北京大学量子材料科学中心

International Center for Quantum Materials, PKU

Seminar

A pressure-induced topological phase with large Berry curvature in Pb1-xSnxTe

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Time: 10:00am, June 7, 2017 (Wednesday)

时间：2017年6月7日 （周三）上午10:00

Venue: Room W563, Physics building, Peking University

地点：北京大学物理楼，西563会议室

Abstract

The picture of how a gap closes in a semiconductor has been radically transformed by topological concepts. Instead of the gap closing and immediately re-opening, topological arguments predict that, in the absence of inversion symmetry, a metallic phase protected by Weyl nodes persists over a finite interval of the tuning parameter (e.g. pressure P). The gap re-appears when the Weyl nodes mutually annihilate. We report evidence that Pb1-xSnxTe exhibits this topological metallic phase. Using pressure to tune the gap, we have tracked the nucleation of a Fermi surface droplet that rapidly grows in volume with P. In the metallic state we observe a large Berry curvature which dominates the Hall effect. Moreover, a giant negative magnetoresistance is observed in the insulating side of phase boundaries, in accord with *ab initio* calculations. The results confirm the existence of a topological metallic phase over a finite pressure interval.

About the speaker

Dr. Tian Liang got his B.S. degree in physics from University of Tokyo, Japan in 2009, and his master degree there in 2011. He received his Ph.D. degree in physics from Princeton University, in 2016. After graduation, he moved to Stanford University as a post-doctoral research associate until now. His current research focuses on microwave impedance microscopy , angle-resolved photoemission spectroscopy.