



清华大学高等研究院

Institute for Advanced Study, Tsinghua University

物理学术报告 Physics Seminars (biweekly)

Title: Quantum criticality of semimetal-insulator transitions

Speaker: Bohm-Jung Yang
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Time: 4:00pm, Wednesday, Dec 21, 2016
(3:30~4:00pm, Tea, Coffee, and Cookie)

Venue: Conference Hall 322, Science Building, Tsinghua University

Abstract

In this talk, I am going to talk about the quantum criticality of a semi-metal insulator transition in interacting electronic systems in both 2D and 3D. At the quantum critical point, the low energy excitations can be described by Weyl fermions with anisotropic dispersion which is quadratic along one direction but linear along the other orthogonal directions. The interplay between the anisotropic dispersion and the Coulomb interaction brings about a new screening phenomenon distinct from the conventional Thomas-Fermi screening in metals and logarithmic screening in Dirac fermions. Such an unusual form of the screened Coulomb interaction makes the fermionic quasiparticle to show almost free particle-like behavior in 3D. Whereas in 2D, the anisotropic momentum dependence of screened Coulomb interaction gives rise to marginal Fermi liquid behavior of quasi-particles.