Abstract Submitted
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Polycrystalline order and disorder in vortex lattices in SNS arrays[1] MALCOLM DURKIN, University of Illinois at Urbana-Champaign, IAN MONDRAGON-SHEM, Yale University, TAYLOR HUGHES, NADYA MASON, University of Illinois at Urbana-Champaign — We present transport measurements on superconductor-normal-superconductor (SNS) arrays placed in a finite magnetic field, studying the introduction of disorder into the vortex lattice. SNS arrays provide a well-defined periodic potential for vortices, allowing a crystalline structure to form when the vortex lattice is commensurate with the SNS array. Disorder is introduced into the crystalline lattice when the field is shifted away from a commensurate value and the vortex lattice no longer matches the array. A recurring question is whether the disorder causes glassy, polycrystalline, or other arrangements of the lattice. We study this by applying a current to drive vortex motion for different commensurate/incommensurate field values. We observe a two-step transition at incommensurate fields consistent with a transition from pinned vortices to lattice defect flow to lattice flow. This suggests a polycrystalline structure with defects forming on the edges of crystalline domain.

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