

Abstract Submitted
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Ferrofluid Drops Falling in a Non-Uniform Field¹ FREDERICK WELLS, GEOFF WILLMOTT, University of Auckland — Ferrofluids, i.e. fluid suspensions of ferromagnetic particles, can form beautiful and interesting shapes when placed in a magnetic field. Most famously, when a magnet is placed near a ferrofluid drop on a surface, the fluid forms spikes (Rosensweig instabilities) which arise from competition between magnetic forces and surface. When a ferrofluid droplet in air is placed in a uniform magnetic field, it becomes non-spherical [1]. This presentation will analyse experiments in which drops fall into a non-uniform magnetic field generated by a simple bar magnet. Using high-speed photography and image analysis methods, droplet shapes are captured. As a drop falls and the magnetic field increases, surface tension becomes less important and the drop elongates, forming a spike at its base. The dynamic evolution of drop shapes is studied by considering energy conservation and forces acting on the drop. The force approach can predict drop shape most effectively, especially if the bulk magnetic force is included. [1] P. Rowghanian, C. D. Meinhart and O. Campas, J. Fluid Mech. 802, 245262 (2016).

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