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Final state sensitivity in magnetotail-like magnetic fields RICHARD MARTIN, DANIEL HOLLAND, CONNOR BRENNAN, JAMIE SVETICH, Illinois State University — In this paper we examine chaotic scattering of charged particles in magnetotail-like fields in the Earth's magnetosphere. We focus on two field models: the modified-Harris current sheet and a two-dimensional magnetic neutral line. Both of these Hamiltonian systems exhibit chaotic scattering over a wide range of parameter values. In the current sheet there is a well defined energy resonance that governs the dynamics, and we show that the neutral line model has no such resonance. We investigate self-similar behavior regarding the final state exit region when particles are injected far from the field reversal region, and show that the current sheet scattering has a fractal exit basin boundary structure that closely follows the energy resonance. The neutral line model has a more complex final state structure, which does indicate self-similarity, with a fractal structure to be determined.

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