Abstract Submitted
for the MAR13 Meeting of
The American Physical Society

**Mechanical read out of a single electron spin in a carbon nanotube**

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— The spin of a single electron in a suspended carbon nanotube can be read out by using its coupling to the nano-mechanical motion of the nanotube. To show this, we consider a single electron confined within a quantum dot formed by the suspended carbon nanotube. The spin-orbit interaction induces a coupling between the spin and one of the bending modes of the suspended part of the nanotube [1]. We simulate the response of the system to the external driving with a Jaynes-Cummings model by solving the quantum master equation. Using parameters comparable to those used in recent experiments, we show how information of the spin state of the system can be acquired by measuring its mechanical motion [2]. The mechanical motion can be detected by observing the current through a nearby charge detector.

[1] A. Palyi, P.R. Struck, M. Rudner, K. Flensberg, G. Burkard, Phys. Rev. Lett. 108, 206811 (2012).
[2] H. Wang, P. R. Struck, G. Burkard, manuscript in preparation.

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Date submitted: 31 Oct 2012 Electronic form version 1.4