Tangent fermions: massless fermions on a lattice

Donís Vela, A.

Stellingen

behorende bij het proefschrift

Tangent fermions: massless fermions on a lattice

1. The topological protection of a single Dirac cone on a space-time lattice requires not only chiral symmetry, but also the continuity of the evolution operator in the reciprocal space. [Chapter 2]

2. It is impossible to have a gauge invariant lattice formulation of massless fermions with a single topologically protected zeroth Landau level. [Chapter 4]

3. In a topological superconductor, a supercurrent cannot produce an inversion of velocity of the Majorana edge modes if the pairing is p-wave. [Chapter 5]

4. The injection of edge-vortices in a topological superconductor can be spoiled by the entrapment of excitations in the Josephson junction of the injector. [Chapter 6]

5. A zigzag-edge boundary condition for Dirac fermions can be replaced by a large vector potential parallel to the boundary.

6. The thermal-metal-insulator transition in a chiral p-wave superconductor is a percolation transition for Majorana fermions.

7. The exceptional points of a non-Hermitian Hamiltonian do not produce a singularity in the Josephson effect. [arXiv:2404.13976]

8. Although the Hamiltonian for tangent fermions is non-local, it can be written as a matrix product operator of finite bond dimension.

9. Within a given research area, there is a negative correlation between the length of the title of a scientific article and its quality.

Álvaro Donís Vela
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