

Abstract Submitted
for the DPP09 Meeting of
The American Physical Society

Experimental Estimation for Beat-Wave Current Generation in an Unmagnetized Plasma and Preliminary Results¹ FEI LIU, UC Davis, ROBERT HORTON, DAVID HWANG, BEN ZHU, RUSSELL EVANS — Beat-wave current generation experiment in a high density compact torus (CT) is being conducted on CTIX using CO₂ lasers. Tunability of the CO₂ lasers provides many options for the wave-particle interaction experiment at a variety of plasma densities with plasma frequency in THz range. For example strong lines such as 9R(12) and 9R(30) could be chosen for an easily obtainable density of $1.28 \times 10^{15} \text{cm}^{-3}$. After restoration, two Lumonics CO₂ lasers are expected to produce approximately 100MW output power in a 50ns pulse. The amount of energy transfer from laser to plasma is determined by the laser power intensity, and by the CT density scale length [1]. The desired power density can be achieved by designing a suitable optical focusing system. In addition, the CT density can be matched to the beat-wave frequency by appropriately selecting the plasma operating conditions and timing. Extensive testing of the Marx banks and pre-ionization boards was done under a variety of operating conditions. Other preliminary results and plans for the wave-particle interaction experiment will also be reported. [1] A. N. Kaufman, B. I. Cohen, PRL, 30 1306 (1973)

¹Supported by U.S. DOE Grant DE-FG02-03ER54732.

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Date submitted: 21 Jul 2009

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