Probing minibands in gated graphene superlattice by magnetic focusing

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Graphene is considered an excellent material for the creation of electronic devices with ballistic transport occurring in presence of external electrostatic potential. That makes it advantageous as a base for superlattices induces by gating. The resulting periodic modulation of on-site energy leads to the reconstruction of the band structure and formation of mini bands and higher-order Dirac cones. Gated superlattices are particularly interesting thanks to tunable modulation strength and flexibility in defining the geometry. At low magnetic field, semiclassically, fermions follow cyclotron trajectories that reflect the Fermi contours, and can be probed by transverse magnetic focusing. This technique has been used for investigating band structures in moire superlattices [2, 3]. We perform a theoretical study of the magnetic focusing in 2D rectangular gated superlattices, and analyze the relation between the observed magnetotransport spectra and the miniband structure. Our investigations of the reconstructed band structure via magnetotransport calculations pave the way to band structure engineerging through periodic gating of graphene.

References

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