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**Detection of adsorbed gas atoms on suspended single-walled carbon nanotube micro-balances** ZENGHUI WANG, University of Washington, JIANG WEI, OSCAR VILCHES, DAVID COBDEN — Monolayers of gas atoms or molecules adsorbed on suspended single-walled carbon nanotubes offer the opportunity to study the phases and phase transitions of a unique low dimensional system. They are expected to resemble the well studied 2D monolayers on planar graphite, but with tight cylindrical boundary conditions imposed. The adsorbed density can be measured by using the nanotube itself as a vibrating microbalance, whose vibration amplitude is detected through the induced modulation of the conductance. We are initially studying the noble gases Ne, Kr and Xe, which are attractive for their simplicity and which show discontinuous phase transitions on 2D graphite that from basic considerations should be altered or suppressed as the dimensionality is reduced. We will also study oxygen monolayers, because oxygen has more complex 2D ordering on graphite, being magnetic and nonspherical, and because of the surprisingly large doping effect reported for oxygen on nanotubes which remains to be fully understood. We will survey the resonant behavior of a number of nanotube microbalances we have made, including examples with quality factor greater than 1000, and the damping effect of a gaseous environment. We will then report on our progress in detecting adsorbed layers and phase transitions in them.

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