Abstract Submitted
for the MAR15 Meeting of
The American Physical Society

Amplitude mode oscillations in pump-probe photoemission spectra of electron-phonon mediated superconductors[1] ALEXANDER KEMPER, Lawrence Berkeley National Laboratory, MICHAEL SENTEF, Universitt Bonn, BRIAN MORITZ, Stanford Institute for Materials & Energy Sciences, JAMES FREERICKS, Georgetown University, THOMAS DEVEREAUX, Stanford Institute for Materials & Energy Sciences — The amplitude, or Higgs mode is deeply intertwined with the historical development of the BCS theory of superconductivity. Although the presence of the Higgs mode is fundamental to superconductivity, it remained elusive for many decades, and its presence and observability is still under debate in many contexts. We present results for time-dependent photoemission spectra to directly probe the dynamics of the superconducting gap edge where the fingerprint of superconductivity is strongest. The pumping of a superconductor is simulated by solving the two-time Gor'kov equations of motion for the Migdal-Eliashberg model, which is a minimal gauge-invariant model for superconductivity with a pairing boson and dissipation. The Higgs mode can be directly detected without the requirement of any additional symmetry breaking and is clearly visible as oscillations of the gap edge spectra at twice the gap frequency, a hallmark of amplitude modes.

[1]A.F.K. was supported by the Laboratory Directed Research and Development Program of Lawrence Berkeley National Laboratory under U.S. Department of Energy Contract No. DE-AC02-05CH11231

Alexander Kemper
Lawrence Berkeley National Laboratory

Date submitted: 14 Nov 2014 Electronic form version 1.4