount of heating scales with increasing fluctuation amplitude of the dominant, edge localized, $n = 1$ MHD mode. Chordal T_i spatial profiles indicate centrally peaked temperatures, suggesting a region of good confinement near the plasma core surrounded by a stochastic region. LHI plasmas are observed to rotate, perhaps due to an inward radial current generated by the stochastization of the plasma edge by the injected current streams. H-mode plasmas are initiated using a combination of high-field side fueling and Ohmic current drive. This regime shows a significant increase in rotation shear compared to L-mode plasmas. In addition, these plasmas have been observed to rotate in the counter-I_p direction without any external momentum sources. The intrinsic rotation direction is consistent with predictions from the saturated Ohmic confinement regime.

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M.W. Bongard
University of Wisconsin-Madison

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