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Superconductivity in Graphene Induced by the Rotated Layer

Recent discoveries in graphene bilayers have revealed that when one of the layers is rotated by a specific angle, superconductivity emerges. We provide an explanation for this phenomenon. We find that due to the layer rotations, the spinors are modified in such way that a repulsive interaction becomes attractive in certain directions.
We also find that due to rotations the nodal points become angle dependent. The spinor in layer $ i=2 $ depends on the twisting angle in contrast to the spinor in layer $i=1$.
As a result, the physics in the two layers depends on the twist and is identified with a twisted phase. In order to observe the twist we use an interaction term which changes sign.
The change from a repulsive interaction to an attractive one gives rise to a one dimensional charge-density-wave. Due to tunneling between the two layers, the proximity of layer $i=1$
induces superconductivity in the charge-density-wave phase in layer $i=2$. This result is obtained by following a sequence of steps: when layer 2 is rotated by an angle θ, this rotation is equivalent to a rotation of an angle $-\theta$ of the linear momentum. Due to the discrete lattice, in layer 1 the Fourier transform conserves the linear momentum $modulo$ the hexagonal reciprocal lattice vector. In layer 2, due to the rotation, the linear momentum is conserved $modulo$ the $Moire$ reciprocal lattice vector. Periodicity is achieved at the $magic $ angles obtained from the condition of commensuration of the two lattices.