

Abstract Submitted  
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**Directly Visualizing Bogoliubov Quasiparticle Interference of LiFeAs: a Way Toward Understanding Superconductivity in Iron Pnictides**<sup>1</sup> SHUN CHI, S. JOHNSTON, G. LEVY, S. GROTHE, R. SZEDLAK, B. LUDBROOK, RUIXING LIANG, P. DOSANJH, S.A. BURKE<sup>2</sup>, A. DAMASCCELLI, D.A. BONN, W.N. HARDY, Y. PENNEC, Department of Physics and Astronomy, University of British Columbia; Quantum Matter Institute, University of British Columbia — Imaging quasiparticle interference (QPI) is a way to probe the electronic states of a wide range of materials. In superconductors, QPI of Bogoliubov excitations is directly sensitive to the sign changes of the superconducting order parameter. In this talk, I present our investigation of QPI in superconducting LiFeAs by means of scanning tunneling microscopy/spectroscopy, angle resolved photoemission spectroscopy, and multi-orbital tight binding calculations. Using this combination we identify intra- and interband scattering vectors between the hole ( $h$ ) and electron ( $e$ ) bands in the QPI maps. Bogoliubov QPI, with a clear antisymmetric phase at positive and negative bias voltages near the superconducting gap, is revealed in the spatial modulations of the local density of states. The observation of both h-h and e-h scattering intensity variations is exploited using scattering selection rules for Bogoliubov quasiparticles. From this we infer an  $s + -$  gap structure, where a sign change occurs in the superconducting order parameter between the  $e$  and  $h$  bands.

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