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Stern-Gerlach Dynamics with Quantum Propagators JEAN-FRANCOIS S. VAN HUELE, BAILEY C. HSU, MANUEL BERRONDO, Brigham Young University — We study the quantum dynamics of a nonrelativistic neutral particle with spin in an inhomogeneous external magnetic field. We first consider fields with one-dimensional inhomogeneities, both unphysical and physical, and construct the corresponding analytic propagators. We then consider fields with two-dimensional inhomogeneities and develop an appropriate numerical propagation method. We propagate various initial states, both pure and mixed, and find the evolution of their spin densities. We identify characteristic features of spin density dynamics and focus on non-ideal Stern-Gerlach outcomes.

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