



復旦大學

Fudan University

復旦大學物理系物質科學報告

Physics Department Colloquium

Theory of Topological Metals and Semimetals

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Abstract: Recently, topological quantum materials have intrigued significantly research interest both theoretically and experimentally. Investigations of these gapless and gapped electronic systems pave the way for discovering new topological phases and their applications in tomorrow's topological quantum computers. In this talk, I will first recall basic concepts and research progress relevant to this topic. Then I will elaborate a rigorous theory of topological metals and semimetals with the time-reversal and/or particle-hole symmetries. Applying this theory to Fermi surfaces on the boundary of topologically gapped materials, a general index theory can be established for capturing the faithful boundary-bulk correspondence of these materials. Moreover, using the topological gapless boundary modes in simulated time-reversal invariant superconducting chains, a set of universal quantum gates can be constructed. Finally, disordered Weyl semimetals and their topological family will also be briefly discussed.

Time: 2:00pm, Tuesday, Mar. 31, 2015

Location: Physics Building, Room 221B

(Cookies and coffee will be served from 1:30 pm)