

Lognumber: MAR16-2015-004026

Title: New Method for Imaging Gap Nodal Structure of Unconventional Superconductors through
the Anisotropic Nonlinear Meissner Effect

Abstract Submitted

for the MAR16 Meeting of
The American Physical Society

Imaging the Anisotropic Non-linear Meissner Effect in the Millikelvin Range¹ YUEWEN TAN, SEOKJIN BAE, STEVEN ANLAGE, Univ of Maryland, College Park — The anisotropic non-linear Meissner effect of unconventional superconductors, which gives information about gap nodal structure, has been observed by measurements of anisotropic photoresponse for temperatures down to about 3 Kelvin.[1] Since the anisotropy of photoresponse originates from the non-linear Meissner effect coefficient, and theory predicts a strong temperature dependence for the photoresponse at temperatures below $0.1T_c$,[2] it will be interesting to measure photoresponse in that range. We are building a laser scanning microscope around a dilution refrigerator, and plan to measure photoresponse of unconventional superconductors in the millikelvin temperature range to test the predictions. Reference: [1] A. P. Zhuravel, B. G. Ghamsari, C. Kurter, P. Jung, S. Remillard, J. Abrahams, A. V. Lukashenko, A. V. Ustinov, and S. M. Anlage, "Imaging the Anisotropic Nonlinear Meissner Effect in Nodal $YBa_2Cu_3O_{7-\delta}$ Thin-Film Superconductors" Phys. Rev. Lett. 110, 087002, 2013. [2] T. Dahm and D.J. Scalapino, "Theory of Intermodulation in a Superconducting Microstrip Resonator", Journal of Applied Physics, vol. 81, pp. 2002-2009, 1997.

¹This work is supported by the NSF Grants DMR-1410712.

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Date submitted: 24 Nov 2015

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