

Abstract Submitted
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Symmetry aspects of localized Dirac fermions within topological defects¹ CHI-KEN LU, Department of Physics, Simon Fraser University, IGOR HERBUT, Department of Physics, SFU — We study the conditions for the existence of zero-energy bound states within topological defects in various insulating and superconducting order parameters for Dirac fermions in graphene and topological insulators. In particular, we discuss several physically relevant realizations of the “Dirac vortex” which include the finite chemical potential and Zeeman terms, and the orbital magnetic fields, and present some explicit solutions for the zero-modes. The crucial role in our discussion is assumed by the antilinear symmetry between the positive and negative parts of the energy spectrum. The effects of the orbital symmetry of the defect’s underlying order on the zero-modes are also considered.

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