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Test Particle Transport Induced by Applied Asymmetric Electric Fields[1] D.L. EGGLESTON, Occidental College — It has long been known that one can produce particle transport in a Malmberg-Penning trap by the application of asymmetric fields via voltages on wall sectors. The resulting field in the plasma, however, depends on the plasma response to the wall voltages and this response is often a complicated function of frequency and amplitude, thus making detailed transport studies difficult. Our experiment avoids this problem by replacing the plasma column with a biased wire stretched along the axis of the trap. Low density electrons (test particles) are injected into this trap and the resulting transport is measured. This scheme maintains the basic dynamical motions of the electrons (azimuthal drift and axial bounce) while allowing perturbing fields that are simply the vacuum solutions to Laplace's equation. We have begun experiments measuring the dependence of transport on perturbation frequency, spin direction, and sector location. The initial data show an increase in transport for perturbation frequencies near the azimuthal drift frequency f_R when the perturbation spin direction matches f_R. This signature appears both when the perturbing sectors are at the ends of the confinement region and also when they are away from the ends.

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☐ Prefer Oral Session
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