Theory of Circular Dichroism in Twisted Bilayer Graphene

Luis Brey
ICMM-CSIC Madrid (SPAIN).
brey@icmm.csic.es

The electrical transport and the topological properties of twisted bilayer graphene depend on the relative orientation of the top and bottom constituent layers. Twisted bilayers graphene are chiral systems where the left-rotated top layer and the right-rotated bottom layer are not connected by mirror symmetry. This rotation between layers implies a different absorption of right and left circularly polarized light and therefore a circular dichroism. Recently it has been observed experimentally that the spatial chirality of the twisted bilayer graphene translates in a large optical circular dichroism[1]. In this communication we present a current-current correlation function for describing circular dichroism in twisted bilayer graphene. Using both a tight-binding Hamiltonian and Dirac like description of twisted bilayer graphene, we have used this formalism for computing the finite frequency Hall conductivity, obtaining a good agreement with the experimental results.

References

[1] Cheol-Joo Kim *et al* Nature Nanotechnology, January 2016 .