



Canadian Association
of Physicists

Association canadienne
des physiciens et physiciennes

Contribution ID: 189

Type: **Invited Speaker / Conférencier(ère) invité(e)**

(I) Domain and Skyrmion bound states on the surface of magnetic topological insulators

Wednesday 9 June 2021 16:50 (5 minutes)

A 3D topological insulator (TI) hosts an odd number of Dirac cones as its 2D surface states spectrum. The states are exponentially localized to the surface and their (pseudo)spin is locked to the surface momentum direction due to spin-orbit interaction. If the TI is also magnetic there are fixed magnetic moments on the surface, co-existing with the itinerant Dirac electrons. The magnetic moments interact with each other both directly (exchange) and indirectly (RKKY) and may form a ferromagnetically ordered state. The magnetic state couples to the Dirac electrons and serves as a Dirac mass which, when uniform, opens a gap in the spectrum. When the ordering of the magnetic moments is modified by excitation such as skyrmions, the Dirac electrons see a landscape of spatially dependent mass. A skyrmion texture binds an electronic state to it which we call a skyrmion-bound state.

In this talk we will see how the bound states can be detected by a surface conductivity measurement and how the skyrmion-skyrmion interaction is altered due to the presence of Dirac electrons. We will also discuss a skyrmion solid background to Dirac electrons.

Session Classification: W4-2 Theory and Condensed Matter (DTP/DCCMP) / Théorie et matière condensée (DPT/DPMCM)

Track Classification: Theoretical Physics / Physique théorique (DTP-DPT)