

Abstract Submitted  
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**Electronic properties and van Hove singularities of observed moiré patterns of dislocated graphene on HOPG** OGUZ GULSEREN<sup>1</sup>, H. SENER SEN, Bilkent University, DILEK YILDIZ, OGUZHAN GURLU, Istanbul Technical University — Highly Oriented Pyrolytic Graphite (HOPG) can be described as stacked graphene layers. Due to the weak van der Waals interaction between the layers, the topmost layer of HOPG can be rotated or shifted by chemical or mechanical means. With rotation of the topmost layer, super-periodic structures called as moiré patterns are formed. In this work, moiré patterns on HOPG surfaces due to dislocated graphene layers were studied. A simple geometric investigation of the atomic structure of the moiré patterns revealed that different atomic moiré periodicities result in similar geometric moiré periods. Our calculations showed that the band structure of moiré patterns even though exhibits the fingerprints of those of a twisted bilayer graphene system, like the preserved Dirac cone at the K point of the moiré Brillouin zone, it has several new emerging features like van Hove singularities and linear or flat bands depending on the moiré periodicity. Our results show that most of the moiré patterns observed on the graphene/HOPG system do not have a purely electronic or structural origin, but both. Moreover, our results show that van Hove singularities in these systems with different twist angles have different origins in their respective band structure.

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