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Anomalous Topological Currents in Graphene Superlattices POLNOP SAMUTPRAPHOOT, Massachusetts Institute of Technology, JUSTIN SONG, Massachusetts Institute of Technology/Harvard University, LEONID LEVITOV, Massachusetts Institute of Technology — Berry's phases naturally arise from the spinor structure of Dirac systems, yet observation of non-trivial Berry's phase effects in the transport characteristics of Dirac systems, such as the Valley Hal effect, has proved elusive. Recently, layered graphene heterostructures have emerged as a promising setting to observe novel electron dynamics. We will discuss how novel features in Berry's curvature arise in Graphene/h-BN superlattices to allow long range topological currents to develop. Non-intuitively, we find superlattice mini-bands that have non-trivial Valley Chern number even though the sub-lattice asymmetric potential oscillates in sign. This results in clear non-local transport signatures for the topological character of the bands formed in Graphene/h-BN heterostructures.

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