Abstract Submitted
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Graphene/MoS_2 heterostructures for optoelectronics applications[1] P HAN, Department of Physics, Georgetown University, Q WONG, Physics Department, University of Central Florida, A EL FATIMY, Department of Physics, Georgetown University, M ISHIGAMI, Physics Department and Nanoscience Technology Center,University of Central Florida, Orlando, FL 32816, P BARBARA, Department of Physics, Georgetown University, Washington DC, 20057 — Graphene and other atomically thin materials can be combined to make novel ultra-thin devices that are suitable for flexible substrates. However, fabricating these heterostructures is a challenge. Most previous work was done by stacking monolayers exfoliated from bulk materials [1], which is a very time-consuming, low-yield method. Large-area monolayer can also be grown by CVD and stacked, as demonstrated by the successful transfer of graphene on as-grown MoS_2 [2], yet the optical properties of some materials like MoS_2 may be degraded by the processing required to detach them from the growth substrate, thereby limiting options in device architecture. Here we develop a method to transfer, align and stack large flakes and films of MoS2 and graphene after transferring both from the growth substrate onto an arbitrary substrate. The Raman and photoluminescence measurements show that the optical properties of the stacked monolayers are not degraded, making this method viable for fabrication of optoelectronics devices. .[1] A.K. Geim, et al., Nature, 499 (2013) 419. [2] L.L. Yu, et al., Nano Letters, 14 (2014) 3055.

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