Abstract Submitted
for the DPP13 Meeting of
The American Physical Society

Study of Auroral Electron Acceleration in the Laboratory[1] J.W.R. SCHROEDER, F. SKIFF, G.G. HOWES, C.A. KLETZING, University of Iowa, T.A. CARTER, S. DORFMAN, University of California, Los Angeles — Particle interactions with Alfvén waves have been proposed as a possible means for accelerating electrons and generating aurorae. Auroral theory states that electron acceleration by inertial Alfvén waves varies with the perpendicular wavenumber and Alfvén wave amplitude. Traditional diagnostics are not sensitive to the predicted small fluctuations of populations in the tail of the distribution function. A novel approach accurately measures this region of the distribution function using the absorption of a small-amplitude high frequency whistler wave. Inertial Alfvén waves ($v_{\rm th}/v_A \sim 0.2$) with $\delta B/B \sim 10^{-5}$ are launched in an overdense plasma at the Large Plasma Device (LaPD) with $B = 1800$ G. Under these conditions, only the whistler mode propagates parallel to the background field at frequencies just below the electron cyclotron frequency. Initial results show the dielectric perturbation of the distribution function by an Alfvén wave. We present further analysis of measurements of the electron distribution function under plasma conditions relevant to the auroral magnetosphere using a range of Alfvén wave parameters and compare results to theoretical predictions.

[1]Supported by NSF grants ATM 03-17310 and PHY-10033446, DOE grant DE-FG02-06ER54890, NSF CAREER Award AGS-1054061, NASA grant NNX10AC91G, and the Basic Plasma Science Science Facility at UCLA.

James Schroeder
University of Iowa

Date submitted: 12 Jul 2013 Electronic form version 1.4