





Meetings of the Belgian Quantum Physics Initiative

Colloquium



Prof. Achim Rosch

University of Cologne

Emergent gauge fields and the dynamics of visons

One of the most intriguing concept in modern condensed matter theory is that gauge fields and excitations like Majorana Fermions naturally emerge in the description of frustrated quantum magnets. Here the two-dimensional honeycomb Kitaev model is, perhaps, the most famous example. Within the Kitaev model, the elementary gauge excitation, the vison, is immobile, but it becomes a dynamical degree of freedom in the presence of perturbations. We study the physics of a single vison [1] and show that it obtains a universal low-temperature mobility when scattering from gapless Majorana fermions. Vison bands in the antiferromagnetic Kitaev models can be topological and may lead to a characteristic features in thermal Hall effects in Kitaev materials. We furthermore discuss [2] thermal Hall experiments in RuCl3, which provide some evidence for the realization of a Kitaev spin liquid in this material.

[1] Aprem P. Joy, Achim Rosch, arXiv:2109.00250, accepted in Phys. Rev. X (2022).[2] Yuval Vinkler-Aviv, Achim Rosch, Phys. Rev. X 8, 031032 (2018).

Thursday 20th OCTOBER 2022 AT 2 P.M.

COFFEE AND TEA WILL BE SERVED AT 3 P.M.

Two short talks will follow:

4:00pm: Tobi Haas (ULB, Brussels)

Cosmological particle production in a BEC

4:30pm: Abhishek Shukla (UHasselt)

Quantum State and Process Tomography: New approach for high fidelity NV qubits

Espace Baudouin, Académie Royale de Belgique Rue Ducale 1, 1000 Bruxelles - Belgique