## Abstract Submitted for the DPP12 Meeting of The American Physical Society

3D Global Two-Fluid Simulations of Turbulence in LAPD DUSTIN FISHER, BARRETT ROGERS, Dartmouth College, Department of Physics and Astronomy, PAOLO RICCI, Centre de Recherches en Physique des Plasmas (CRPP), Ecole Polytechnique Federale de Lausanne (EPFL), Lausanne, Switzerland -3D global two-fluid simulations are presented in an ongoing effort to identify and understand the physics of instabilities that arise in the Large Plasma Device (LAPD) at UCLA's Basic Science Facility. The LAPD, with its wide range of tunable parameters and device configurations, is ideally suited for studying space and laboratory plasmas. Moreover, the highly detailed and reproducible measurements of the LAPD lend themselves amicably to comparisons with simulations. Ongoing modeling is done using a modified version of the Global Braginskii Solver (GBS) [1] that models the plasma from source to edge region in a fully 3D two-fluid code. The reduced Braginskii equations are solved on a field-aligned grid using a finite difference method and 4th order Runge-Kutta time stepping and are parallelized on Dartmouth's Discovery cluster. Recent 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 it is now possible to vary the potential on the front and side walls. Preliminary results, seen from the density and temperature profiles, show that the low frequency Kelvin Helmholtz instability still dominates the turbulence in the device.

[1] B. Rogers and P. Ricci. Phys. Rev. Lett. 104:225002, 2010

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Date submitted: 19 Jul 2012

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