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Self-detecting mechanical resonators made from suspended carbon nanotubes BENOIT WITKAMP, MENNO POOT, ANDREAS K. HÜTTEL, HERRE S.J. VAN DER ZANT, Delft University of Technology — We study the flexural and torsional mechanical properties of suspended carbon nanotubes. We have used a suspended carbon nanotube as a frequency mixer to detect its own mechanical motion. A single gate-dependent resonance is observed, which we attribute to the fundamental bending mode vibration of the suspended carbon nanotubes. Using a continuum model fit to the measurements, we show that the nanotubes in our devices have no slack and that, by applying a gate voltage, the nanotube can be tuned from a regime without strain to a regime where it behaves as a vibrating string under tension. We are currently investigating the low-temperature properties of these devices. We are also investigating the torsional mechanical properties of nanotubes.

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