Seminarankündigung

Dienstag, 19. Juni 2018
13:00 Uhr

WSI, Seminarraum S 101

“Electron-nuclear spin interactions in the quantum Hall regime”

More than 30 years after its discovery, the quantum Hall effect keeps surprising us by the stunning richness and complexity of the underlying physical phenomena. Some of the finest pieces of many body physics are featured in the quantum Hall effect, such as the spontaneous ordering of charges and spins in spatial patterns resembling both bubble and stripe phase symmetry (Fig. 1). The spin degree of freedom adds to the complexity of the physical phenomena in the quantum Hall regime. It gives rise to a number of interesting phenomena such as ferromagnetic phase transitions and skyrmionic spin excitations.

The coupling of the electronic and nuclear spin system, however, is an often unconsidered aspect when dealing with the quantum Hall effect. In most cases, this is justified as it only leads to minor adjustments of the involved energy scales. Yet, in some cases, this small contribution has far-reaching consequences. For instance, it can be conveniently utilized to study spin excitations and ordered electron phases in the quantum Hall regime by measuring the nuclear spin relaxation rate as well as the nuclear resonance frequency. In my presentation I will explain the basics underlying these experimental techniques and highlight some important examples where electron-nuclear spin interactions provide valuable information on different ground states in the quantum Hall effect.

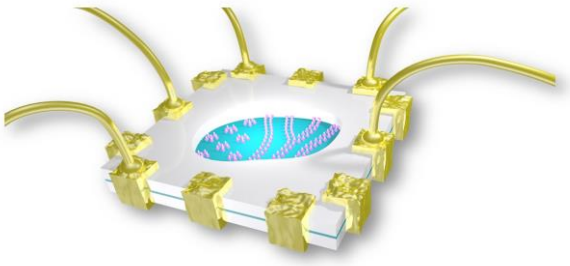

Fig. 1: Schematic of the bubble and stripe phases in the quantum Hall regime

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