Abstract Submitted
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Observation, Modeling and Fabrication of Self-Oscillating Carbon Nanotube-Based NEMS[1] BENJAMIN ALEMAN, JEFF WELDON, ALLEN SUSSMAN, WILL GANNETT, ALEX ZETTL, University of California, Berkeley — Capturing the full potential size, power and performance benefits of NEMS is often precluded by their functional reliance on relatively large, high-power, high-frequency external electronics. In this work, we use Transmission Electron Microscopy (TEM) to observe the controllable self-oscillations of singly-clamped, field-emitting carbon nanotubes that operate with only a single DC bias voltage, and formulate an electromechanical model that predicts the voltage necessary to induce oscillations solely in terms of device geometry and material properties. Furthermore, we use this model to successfully fabricate, for the first time, top-down self-oscillating NEMS amenable to large-scale integration.

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