



# 学术报告

**题目：** Some recent results of 3D topological materials

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**报告摘要：** We discuss some thermionic, optical and transport properties of three dimensional Dirac materials. In 3D Dirac materials, the energy equipartition theorem gives rise to an average energy of  $kBT$ . This is twice of the energy in traditional materials. This enhanced energy leads to an enhanced thermionic cooling efficiency which is higher than that in normal metal and in graphene. Fast charge dynamics has been studied, taking into account the electron-acoustic phonon and electron-optical phonon interaction. Results indicate that the charge relaxation is directly proportional to the gap. Electronic structure of a Weyl semimetal and superconducting Weyl semimetal has been calculated. A dual gap structure has been revealed. The Andreev reflection can be used to directly map out the the dual gap characteristics.

**报告人简介：** Professor Chao Zhang received his PhD in physics in 1987 from City University of New York, USA. From 1987 to 1989, he was a postdoctoral fellow at Max-Planck-Institute for Solid Research in Stuttgart, Germany, working on quantum magneto-transport in semiconductor nanostructures. From 1989 to 1992, He was a research associate at Canada's Meson Research Facility in Vancouver, working on quantum coherence and dissipation in solids. Since 1993, he has been a tenured faculty member in the School of Physics, University of Wollongong, Australia. Currently he is a senior professor of physics. From 2004-2014, he served as the associate director of the Institute of Superconducting and Electronic Materials. He is a Fellow of Australian Institute of Physics. He is the associate editor of Frontier of Optoelectronics and a member of the editorial board of Scientific Reports. He is an advisory member of the International Organizing Committee for Infrared, Millimeter and Terahertz Waves. His research interest is in the areas of quantum transport of nanostructures, terahertz photonics, nonlinear dynamics of semiconductors, graphene and topological insulators. He has received several awards including, JSPS Fellow 2001, Norwegian Research Council Senior Fellow 1996, Australian Academy of Sciences International Award 1999, 2000, 2004.