

Abstract Submitted  
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**Iso-Dissipative Measurements of Little-Parks Oscillations on Ultra-thin, Superconducting Films Perforated with Nano-pores** M. D. STEWART, JR., ZHENYI LONG, NIRAVUN PAVENAYOTIN, JAMES M. VALLES, JR., Dept. of Physics, Brown University, Providence, RI 02912, AIJUN YIN, J. M. XU, Division of Engineering, Brown University, Providence, RI 02912 — We have quench condensed ultra-thin Bi/Sb films on substrates with a regular (honeycomb) array of holes whose spacing is of the same order as the coherence length. The resulting films retain the same perforated structure as the substrate with a much longer penetration depth than previous studies [1]. Iso-dissipative measurements of magnetic field vs temperature have been made at several different fractions of the normal state resistance. The magnitude of the Little-Parks oscillations grows with decreased dissipation level, agreeing qualitatively with expectations for such a phase-coherent effect. In addition, the number of oscillations grow with hole size reflecting an increase in vortex pinning by the holes [2,3]. Our latest data will be presented and discussed within the context of the relative roles of amplitude and phase fluctuations for films near the Superconductor to Insulator Transition. We acknowledge the support of the NSF through DMR0203608 and an REU supplement. [1] U. Welp *et al.*, Phys. Rev. B, 66, 212507 (2002). [2] A. I. Buzdin, Phys. Rev. B, 47, 11416 (1993). [3] V. V. Metlushko *et al.*, Europhys Lett., 41 (3), 333 (1998).

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