Abstract Submitted
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Thermal depinning and transverse-field tilting transitions in a planar vortex array pinned by a columnar defect[1] LEO RADZIHOVSKY, University of Colorado at Boulder — I will discuss results on a thermal and a transverse magnetic field response of a vortex line array confined to a plane with a dilute concentration of columnar pins. As a function of temperature, for a magnetic field aligned with defects this system exhibits a one-dimensional analog of a roughening transition, with a low-temperature "smooth" phase corresponding to a vortex array pinned by the defects, and a high-temperature "rough" phase in which at long scales thermal fluctuations effectively average away pinning by the defects. In the low-T pinned phase, the vortex lattice tilt response to a transverse magnetic field proceeds via a soliton proliferation "transition", governed by an integrable sine-Hilbert equation. Combining the aforementioned roughenning transition with this commensurate-incommensurate transition, I map out the transverse-field—temperature phase diagram for this system.

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Leo Radzihovsky
University of Colorado at Boulder

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