W2S Seminar
(Webinar series on Spintronics)

Emergent Antiferromagnetic Spintronics: from Dirac quasiparticles to non-relativistic novel magnetic classes

Speaker:

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Abstract

Antiferromagnetic spintronics considers the active manipulation of the antiferromagnetic order parameter in spin-based devices. An additional concept that has emerged is that antiferromagnets provide a unifying platform for realizing synergies among prominent fields of contemporary condensed matter physics, such as Dirac quasiparticles and topological phases. Here spintronic devices made of antiferromagnets with their unique symmetries will allow us to control the emergence and to study the properties of Dirac/Weyl fermion topological phases that are otherwise principally immune against external stimuli. In return, the resulting topological magneto-transport phenomena open the prospect of new, highly efficient means for operating the antiferromagnetic memory-logic devices. These topological phases emerge from symmetry and their robustness depends on the relative orientation of the Neel order parameter that can be manipulated by Neel spin-orbit torques. Turning off spin-orbit coupling, a new fresh view at the family of antiferromagnetic ordered systems reveals also an emergent new class with properties unique to itself and separate from ferromagnets and antiferromagnets. This magnetic state exhibits spin-momentum-lattice site locking and spin splitting that alternates sign in momentum space and offers unique new possibilities in device applications.

To attend the lecture please visit
Zoom link: https://us06web.zoom.us/j/95356917631

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