Abstract Submitted
for the MAR08 Meeting of
The American Physical Society

Carbon nanotube nanomechanical mass sensors HSIN-YING CHIU, PETER HUNG, California Institute of Technology, HENK POSTMA, California State University Northridge, MARC BOCKRATH, California Institute of Technology — Single-walled carbon nanotubes are arguably the lightest and smallest wires in the world, and have recently been shown to act as nanomechanical resonators [1]. As a result, single-wall carbon nanotubes are excellent candidates for highly sensitive mass sensing [2]. We observed the down shift of the resonant frequency of a suspended double-clamped carbon nanotube resonator at cryogenic temperatures upon helium mass loading. Using a straightforward estimate of the nanotube mass, the observed frequency shift corresponds to the mass of ∼1000 helium atoms, which is the zeptogram range. This is considerably smaller than found previously with nanotube resonators, and comparable to that found using nanowire resonators [3]. Our noise floor is currently ∼1 Xenon atom per root Hz, which may enable single-atom detection in future experiments. [1] Vera Sazonova, et al., Nature **431**, 284 (2004). [2] H. B. Peng, et al. Phys. Rev. Lett. **97**, 087203 (2006) [3] Y. T. Yang, et al. Nano Lett. **6**, 583 (2006).

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Date submitted: 27 Nov 2007 Electronic form version 1.4