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Title: Ferroelectric domain structures in twistrionic 2D crystals

Abstract: We discuss lattice structure and physical properties of twisted bilayers of 2D crystals, such as transition-metal dichalcogenide and hexagonal boron nitride. We show that for 'marginally' (small-angle) twisted bilayers lattice reconstruction results in the networks of domains with the energetically preferential stacking and domain walls, which are similar to dislocations in bulk crystals. In some cases, such domains feature interfacial ferroelectric polarisation, switchable by sliding of the two monolayers with respect to each other. This gives rise to the tunability of domain structure by an out-of-plane electric field, manifested in the hysteretic field-effect transistor operation and, also, readable optically by the linear Stark shift of the interlayer excitons. Also, we show that weak ferroelectricity is possible in few-layer graphene films (tetralayers, or thicker) with mixed Bernal and rhombohedral stacking.