



CEA – Saclay, 91191 Gif-sur-Yvette Cedex
Service de Physique de l'Etat Condensé - UMR 3680

SÉMINAIRE

Mercredi 29 novembre 2017 à 11h15

Orme des Merisiers SPEC, Salle Itzykson, Bât.774

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Magneto-transport in 3D topological insulator nanowires

Three-dimensional topological insulators (3DTIs) are a class of bulk insulators hosting time reversal symmetry-protected metallic surface states. The latter are helical, i.e. characterized by (pseudo)spin-momentum locking, and described by low-energy effective models à la Dirac. 3DTI nanowires are a rich quantum transport playground, due to the interplay between topological properties and effects arising from phase coherence. The fact that the conducting Dirac states are “wrapped” around an insulating bulk leads to interesting and geometry-sensitive magnetoresistive phenomena, which in standard metallic systems are absent or at best inaccessible, since bulk and surface contributions cannot in general be singled out.

I will start with an analysis of low-T magneto-conductance measurements in 3DTI nanowires performed by our collaborators (D. Weiss' group, Uni Regensburg), showing evidence of quasi-ballistic topological surface transport. I will then discuss theoretically effects due to the curvature of the surface states. The focus will be on shaped nanowires with varying cross-section, hosting a competition between quantum confinement and a spatially varying enclosed magnetic flux.

A coffee break will be served at 11h00. The seminar will be given in English.