Grain boundaries in two-dimensional materials: topological states and stacking changes in few-layer graphene

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Pristine graphene shows outstanding properties due to the linear band crossing at the Fermi energy, the Dirac cones that define the K and K' valleys. Other properties have been tried to be engineered by doping on purpose. However, during the growth of two-dimensional materials intrinsic defects, such as grain boundaries due to stitching or stacking, can appear. Far from being undesired, the grain boundaries in two-dimensional materials bring localized and topological states into play with emergent physics novel to the traditional engineering of metals and semiconductors.

In this talk, I review our research performed in the group concerning stacking changes: (i) in bilayer graphene, which brings topological states into play, and (ii) in trilayer graphene, where the rhombohedral stacking is being more stable. This work will be of interest to the people working on the emergent physics associated with graphene layers, and presents practical conclusions, that have to be considered in the design of graphene devices.

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