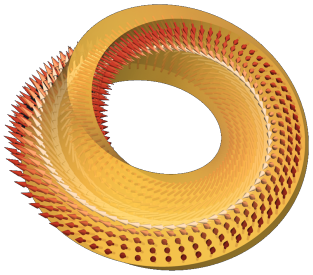

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Topology and transport in nanostructures with curved geometries

Thursday, 23 May 2019 09:15 (30 minutes)

Nanostructures are material structures with size in the range of one to a few hundreds of nanometers in at least one spatial dimension. They include zero-dimensional quantum dots, one-dimensional quantum wires and two-dimensional quantum wells. Apart from these conventional material geometries, recent advances in nanostructuring techniques have enabled the synthesis of complex nanoarchitectures: constructs of one- or two-dimensional nanostructures assembled in curved geometries, such as nanotubes and nanohelices.

In this talk, I will first show how the very fundamental quantum mechanical properties of the charge carriers in these nanomaterials are strongly affected by the curved background in which they live. Then I will discuss examples of unique curvature-induced topological and transport properties, including the ballistic anisotropic magnetoresistance effect in non-magnetic and spin-orbit free materials rolled-up into tubes, and the generation of topological insulating phases in corrugated nanowires with Rashba spin-orbit interaction.

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