

DS 29: Gaede Prize Talk – Philip Hofmann

Time: Wednesday 14:00–14:45

Location: TRE Phy

Prize Talk

DS 29.1 Wed 14:00 TRE Phy

Spin-split metallic surface states on semimetals and topological insulators — ●PHILIP HOFMANN — Department of Physics and Astronomy, Interdisciplinary Nanoscience Center Aarhus University, 8000 Århus C, Denmark

The surfaces of Bi, Sb and the so-called topological insulators (TIs) all share the property that their electronic structure is metallic, in sharp contrast to the bulk which is either semimetallic (Bi, Sb) or semiconducting (TI). The main reason for the existence of the metallic surface states is not bond-breaking but the loss of inversion symmetry

at the surface, combined with a strong spin-orbit interaction. The surface states are almost completely non-degenerate with respect to the electron's spin and this has interesting consequences for their electron dynamics. Indeed, the surface states on TIs are predicted to exhibit a number of novel and exotic physical phenomena and have potential applications in spintronics and quantum computing. In this talk I will review some basic properties of spin-split surface states, relate the findings on semimetal surfaces to topological considerations and discuss the similarities and differences of surface states on semimetals and topological insulators.