

Abstract Submitted
for the MAR17 Meeting of
The American Physical Society

Signatures of pair-density wave order via measurement of the current-phase relation in $\text{La}_{2-x}\text{Ba}_x\text{CuO}_4$ Josephson junctions DAVID HAMILTON, ADAM WEIS, Univ of Illinois - Urbana, GENDA GU, Brookhaven National Laboratory, DALE VAN HARLINGEN, Univ of Illinois - Urbana — $\text{La}_{2-x}\text{Ba}_x\text{CuO}_4$ (LBCO) exhibits a sharp drop in the transition temperature near $x = 1/8$ doping. In this regime, charge, spin and superconducting orders are intertwined and superconductivity is believed to exist in a pair-density wave (PDW) state, an ordered stripe phase characterized by sign changes in the superconducting order parameter between adjacent stripes. We present direct measurements of the current-phase relation (CPR) of Josephson junctions patterned onto crystals of LBCO at $x = 1/8$ and $x = 0.155$ (optimal doping) using a phase-sensitive Josephson interferometry technique. In contrast to the approximately sinusoidal CPR observed at optimal doping, we find the proportion of higher harmonics in the CPR increases at $x = 1/8$ doping, consistent with the formation of a PDW state. In parallel, we are carrying out measurements of the resistance noise in thin films of LBCO of various doping levels to identify features that signify the onset of charge order and changes in the dynamics of charge stripes.

David Hamilton
Univ of Illinois - Urbana

Date submitted: 11 Nov 2016

Electronic form version 1.4