



TRR 80 Sonderseminar

Am Dienstag, den 5. Juni um 16:00 Uhr

spricht

Dr. Grigory Tkachov
Universität Würzburg

über das Thema

Probing topology by quantum transport

Topological insulators are characterized by a skyrmion-like (pseudo)spin texture of electronic bands in momentum space, giving rise to nontrivial Chern numbers and gapless edge states. This talk will explore an intricate connection between the nontrivial band topology and quantum electron transport in some representative noncentrosymmetric materials. I will in particular address the topological aspects of the minimal conductivity [1], backscattering processes [2], weak antilocalization [3,4] and the universal magnetoelectric effect [5] in HgTe as well as unconventional triplet superconductivity [6] and Majorana fermions in candidate topological superconductors.

1. B. Büttner, C.X. Liu, G. Tkachov, E.G. Novik, C. Brüne, H. Buhmann, E.M. Hankiewicz, P. Recher, B. Trauzettel, S.C. Zhang, and L.W. Molenkamp, Single valley Dirac fermions in zero-gap HgTe quantum wells, *Nature Phys.* 7, 418 (2011).
2. G. Tkachov, C. Thienel, V. Pinneker, B. Büttner, C. Brüne, H. Buhmann, L. W. Molenkamp, and E. M. Hankiewicz, Backscattering of Dirac fermions in HgTe quantum wells with a finite gap, *Phys. Rev. Lett.* 106, 076802 (2011).
3. G. Tkachov and E. M. Hankiewicz, Weak antilocalization in HgTe quantum wells and topological surface states: Massive versus massless Dirac fermions, *Phys. Rev. B* 84, 035444 (2011).
4. M. Mühlbauer, A. Budewitz, B. Büttner, G. Tkachov, E.M. Hankiewicz, C. Brüne, H. Buhmann, and L.W. Molenkamp, One-dimensional weak antilocalization due to the Berry phase in HgTe wires, *Phys. Rev. Lett.* 112, 146803 (2014).
5. V. Dziom, A. Shuvaev, A. Pimenov, G. V. Astakhov, C. Ames, K. Bendias, J. Böttcher, G. Tkachov, E. M. Hankiewicz, C. Brüne, H. Buhmann, and L. W. Molenkamp, Observation of the universal magnetoelectric effect in a 3D topological insulator, *Nat. Commun.* 8, 15197 (2017).
6. G. Tkachov, Magnetoelectric Andreev effect due to proximity-induced nonunitary triplet superconductivity in helical metals, *Phys. Rev. Lett.* 118, 016802 (2017).

Gäste sind herzlich willkommen.

Der Vortrag findet im Seminarraum S-288, Institut für Physik,
Universität Augsburg statt.

Gastgeber: Prof. Dr. Ulrich Eckern
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