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Semiclassical Dynamics of Charges in a Magnetic Field CHRISTIAN BRACHER, Bard College, ALEXANDROS FRAGKOPOULOS, Georgia Institute of Technology — Using the semiclassical method, we study the propagation of charged, monochromatic particle-waves emitted by an isotropic point source into a two-dimensional layer in the presence of crossed, homogeneous electric and magnetic fields, akin to the Hall configuration. While individual charges follow simple trochoid paths that combine cyclotron and drift motion, in combination they form intersecting trajectory fields that are characterized by intricate caustic structures and foci. Interference among these paths gives rise to strong modulations in the current emitted by the source: Depending on the energy of the charges and the electric and magnetic field strengths, the semiclassical electric flux can be strongly enhanced or completely suppressed, in accordance with quantum calculations. The associated current profile bears little resemblance to the classical trajectory pattern. Instead, we observe three distinct limiting behaviors—global suppression of particle emission, emission into discrete parallel current "stripes," and closed current fields looping around the source.

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