Abstract Submitted
for the MAR14 Meeting of
The American Physical Society

Optical properties of twisted bilayer graphene PILKYUNG MOON, YOUNG-WOO SON, Korea Institute for Advanced Study, MIKITO KOSHINO, Tohoku University — A twisted stack of two graphene layers (twisted bilayer graphene) exhibits an extremely long potential period arising from the Moiré interference between the layers. We calculate the optical absorption of twisted bilayer graphene in the absence of magnetic field and demonstrate that the spectroscopic characteristics serve as a fingerprint to identify the rotation angle between two layers[1]. We explain the peculiar optical selection rule in terms of the symmetry of the effective Hamiltonian. We also investigate the effects of charging and gating on the optical spectrum[2]. In addition, we investigate the absorption spectrum and the selection rule for the fractal band regime (Hofstadter butterfly) in the presence of magnetic field. We demonstrate that the absorption spectrum exhibits a self-similar recursive pattern reflecting the fractal nature of the energy spectrum, and the optical selection rule has a nested self-similar structure as well[3].

[1]P. Moon and M. Koshino, Phys. Rev. B **87**, 205404 (2013).
[2]P. Moon, M. Koshino, and Y.-W. Son, in preparation
[3]P. Moon and M. Koshino, arXiv:1308.0713 (2013)

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Date submitted: 15 Nov 2013 Electronic form version 1.4