Abstract Submitted
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Exploring the Alfvén-wave acceleration of auroral electrons in the laboratory[1] J. W. R. SCHROEDER, F. SKIFF, G. G. HOWES, C. A. KLETZING, University of Iowa, T. A. CARTER, S. VINCENA, S. DORFMAN, UCLA — Inertial Alfvén waves likely contribute to the acceleration of auroral electrons. However, a definitive test of Alfvénic electron acceleration is lacking. The Large Plasma Device (LAPD) at UCLA provides a controlled environment to study this wave-particle interaction that may be responsible for a significant fraction of auroras. Inertial Alfvén waves were produced in the LAPD while simultaneously measuring the suprathermal tails of the electron distribution function using resonant whistler mode wave absorption. During a burst of inertial Alfvén waves, the measured portion of the distribution function oscillates at the Alfvén wave frequency. The phase space response of the electrons is well-described by a solution to the linearized Boltzmann equation. Experiments have been repeated using electrostatic and inductive Alfvén wave antennas. The oscillation of the distribution function is described by a purely Alfvénic model when the Alfvén wave is produced by the inductive antenna. However, when the electrostatic antenna is used, measured oscillations of the distribution function are described by a model combining Alfvénic and non-Alfvénic effects. Indications of a nonlinear interaction between electrons and inertial Alfvén waves are present in recent data.

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