

Notes about Periodic table for topological insulators and superconductors

Taper

November 1, 2016

Abstract

As title suggests.

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From the start: for **Gapped free-fermion** system, he mentions the classification hitherto available. See Table 1.

Robustness in classification

..., the topological numbers are insensitive to disorder and can even be defined without the spectral gap assumption, provided the eigenstates are localized.

Equivalence of Hamiltonian

... Two Hamiltonians belong to the same phase if they can be continuously transformed one to the other while maintaining the energy gap or localization; we will elaborate on that later.

1 Anchor

References

- [1] Alexei Kitaev. Periodic table for topological insulators and superconductors.

2 License

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Table 1: Classification			
<i>Symmetry</i>	<i>Spatial Dimension</i>	<i>Result</i>	<i>Other Keywords</i>
T	0	An intger: the number of particle-occupied Kramers doublet states	
T	1	None	
T	2	\mathbb{Z}_2	
T	3	\mathbb{Z}_2	3D crystals have additional $3\mathbb{Z}_2$ invariant \Rightarrow "weak topological insulators"
Q(?)	2	Characterized by μ in units of e^2/h	TKNN
Q(?)	even d	Topological invariant (k -th Chern number)	
Q(?)	0	number of single-particle states with negative energy ($E < E_F = 0$), which are filled with electrons.	
T& Q			
No T & No Q	0	\mathbb{Z}_2	
No T & No Q	1	\mathbb{Z}_2	"majorana chain"
No T & No Q	2	Topological number is integer.	Even-odd effects.