CROSS-FIELD MOBILITY IN A PURE ELECTRON PLASMA

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An electron trapping apparatus was constructed in order to study electron dynamics in the defining electric and magnetic fields of a Hall-effect thruster. The approach presented here decouples the cross-field mobility from plasma effects by conducting measurements on a pure electron plasma in a highly controlled environment. Dielectric walls are removed completely eliminating all wall effects; thus, electrons are confined solely by a radial magnetic field and a crossed, independently-controlled, axial electric field that induces the closed-drift azimuthal Hall current. Electron trajectories and cross-field mobility were examined in response to electric and magnetic field strength and background neutral density.