学术报告

Geometric phase in Stuckelberg interferometer with cold atoms

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About the speaker：

Lih King Lim obtained his B.Sc. (2003) in physics at Imperial College, UK. He went on to do a Master degree in Applied Mathematics and Theoretical Physics at Cambridge University, UK, and wrote a master thesis on Technicolor Model under the supervision of Prof. G. 't Hooft, at Utrecht University, the Netherlands. His PhD thesis, entitled "Novel superfluid phases in ultracold bosons and fermions" (2006-2010), they completed under the supervision of Prof. Cristiane Morais Smith. During his postdoc, he spent 4 years (2010-2014) in University Paris Sud, France, and 1 year (2015) at the Max Planck Institute for Complex Systems, Dresden, Germany. Since Oct 2015, he is an associate member at the Institute of Advanced Study Tsinghua University, Beijing, China.

Abstract:

Thanks to recent progress in engineering two-dimensional topological band structure with cold atoms, we study a Stuckelberg interferometer realized via Bloch-oscillations-type experiment. The paths that are brought to interfere are made of two energy levels through which Bloch waves are driven. We show that the interference pattern contains a phase shift of geometrical origin, a quantity independent of the adiabaticity parameter in the Landau-Zener tunneling [1,2]. This phase can serve as a robust bulk probe for topological band structures realized with artificial crystals [3,4].

References:
[1] L.-K. Lim, J.-N. Fuchs, and G. Montambaux, Phys. Rev. Lett. 112, 155302 (2014).
[2] L.-K. Lim, J.-N. Fuchs, and G. Montambaux, Phys. Rev. A 92, 063627 (2015).
[3] L. Tarruell et al, Nature 483, 302 (2012).
[4] T. Li et al, arxiv:1509.02185.

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