



東京大学大学院理学系研究科・理学部

物理学教室 談話会

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“Topological Semimetals: How to find them”

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東京大学本郷キャンパス理学部4号館2階 1220号室

In this talk, I will introduce the family of topological semimetals (TSM) including Dirac semimetal (DSM), Weyl semimetal (WSM), and triply degenerate nodal point semimetal (TPSM). In ideal case, they have and only have nodal points at the Fermi level, but they are classified according to the distribution and degeneracy of these nodal points. The quasiparticles of low energy excitation in DSM and WSM can be described by massless Dirac and Weyl equation, respectively, while those in TPSM have no counterpart in the high-energy field theory. To find realistic materials hosting these exotic topological quantum states is very challenge and crucial to the further experimental studies. We noticed that the unusual temperature dependent diamagnetism is a strong hint of existence of linear Dirac cone like bands around Fermi level. This has been confirmed in DSMs Na₃Bi and HfTe₅ at phase transition. It also leads to the success in locating TaAs, the first available WSM. The experimental studies of these materials have stimulated many research works, including the characteristic chiral anomaly and Fermi arcs. Finally, the TSM family members and their relationship with each other are summarized.

※ 理論計算を用いて TaAs など数々のトポロジカル物質を発見し、今年度の第5回仁科アジア賞を受賞された、中国科学院の Hongming Weng 教授に講演をお願いしました。

ご来場をお待ちしております。

※ 午後4時半過ぎから1220号室の前にお茶とお菓子を用意しています。
どうぞご利用下さい。