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Séminaire de Physique Nucléaire Théorique

Quantum Hall ferromagnetism in graphene

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When electrons moving in a plane are subjected to a perpendicular magnetic field their kinetic energy takes only discrete values and energy levels form the set of highly degenerate so-called Landau levels. This simple model is relevant to the physics of electrons in semiconductor heterostructures and quantum wells and also of atomically thin materials like graphene. When an integer number of Landau levels are filled, the Coulomb interactions between the electrons give rise to a ferromagnetic state which is exactly described by a single Slater determinant. This is the &amp ;amp ;quot ;perfectly understood magnet&amp ;amp ;quot ;. Charged excitations in its vicinity are non-trivial topological collective objects called skyrmions. Their symmetry analysis is very rich in the graphene case. I will give an overview of recent progresses making contact with other domains of physics.

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