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3D Global Braginskii Simulations of Plasma Dynamics and Turbulence in LAPD[1] DUSTIN FISHER, BARRETT ROGERS, Dartmouth College — 3D global two-fluid simulations are presented in an ongoing effort to identify and understand the plasma dynamics in the Large Plasma Device (LAPD) at UCLA's Basic Science Facility. Modeling is done using a modified version of the Global Braginskii Solver (GBS) [1] that models the plasma from source to edge region on a field-aligned grid using a finite difference method and 4th order Runge-Kutta time stepping. Progress has been made to account for the thermionic cathode emission of fast electrons at the source, the axial dependence of the plasma source, and biasing the front and side walls. Along with trying to understand the effect sheath's and neutrals have in setting the plasma potential, work is being done to model the biasable limiter recently used by colleagues at UCLA [2] to better understand flow shear and particle transport in the LAPD. Comparisons of the zero bias case are presented along with analysis of the growth and dynamics of turbulent structures (such as drift waves) seen in the simulations.

[1] B. Rogers and P. Ricci. Phys. Rev. Lett. 104:225002, 2010
[2] D. A. Schaffner, et. al., Phys. of Plasmas, 20:055907, 2013

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