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Anyonic, cosmic, and chaotic: three faces of Majorana fermions

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Citation

Cheipesh, Y. I. (2022, November 17). *Anyonic, cosmic, and chaotic: three faces of Majorana fermions. Casimir PhD Series*. Retrieved from <https://hdl.handle.net/1887/3487143>

Version: Publisher's Version

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Stellingen

behorende bij het proefschrift

Anyonic, cosmic, and chaotic: three faces of Majorana fermions

1. A vanishing fermion parity in a superconductor fusion experiment can not become a distinctive signature of an isolated Majorana zero-mode. [chapter 2].
2. The absence of quasiparticles in SYK model manifests itself in a linear in temperature dependence of the tunneling current between it and the fermion bath. [chapter 5].
3. Many-body effects in the nano-device present in the experimental setup for the relic neutrino detection impose fundamental intrinsic limitation on its energy resolution. [chapter 6].
4. The detection of relic neutrinos in the β -decay spectrum of ${}^3\text{H}$ is fundamentally impossible. The only viable isotope for neutrino detection is ${}^{171}\text{Tm}$. [chapter 7].
5. Any gauge-invariant lattice theory of Dirac fermions which preserves chiral symmetry must have a vanishing topological index.
6. Entanglement entropy is not a good measure of the complexity of the fermionic system.
7. There is a k -body basis independent measure of fermionic complexity $C(k)$ that is zero for a product state, exponentially decreasing for a Fermi liquid state and $\delta(k - k^*)$ with $k^* \propto \text{volume of the system}$ for a chaotic state.
8. If one couples two fermionic systems, their internal energies will grow at timescales of the Fermi time $\tau_F \sim 1/\varepsilon_F$ independently of their initial temperatures.

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27 november 2022