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Fabrication and characterization of devices made of graphene encapsulated in hexagonal boron nitride[1] ANDY WANG, North Carolina School of Science and Mathematics, ANDREW SEREDINSKI, GLEB FINKELSTEIN, Department of Physics, Duke University — Hexagonal boron nitride (hBN) encapsulated graphene provides a platform for the manifestation of exotic phenomena, such as the integer and fractional quantum Hall effects. The encapsulating hBN layers protect the graphene device from external charge and surface inhomogeneity. These heterostructures are fabricated by stacking layered materials through dry-transfer stamping of each layer. Throughout this process, blisters form in the interfaces between the hBN and graphene layers, reducing device quality and limiting the usable size of a device. Hence, it is essential to develop a consistent and clean device fabrication procedure that minimizes blister formation while maximizing device size and quality. We review and present optimizations on various aspects of the fabrication process, including layered material exfoliation, stamp fabrication, stacking strategies, and cleaning procedures. To evaluate these procedures, we identify blister formation with atomic force microscopy and graphene quality via Raman spectroscopy.

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