Bifurcation of Topological Phases in Two Dimensional Ising Superconductor NbSe2 Monolayer

Zoltán Tajkov[1, a)], Jozef Haniš[1], Marko Milivojević,[2] and Martin Gmitra[3, 4]

[1)] *Centre of Low Temperature Physics, Institute of Experimental Physics, Slovak Academy of Sciences, Košice SK-04001, Slovakia (Slovakia)*
[2)] *Institute of Informatics, Slovak Academy of Sciences, Bratislava, Slovakia (Slovakia)*
[3)] *Institute of Physics, Pavol Jozef Šafárik University in Košice (Slovakia)*
[4)] *Centre of Low Temperature Physics, Institute of Experimental Physics, Slovak Academy of Sciences (Slovakia)*

[a)] Corresponding author: tajkov@saske.sk

Abstract. Two-dimensional (2D) topological superconductors are increasingly sought after due to their promise in exploring exotic quantum phenomena and their potential applications in quantum computing. However, despite their significance, there remains a scarcity of reports on 2D superconductors, particularly those with topological properties. In this study, we investigate the topological characteristics of monolayer NbSe2, a 2D Ising superconductor, under the influence of doping through the chemical potential. Through a systematic analysis utilizing the categorization of potential superconducting states based on irreducible representations within specified symmetry groups, our findings unveil the potential topological phases present in the system. By discerning the superconductive gap functions, we can determine whether the material exhibits a topological or trivial state, revealing a diverse array of topological superconductivity phenomena in NbSe2.