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Control of Rewriteable Doping Patterns in Graphene/Boron Nitride Heterostructures SALMAN KAHN, JAIRO VELASCO JR., DILLON WONG, JUWON LEE, HSIN ZON TSAI, University of California - Berkeley, LONG JU, Cornell University, LILI JIANG, ZHIWEN SHI, University of California - Berkeley, PAUL ASHBY, Molecular Foundry, TAKASHI TANIGUCHI, KENJI WATANABE, National Institute for Materials Science, ALEX ZETTL, FENG WANG, MICHAEL CROMMIE, University of California - Berkeley — Spatial control of charge doping in 2D materials is a promising technique for designing future electronic devices and understanding novel physics. Electrostatic gating and chemical doping are common methods to achieve control of charge doping in 2D materials. However, these approaches suffer from complicated fabrication processes that introduce impurities, change material properties irreversibly, and lack flexibility. Here, we introduce a new method for patterning rewriteable doping profiles with local interface charge transfer from defects in a tunable BN substrate into an adjacent layer of graphene. We characterize these spatial doping patterns through local probe and transport techniques. This technique enables many novel device designs for 2D materials, including atomically thin p-n junctions and rewriteable memory devices.

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