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On topological Properties of Superconducting Nanowires

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Stellingen

behorende bij het proefschrift

On topological properties of superconducting nanowires

1. There exist sharp topological transitions in finite systems.
Chapter 2
2. Weak localization of electrons is not destroyed by a magnetic field in the presence of a superconductor.
Chapter 4
3. The 4π -periodic Josephson effect leaves signatures in the critical current.
Chapter 6
4. Commonly used relaxation-time approximation for the solution of the Boltzmann equation can give the wrong sign for the Nernst coefficient.
Chapter 7
5. The puzzling insensitivity of the quantum spin Hall effect to a perpendicular magnetic field, observed experimentally, can be explained as a disorder effect.
L. Du, I. Knez, G. Sullivan, and R.-R. Du, arXiv:1306.1925 (2013).
6. Real eigenvalues of real matrices have the same statistics as energy levels at a metal-insulator transition.
C. W. J. Beenakker, J. M. Edge, J. P. Dahlhaus, D. I. Pikulin, Shuo Mi, and M. Wimmer, Phys. Rev. Lett. **111**, 037001 (2013).
7. Bogoliubov quasiparticles are Majorana fermions.
8. Majorana bound states can be confined by a gate electrode at the edge of a quantum spin Hall insulator.
Shuo Mi, D. I. Pikulin, M. Wimmer, and C. W. J. Beenakker, Phys. Rev. B **87**, 241405(R) (2013).
9. In many cases overconfidence is more profitable than rational behaviour.

Dmitry Igorevich Pikulin
Leiden, November 26