Abstract Submitted
for the DPP05 Meeting of
The American Physical Society

A wave absorption measurement of the electron distribution function FRED SKIFF, CRAIG KLETZING, DEREK THUECKS, SCOTT BOUNDS, University of Iowa, STEVEN VINCENA, UCLA — A new wave absorption technique for determining the electron distribution function parallel to the magnetic field in an overdense ($\omega_{pe} > \omega_{ce}$) magnetized plasma is tested in the LAPD device at UCLA. Previously, electron distribution functions have been determined in tokamak plasmas using electron cyclotron absorption (ECA) (1). In sufficiently overdense plasmas this is no longer possible because of the x-mode cut-off. Here we use the right-hand circularly polarized (whistler) wave. As in the previous experiments one can make use of reciprocity arguments to simplify the analysis in the case of determining the antisymmetric part of the distribution $f(v_\parallel) - f(-v_\parallel)$. However, since it is possible to calculate the coupling efficiency of the antenna structure one can determine the full distribution function with enough time resolution to measure fluctuations. Because the technique is based on wave-particle resonance it is both sensitive and selective. An explanation of the principles of the technique together with preliminary data from an instrument designed for the LAPD plasma (B$\sim$2kG, $n_e \sim 2\text{x}10^{12}$ cm^{-3}, $T_e \sim$7eV) will be presented. The possibility of extending the technique to Lagrangian "Vlasov tagging" will also be discussed. (1) F. Skiff, D. A. Boyd, and J. A. Colborn, Phys. Fluids B5, 2445 (1993).

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Date submitted: 26 Aug 2005 Electronic form version 1.4