

Effect of Mixed Superconducting Order Parameter on Quasiparticle Interference in Ising NbSe₂ Superconductor

Jozef Haniš^{1,3, a)}, Marko Milivojević², and Martin Gmitra^{1,3}

¹*Department of Theoretical Physics and Astrophysics, Institute of Science, Pavol Jozef Šafárik University in Košice, Park Angelinum 9, 040 01 Košice, Slovakia*

²*Institute of Informatics, Slovak Academy of Sciences, Dúbravská cesta 9
845 07 Bratislava 45, Slovakia*

³*Institute of Experimental Physics, Slovak Academy of Sciences, Watsonova 47, 04001 Košice, Slovakia*

a) Corresponding author: jozef.hanis@student.upjs.sk

Abstract. The NbSe₂ monolayer hides fascinating physical properties at very low temperatures. The most striking is its superconductivity in the 2D limit which is characterized by unconventional Ising pairing, capable of sustaining significant in-plane magnetic fields [1-4]. Recent experimental observations have indicated the potential coexistence of other superconducting gap function symmetries like nodal and nematic superconductivity [5]. In this talk, we will present all possible singlet and triplet superconducting gap functions derived from the group-theoretical framework for the NbSe₂ monolayer and their effect on quasiparticle interference (QPI). The QPI patterns for a single scalar impurity [6] are investigated. Our analysis reveals pronounced features in the QPI patterns when both singlet and triplet superconducting pairings are mixed. This observation underscores that investigation of the QPI patterns can reveal the presence of nematic phases. The QPI offers valuable indications for unraveling the pairing mechanisms and nematicity in unconventional superconductors.

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