# Twisted bilayer graphene in a magnetic field

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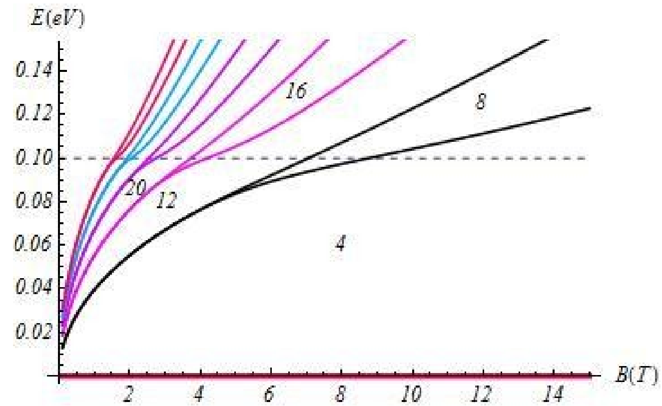
The physics of bilayer graphene is almost as rich as the one of monolayer graphene. Whereas an ordered stacking (AB-stacking) is most common, one also encounters twisted bilayers where the second layer is rotated with respect to the first one. In this case the low-energy electrons are similar to those in single-layer graphene and electrons at higher energy behave rather as those in bilayer graphene with AB stacking. The electronic properties of such twisted bilayers in a strong magnetic field have been studied theoretically. The crossover between the two energy regimes has a particular signature in the Landau-level spectrum (Fig. 5). The degeneracy of the low-energy levels is twice as large as those at higher energy. The crossover between the two energy regimes is itself determined by the twist angle between the two graphene layers. Recently, this picture has been confirmed in magneto-transport measurements (K. von Klitzing group, MPI Stuttgart).
Furthermore, the electronic spectrum in the absence and in the presence of a magnetic field has also been studied for bilayer graphene when one layer is displaced with respect to the other. Compared to the situation for twisted bilayer graphene, additional features occur at extremely low energies [deGail, 2012].




Evolution of the Landau levels with the magnetic field in a twisted bilayer. The red line indicates the zero-energy level, and the numbers correspond to the filling factors in the gaps. The cross-over energy depends on the twist angle.

**Key publication**

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