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Coupling between electrons and an adsorbed atomic monolayer on the surface of a single nanotube.[1] ZENGHUI WANG, ERIK FREDRICKSON, OSCAR VILCHES, DAVID COBDEN, University of Washington — Two-dimensional phase transitions within an atomic monolayer adsorbed on the surface of a single suspended carbon nanotube can be detected by using the nanotube as a vibrating nanobalance. Here we report that such phase transitions can also be detected and studied by measuring the electrical conductance of the nanotube. In addition, the behavior of the monolayer is affected by the electric current through the nanotube, which produces heating, and by a dc gate voltage, which controls the electric field at the nanotube surface. As a result, new kinds of adsorption experiments are possible in which the coupling between the adsorbates and substrate electrons can be quantified and parameters of the monolayer can be tuned.

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