KIDS TALK

“Topological invariants in one-dimensional lossy quantum walks”

Speaker: Manolo Rivera Lam, AG Meschede, Uni Bonn

Abstract: Quantum walks describe the motion of a quantum particle in discrete steps in time and space. During the last years, substantial theoretical progress has been done concerning the topological properties of quantum walks. It has been shown that quantum walks enable topologically protected edge states with two associated topological invariants [1]. Topological invariants are physical quantities characterizing the walk, which do not change under continuous deformation of the walk's parameters (coin angles in this case). Furthermore, the number of topologically protected edge states is equal to the difference of the two topological invariants (bulk-boundary correspondence principle). Recent theoretical work suggests that such topological invariants can be measured with a lossy quantum walk [2]. More precisely, if we remove one spin species at each time step, the average position where the atom is removed is an integer equal to the sum of the two topological invariants. I will present the one dimensional split-step protocol and its topological properties. Moreover, I will present the experimental proposal to achieve the realization of the lossy quantum walk using optimal coin and transport operations, and the measurement of its associated topological invariants.

[1] JK Asbóth, H Obuse, “Bulk-boundary correspondence for chiral symmetric quantum walks”, Phys. Rev. B 88, 121406(R) (2013)
[2]J. K. Asboth, T. Rakovszky, A. Alberti, “Detecting topological invariants via losses in chiral symmetric Floquet insulators”, arXiv:1611.09670 [cond-mat.mes-hall] (2016)

When: Friday, June 23rd 2017, **10:00 am**

Where: Room 46-387/388

All undergraduate and graduate students as well as postdocs are welcome and encouraged to join our discussion!

********** COFFEE, TEA AND COOKIES WILL BE SERVED **********

For questions, comments or suggestions: cjoerg@physik.uni-kl.de

MATERIALS IN MAINZ SCIENCE

TECHNISCHE UNIVERSITÄT KAISERSLAUTERN

OPTIMAS TU Kaiserslautern