UNI FREIBURG
Fakultät für Mathematik und Physik
Albert-Ludwigs-Universität Freiburg
Physikalisches Institut

SONDERKOLLOQUIUM

AM 20. NOVEMBER 2015 UM 13:00 UHR

IM SEMINARRAUM GUSTAV-MIE-HAUS

DIRAC FERMIONS IN TOPOLOGICAL INSULATORS

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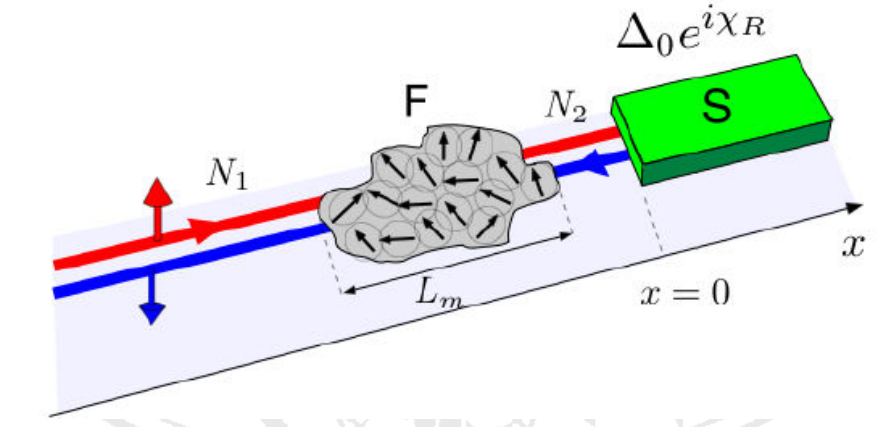
Topological Insulators (TIs) behave like ordinary insulators in the bulk but like metals at the surface. Interestingly, the surface states can be described as massless Dirac fermions. In nature, TIs have been first realized in HgTe/CdTe quantum wells – in two spatial dimensions (2D) – and subsequently also in 3D, for instance, in Bismuth compounds.

We start the presentation with an introduction to the physics of TIs explaining the relation to topology. Afterwards, we discuss peculiar examples of TI-specific physical properties such as the protection against elastic backscattering of their edge states or the emergence of Majorana bound states and odd-frequency triplet pairing in hybrid structures of TIs, superconductors, and ferromagnets.



Helical edge states in proximity to a ferromagnet (F) and a superconductor (S)