Abstract Submitted
for the MAR14 Meeting of
The American Physical Society

Observation of Henry's Law in Low-Density Measurements of Adsorption on Carbon Nanotubes BORIS DZYUBENKO, DENISE SCHMITZ, HAO-CHUN LEE, OSCAR E. VILCHES, DAVID H. COBDEN, Department of Physics, University of Washington — We have studied the adsorption of noble gases on pristine suspended single-walled carbon nanotubes at low temperatures in the limit of low density (coverage), as determined from the shift of the mechanical resonance frequency of the nanotube due to mass loading. The high homogeneity of the nanotube substrate and the sensitivity of the technique allow us to observe Henry's law, in which the coverage is proportional to the gas pressure. In this limit the adsorption isotherm is determined by single-atom effects, allowing unprecedentedly accurate ($\pm$ 2%) determination of the single-particle binding energies to a nanotube. Also, by measuring the deviation from Henry's law as coverage increases we obtain information about the pairwise interactions between the adsorbed atoms using the virial expansion.

Boris Dzyubenko
Department of Physics, University of Washington

Date submitted: 14 Nov 2013 Electronic form version 1.4