SFB/TRR 21 - Colloquium

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Quantum transport in dually-gated suspended bilayer graphene devices in electric and magnetic fields

The layer pseudospin of bilayer graphene can be controlled by applying an electric field E across the flake. We demonstrate control over this pseudospin in suspended bilayer graphene devices with suspended top gates [1]. At zero magnetic field B, we observe a significantly larger increase in resistance at the charge neutrality point with growing E than had been reported before, indicative of the high sample quality. At finite B, the 8-fold degeneracy of the lowest Landau level is lifted due to electron-electron interactions. The strength and nature of these symmetry broken filling factors are found to be depended on E. Finally, we observe an insulating phase in neutral bilayer graphene at zero magnetic field that can only be explained by electron-electron interactions.
[1] R.T. Weitz, et al. Science 330, 812 (2010)

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