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Electronic detection of phase transition of adsorbed water on graphene SHUDONG XIAO, MICHAEL FUHRER, Center for Nanophysics and Advanced Materials, University of Maryland, College Park, MD 20742-4111 — Graphene is sensitive to overlayers on its surface through charge transfer and also through changes in dielectric constant, which can alter the scattering by static disorder in graphene. We performed transport measurement on graphene devices *in situ* in ultra-high vacuum at low temperature. Water vapor is introduced to the chamber and is adsorbed on graphene at low temperature. After deposition of a few monolayers of water, the resistivity of graphene at fixed gate voltages is measured as the temperature is raised from 40K to room temperature. Sharp features in the temperature-dependent resistivity mark reproducible, irreversible (upon re-cooling) changes in the sample which we interpret as phase transitions in the adsorbed water overlayer, likely corresponding to dewetting and desorption. This work has been supported by the University of Maryland NSF-MRSEC under Grant No. DMR 05-20471 with supplemental funding from NRI.

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