Abstract Submitted
for the DPP15 Meeting of
The American Physical Society

Studies of waves and instabilities using increased beta, warm ion plasmas in LAPD[1] TROY CARTER, SETH DORFMAN, WALTER GEKELMAN, STEVE VINCENA, BART VAN COMPERNOLLE, SHREEKRISHNA TRIPATHI, PAT PRIBYL, GEORGE MORALES, UCLA — A new plasma source based on a Lanthanum Hexaboride (LAB_6) emissive cathode has been developed and installed on the LArge Plasma Device (LAPD) at UCLA. The new source provides a much higher discharge current density (compared to the standard LAPD Barium Oxide source) resulting in a factor of ~ 50 increase in plasma density and a factor of $\sim 2-3$ increase in electron temperature. Due to the increased density the ion-electron energy exchange time is shorter in the new plasma, resulting in warm ions (measured spectroscopically to be $\sim 5-6$eV, up from $\lesssim 1$eV in the standard source plasma). This increased pressure combined with lowered magnetic field provides access to magnetized plasmas with β up to order unity. Topics under investigation include the physics of Alfvén waves in increased β plasmas (dispersion and kinetic damping on ions), electromagnetic effects and magnetic transport in drift-Alfvén wave turbulence, and the excitation of ion-temperature-anisotropy driven modes such as the mirror and firehose instabilities. The capabilities of the new source will be discussed along with initial experimental resuls on electromagnetic drift-Alfvén wave turbulence and Alfvén wave propagation with increased plasma β.

[1]Supported by NSF and DOE.

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Date submitted: 24 Jul 2015 Electronic form version 1.4