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The random path of a charged particle in a white noise magnetic field: analysis, simulation, and a physical realization TREVOR LIPSCOMBE, Johns Hopkins University Press, DON LEMONS, BLAKE JOHNSON, Bethel College — We derive a set of stochastic differential equations, parameterized with a single diffusion constant, that describes an isotropic, one-dimensional random path embedded in three dimensions. The path variously describes the trajectory of a charged particle in a white noise magnetic field, a photon undergoing weak scattering, and the random orientation of a long chain molecule. The mean and variance of the squared distance between the ends of the path depend only upon the diffusion constant and the path length. We illustrate this dependence with numerical simulations and test it by gathering data on a physical realization consisting of segments of thread suspended in glycerol.

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