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Graphene slides over the substrate when you pull it: Direct measurement, theory, and frictional forces ALEXANDER KITT, ZENAN QI, HAROLD PARK, ANNA SWAN, BENNETT GOLDBERG, Boston University — Using graphene sealed cylindrical microchambers we characterize, for the first time, the sliding of graphene over a thermal oxide substrate. High spatially resolved Raman spectra recorded as external pressure is applied to the microchamber shows that as the graphene is pressed into the hole it drags some of the previously substrate-supported graphene with it. The well-understood strain response of the Raman G-band allows us to measure strains of less than .01%, corresponding to 1nm stretching over a micron, with 500 nm lateral resolution as pressure is applied to the system. Our results are compared to both atomistic and continuum models, with interesting new conclusions, of the system in order to quantify the sliding for mono, bi, and tri layer graphenes over holes of radii between 1.25 and 5 μm with applied pressures between 0 and 100 psi.

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