Abstract Submitted
for the DPP13 Meeting of
The American Physical Society

Shear suppression of turbulent transport in a magnetized laboratory plasma[1] TROY CARTER, DAVID SCHAFFNER, BRETT FRIEDMAN, GIOVANNI ROSSI, DANIEL GUICE, STEPHEN VINCENA, Dept. of Physics and Astronomy, UCLA — The Large Plasma Device (LAPD) is 17m long, 60 cm diameter magnetized plasma column with typical plasma parameters: $n_e \sim 1 \times 10^{12}$ cm^{-3}, $T_e \sim 10$eV, and $B \sim 1$kG. Broadband, fully-developed turbulence is observed in the edge of the LAPD plasma along with spontaneously driven azimuthal flows. Azimuthal flow and flow shear is varied continuously via a biased limiter. Turbulent particle flux and radial correlation length are observed to decrease with increasing shear [1]. The decrease occurs with shearing rates which are comparable to the inverse turbulent autocorrelation time in the zero flow state. The control over edge flows and flow shear and extensive measurement capability in LAPD provides an opportunity to validate edge turbulence models. LAPD turbulence has been modeled using the 3D Braginskii fluid turbulence code BOUT++. Good qualitative and semi-quantitative agreement is found between BOUT++ simulations and LAPD experimental measurements [2]. Analysis of nonlinear BOUT++ simulations indicates that a nonlinear instability controls the saturated turbulent state.

[1] D.A. Schaffner, et al., Phys. Rev. Lett. 109, 135002 (2012)
[2] B. Friedman, et al., Phys. Plasmas 20, 055704 (2013)

[1]Supported by NSF Award PHY-1202007.

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Date submitted: 12 Jul 2013 Electronic form version 1.4