

Abstract Submitted
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Stabilizing topological phases in graphene via random adsorption JIANG JIANG, International Center for Quantum Materials, Peking University, Beijing 100871, China, ZHENHUA QIAO, Department of Physics, The University of Texas at Austin, Austin, Texas 78712, USA, HAIWEN LIU, Institute of Physics, Chinese Academy of Sciences, Beijing 100190, China, JUNREN SHI, QIAN NIU, International Center for Quantum Materials, Peking University, Beijing 100871, China — We study the possibility of realizing topological phases in graphene with randomly distributed adsorbates. When graphene is subjected to periodically distributed adatoms, the enhanced spin-orbit couplings can result in various topological phases. However, at certain adatom coverages, the intervalley scattering renders the system a trivial insulator. Using both finite-size scaling method and transport calculation, we show that when the adatom distribution becomes random, the intervalley scattering is weakened, but other quantities (e.g. spin-orbit couplings, and exchange field) are not affected. This finding points out that the topological states are graphene-favored ground states in the presence of randomly distributed adatoms. Hua Jiang, Zhenhua Qiao, Haiwen Liu, Junren Shi and Qian Niu, *Phys. Rev. Lett.* **109**, 116803 (2012).

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