Abstract Submitted
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Microemulsion phases in one and two dimensional magnetic models with long-range interactions[1] ERIK NIELSEN, Department of Electrical Engineering, Princeton University, R. N. BHATT, Department of Electrical Engineering and Princeton Center for Theoretical Physics, Princeton University, DAVID HUSE, Department of Physics, Princeton University, Princeton, NJ 08544 — Spivak and Kivelson[2] have proposed that the first order phase transition between the Wigner crystal and Fermi liquid phases of the interacting electron gas in two dimensions is pre-empted by a series of microemulsion phases characterized by phase separation on the mesoscopic scale, which may be responsible for the anomalous conductivity. We have studied analogous classical magnetic models in one and two dimensions. In particular, we present an exact analytical solution of a one dimensional classical ferromagnetic Ising spin chain frustrated by a long range antiferromagnetic interaction, which clearly exhibits such phase separation in which the mesoscale varies continuously with applied magnetic field. We describe these phases in the 1D model and consider extensions to stripe and bubble phases in two dimensions.[3]

[1]Supported by NSF-MRSEC (DMR-0213706).
[2]B. Spivak and S. A.Kivelson, Physical Review B, 70 155114 (2004)
[3]K. Ng and D. Vanderbilt, Physical Review B, 52 2177 (1995)

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