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Waves and instabilities in high β , warm ion plasmas in LAPD

TROY CARTER, SETH DORFMAN, GIOVANNI ROSSI, DANIEL GUICE, WALTER GEKELMAN, UCLA, KRIS KLEIN, U. New Hampshire, GREG HOWES, U. Iowa — The Large Plasma Device (LAPD) has been upgraded with a second LaB₆ cathode plasma source that permits the creation of higher density ($\sim 3 \times 10^{13} \text{cm}^{-3}$), higher temperature ($T_e \sim 12 \text{eV}$), warm ion ($T_i \sim 6 \text{eV}$) plasmas. Along with lowered magnetic field, significant increases in plasma β can be achieved with this new source (e.g. at $B = 100 \text{G}$, $\beta \sim 1$). These new plasma conditions permit a range of new experimental opportunities on LAPD including: linear and nonlinear studies of Alfvén waves in warm ion, high β plasmas; pressure-gradient driven instabilities in increased β plasmas and electromagnetic modifications to turbulence and transport; instabilities driven by ion temperature anisotropies (e.g. firehose and mirror instabilities). The characteristics of the new plasma will be presented along with a discussion of these new research areas.

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