

Abstract Submitted
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Fresnel aperture diffraction: a phase-sensitive probe for pairing symmetry of a superconductor¹ CHENG-SHI LIU, Yanshan University, WEN-CHIN WU, National Taiwan Normal University — Fresnel single aperture diffraction is proposed as a phase-sensitive probe for studying the pairing symmetry of a superconductor. It is shown that in case of gap symmetry $\Delta(-\mathbf{k}) = \Delta(\mathbf{k})$ with wavevector \mathbf{k} normal to the tunnelling junction of a superconducting film, the quasi-particle diffraction pattern developed at the image plane is zeroth-order minimum. In contrast, the corresponding diffraction pattern is zeroth-order maximum for the case of $\Delta(-\mathbf{k}) = -\Delta(\mathbf{k})$. Observable consequences are discussed and proposed for studying the iron-arsenic based superconductor to which gap symmetry may be complicated as a result of multiple Fermi surface pairings.

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