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Dissipative vortex dynamics in overdamped superconducting arrays MALCOLM DURKIN, IAN MONDRAGON-SHEM, University of Illinois at Urbana-Champaign, SERENA ELEY, Los Alamos National Laboratory, TAYLOR HUGHES, NADYA MASON, University of Illinois at Urbana-Champaign — We study 2D superconductor-normal-superconductor (SNS) arrays consisting of regularly spaced Nb islands on Au films, measuring the current-driven voltage response. SNS arrays provide a highly tunable platform for studying classical vortex behavior and we are able to access a number of vortex regimes, including edge pinning and site pinning regimes at low fields and commensurate vortex lattice behavior at higher fillings. Focusing on the low vortex filling regime, we study the current driven transition from pinned vortices to flux flow, finding that the differential resistance peak predicted by current driven vortex models is absent in our arrays. While the absence of a differential resistance peak is typically associated with finite temperature effects, this explanation is not consistent with our data. Instead, we find that the dynamic behavior of our system is consistent with the presence of time delayed dissipative forces in an overdamped array.

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