

Abstract Submitted
for the MAR09 Meeting of
The American Physical Society

A shape phase diagram for a ferromagnetic liquid drop SHUBHO BANERJEE, TRAVIS RASOR, Rhodes College, MIKE WIDOM, Carnegie Mellon University — A ferromagnetic liquid phase has been predicted by mean field theory and computer simulations but conclusive experimental evidence is lacking. Liquids such as ferrofluids, that are suspensions of ferromagnetic particles in solvents, magnetize only in the presence of an applied magnetic field and thus are paramagnets, not ferromagnets. A ferromagnetic liquid, if it existed, would spontaneously magnetize even in the absence of a magnetic field. A droplet of such a liquid will likely not be a sphere due to the magnetostatic energies involved. These energies will induce a magnetization texture in the drop analogous to domain formation in solids. We examine possible shapes for the droplet by optimizing its shape and magnetization textures with respect to its overall energy.

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Date submitted: 16 Dec 2008

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