Lecture

Shaking Majoranas

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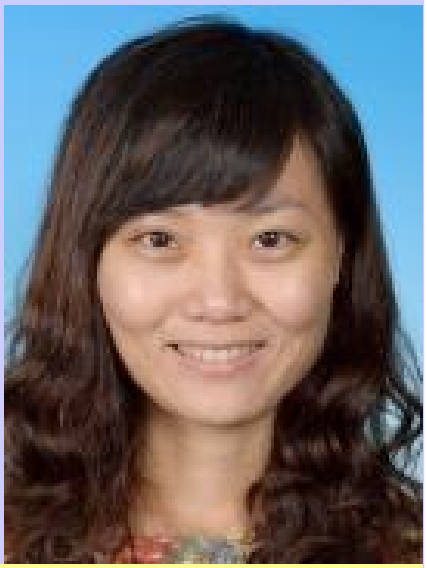
2016年1月28日(周四) 下午3:30–5:00
频标楼4楼报告厅



About the speaker：

Dr. Ying Hu received Ph.D degree in Physics in 2008 from Vanderbilt University USA. After postdoctoral researches in Hong Kong Baptist University and Peking University, Dr. Ying Hu is currently a junior scientist with Prof. Peter Zoller in the Institute for Quantum Optics and Quantum Information (IQOQI) of the Austrian Academy of Sciences, Innsbruck, Austria. The present research of Dr. Ying Hu focuses in the interdisciplinary area involving topology, AMO physics and non-equilibrium dynamics in open quantum systems.

Abstract:

At present there is significant experimental effort to realize Majorana fermions of 1D wires in a condensed matter setting and with atomic physics. The robustness of these edge states and non-Abelian excitations of topological states of matter promises quantum information processing, which is naturally immune against microscopic imperfections. However, such an immunity towards microscopic details is true only in the limit of static disorder, and topology will not in general protect quantum system from time-dependent disorder or noise. Here we develop an exactly solvable model on the many-body non-equilibrium dynamics in the presence of colored Markovian noise, where the noise correlation time is tuned from the fast fluctuation to the static disorder limit. Within this model we study the dynamics of Majorana edge modes in stochastically driven quantum wires, and fidelity of Majorana braiding operations. While in general noise will induce heating and dephasing, we identify examples of long-lived quantum correlations in presence of fast fluctuation due to motional narrowing, where the noise drives the system rapidly across the phase transition between the topological and non-topological phases.

[1] Ying Hu, Zi Cai, Mikhail A. Baranov, and Peter Zoller, Majorana fermions in noisy Kitaev Wires, Phys. Rev. B 92, 165118 (2015)
[2] Ying Hu and Mikhail A. Baranov, Effects of gapless bosonic fluctuations on Majorana fermions in an atomic wire coupled to a molecular reservoir, Phys. Rev. A 92, 053615 (2015)

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