

DEPARTMENT OF PHYSICS & ASTRONOMY
CONDENSED MATTER SEMINAR

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On the Hall Effect in Composites

The Hall effect describes the appearance of a transversal voltage, the so-called Hall voltage, in a current-carrying slab of material that is subject to a magnetic field. The corresponding material property, which relates the Hall voltage to the current, magnetic field, and thickness of the slab, is the so-called Hall coefficient. In composites, very unusual values of the effective Hall coefficient can be realized by tailoring their microscopic structure. In this talk, based on the work of Marc Briane and Graeme Milton, I will show that the effective Hall coefficient of a single-constituent porous composite can be sign-inverted with respect to the Hall coefficient of the constituent material and how we were able to demonstrate this effect experimentally. Furthermore, I will discuss structures with lower symmetry, which are described by a rank-two tensor instead of a scalar Hall coefficient. Finally, I will elaborate on corresponding bounds and show how the theory can be extended to account for non-trivial distributions of the magnetic permeability. Joint work with Graeme Milton, Muamer Kadic, and Martin Wegener.

Tuesday, August 27, 2019

JFB 334

4:00 pm

Refreshments will be served in JFB 334 at 3:45 pm