Abstract Submitted
for the MAR12 Meeting of
The American Physical Society

Evidence for domain wall superconductivity in antiferromagnetic CaFe2As2 ADAM P. DIOGUARDI, UC Davis Physics, HONG XIAO, T. HU, Department of Physics, University of Crete and FORTH, NICHOLAS APROBERTS-WARREN, ABIGAIL SHOCKLEY, JOHN CROCKER, DAVID M. NISSON, Department of Physics, UC Davis, Z. VISKADOURAKIS, Department of Physics, University of Crete and FORTH, XIANYANG TEE, Division of Physics and Applied Physics, Nanyang Technology University, I. RADULOV, Department of Physics, University of Crete and FORTH, C.C. ALMASAN, Department of Physics, Kent State University, NICHOLAS J. CURRO, Department of Physics, UC Davis, CHRISTOS PANAGOPOULOS, Department of Physics, University of Crete and FORTH — ^{75}As nuclear magnetic resonance (NMR), resistivity, and magnetization measurements in the antiferromagnetic state of the iron-based superconductor parent compound $CaFe_2As_2$ exhibit anomalous features consistent with the collective freezing of domain walls. Below T* $\approx$ 10 K, the ^{75}As NMR measurements reveal the presence of slow fluctuations of the hyperfine field, the resistivity shows an enhancement and subsequent suppression, and the bulk magnetization shows a sharp increase. These features in both the charge and spin response are strongly field dependent, are fully suppressed by H* $\approx$ 15 T, and suggest the presence of filamentary superconductivity nucleated at the antiphase domain walls.

Adam P. Dioguardi
UC Davis Physics

Date submitted: 14 Dec 2011 Electronic form version 1.4