

Abstract Submitted
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Robust measurement of superconducting gap sign changes via quasiparticle interference: an application to 111 compounds¹ ILYA

EREMIN, DUSTIN ALTENFELD, Institut für Theoretische Physik III, Ruhr-Universität Bochum, D-44801 Bochum, Germany, PETER HIRSCHFELD, Department of Physics, University of Florida, Gainesville, Florida 32611, USA, IGOR MAZIN, Code 6393, Naval Research Laboratory, Washington, DC 20375, USA — While quasiparticle interference (QPI) measurements based on scanning tunneling spectroscopy are often proposed as definitive tests of gap structure, the analysis typically relies on details of the model employed. Here using the simplified two-band model system we propose, that the temperature dependence of momentum-integrated QPI data can be used to identify gap sign changes in a qualitative way, and present an illustration for s_{\pm} and s_{++} states in a system with typical Fe-pnictide Fermi surface. Using ARPES derived band structures within 10 orbital model Hamiltonian we analyze the QPI spectra in LiFeAs and Co-doped NaFeAs compounds and show that the sign-changing gap can be clearly identified using non-magnetic impurity scattering.

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