DAY 2 (24 June): 13:30 – 14:10

Coupled charge and valley excitations in graphene quantum Hall ferromagnets

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Graphene is a two-dimensional carbon material with a honeycomb lattice and Dirac-like low-energy spectrum. In a strong magnetic field, where Coulomb interactions dominate against disorder broadening, quantum Hall ferromagnetic states realize at integer fillings. Extending the quantum Hall ferromagnetism to the fractional filling case of massless Dirac fermions, we study the elementaly charge excitations which couple with the valley degrees of freedom (so called valley skyrmions). With the use of the density matrix renomalization group (DMRG) method, the excitation gaps are calculated and extrapolated to the thermodynamic limit. These results exhibit numerical evidences and criterions of the skyrmion excitations in graphene