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Topological Zero-mode States in Graphene/hBN Superlattices
JUSTIN SONG, Harvard University/ Massachusetts Institute of Technology, LEONID LEVITOV, Massachusetts Institute of Technology — Lateral heterostructures comprised of layered Van der Waal's materials, such as graphene on hexagonal boron nitride (hBN) are a new playground in which electronic Hamiltonians can be engineered, and new electronic states can be found. G/hBN heterostructures provide an instructive example wherein the lateral superlattice periodicity can match typical electron wavelengths. As a result, G-hBN coupling, even if weak, strongly affects electronic states. We will describe how novel electronic states can arise in G/hBN superlattices. Importantly, G/hBN exhibits a potential landscape which has a spatially alternating mass (sub-lattice asymmetric) allowing topologically protected 1-D states to form along its nodal lines. These analogs of Topological Insulator surface states have clear manifestations which allow them to be observed.

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