



第27回トポロジカル物質科学セミナー  
Topological Material Science Seminar (27)

**Quantum oscillations and Chiral anomaly  
without magnetic field in Dirac and Weyl semimetals**

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Place: Room 525, Department of Physics, Graduate School of Science,  
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Time: 10:30-

**Abstract:** Elastic strain is known to act as a pseudomagnetic field on the low-energy Dirac electrons present in graphene. We show that similar effect occurs in the recently discovered class of Dirac and Weyl semimetals whose low-energy electronic structure resembles that of graphene but promoted to three spatial dimensions. This gives rise to some remarkable phenomena in these materials including quantum oscillations driven by strain in the complete absence of external magnetic field and various novel manifestations of the Chiral anomaly such as the concept of "topological coaxial cable" which supports hydrodynamic flow of electrons with potentially very low dissipation. We describe these intriguing phenomena in some detail and discuss constraints on their experimental observability.

Prof. Marcel Franz is one of the main members of our alliance, CIFAR-QM program.