IR optical conductivity of (twisted) bilayer graphene

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Twisted bilayer graphene has recently gained enormous attention thanks to the exotic, strong correlations between the carriers in the flat bands occurring at magic twist angles. Understanding the observed phenomena requires probing observables that can be connected to electron-electron interactions, which are theoretically challenging to model. Optical conductivity measurement can provide a feasible way to probe optical transitions and compare theoretical predictions with the data. As the separation between the relevant energy levels lowers with lowering the twist angle [1], the interesting features lie in the mid-IR range. Here, we report a measurement of photocurrent, which is proportional to optical conductivity, of twisted bilayer graphene and Bernal-stacked bilayer graphene. The data is compare the data with the prediction of a theoretical model of optical conductivity.

References

[1] Moon, P., & Koshino, M. (2013). Optical absorption in twisted bilayer graphene. *PHYSICAL REVIEW B*, *87*, 205404. https://doi.org/10.1103/PhysRevB.87.205404