Abstract Submitted
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Landau levels and scattering resonances due to strained folds in graphene[1] NANCY SANDLER, DAWEI ZHAI, Ohio University, YUHANG JIANG, Rutgers University, DAIARA FARIA, Universidade do Estado de Rio de Janeiro, EVA ANDREI, Rutgers University — Effects of strain in graphene can be understood in terms of pseudo-scalar and pseudo-magnetic fields with opposite signs at the K and K valleys, that renders distinctive signatures in STM measurements. Here we report studies of graphene with out-of-plane strained fold deformations, naturally occurring when the sample is transferred onto hexagonal boron nitride substrates. STM spectroscopy measurements of local density of states at fixed positions on top of the folded region reveal a finite number of resonant peaks. Energy levels for some of these resonances follow the scaling expected for pseudo-Landau levels, however the origin for several others remains poorly understood. We present results from a theoretical model based on the Dirac equation that incorporates inhomogeneous pseudo-fields. We show that position-dependent fields lead to the existence of resonant scattering states, in addition to bound states, whose energies are comparable to those of pseudo-Landau levels. We show that the parameters of the fold determine the maximum number of observable bound states as well as the energies for the scattering states. These results are in good agreement with observed experimental measurements.

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