Abstract Submitted
for the MAR17 Meeting of
The American Physical Society

Imaging Gap Nodal Structure of Unconventional Superconductors through the Anisotropic Nonlinear Meissner Effect[1] SEOKJIN BAE, Univ of Maryland-College Park, YUEWEN TAN, Washington Univ in St. Louis, ALEXANDER ZHURAVEL, Verkin Institute for Low Temperature Physics, STEVEN ANLAGE, Univ of Maryland-College Park — We present a new measurement method which can be used to image gap nodal structure of superconductors whose pairing symmetry is unknown. This method utilizes photoresponse from a microwave resonance of the superconducting sample perturbed by a scanned laser spot. For an epitaxial thin film or single crystal sample, the anisotropy of this photoresponse is directly related to that of the gap function via the non-linear Meissner coefficient, so the gap nodal directions can be inferred from the photoresponse image. Also, this method is able to simultaneously measure the change in penetration depth, whose low temperature behavior gives an important clue for gap structure. By combining results for gap symmetry from photoresponse, and low temperature behavior of penetration depth, the presented method can make a more conclusive judgement on gap nodal structure and hence pairing symmetry. The data taken from an example unconventional superconductors will be presented and discussed.

[1]NSF Grant DMR-1410712

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Date submitted: 13 Jan 2017 Electronic form version 1.4