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Anisotropic model for plastic flow with pinning: 3D simulations
B. ELIZABETH RODRIGUEZ-MILLA, A. ALAN MIDDLETON, M. CRISTINA MARCHETTI, Syracuse University — Switching and macroscopic hysteresis are seen in the driven transport of flux liquids (and in charge density waves). Such effects are ruled out for purely elastic models of flux array transport. Results are presented for a coarse-grained model of flux arrays which generically incorporates both elastic coupling and plastic viscous coupling. This anisotropic model, describing elastic channels interacting in a plastic fashion, has a complex phase diagram with many interesting features that have been found in exact mean-field calculations, including a tricritical point which separates the non-hysteretic region from the region where there is coexistence of stuck and moving states. Our most recent work examines this coarse-grained model in finite dimensions in detail, for distinct models of couplings between the elastic channels. Strong evidence for the existence of a tricritical point has been found. The shape of the phase diagram has a shape significantly different from the mean-field calculations. Results for the critical behavior in finite dimensions will be presented.

A. Alan Middleton
Syracuse University

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