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**Electrostatic Driving of Graphite Resonators** AREND VAN DER ZANDE, SCOTT BUNCH, SCOTT VERBRIDGE, Cornell University, IAN FRANK, DAVID TANENBAUM, Pomona College, JEEVAK PARPIA, HAROLD CRAIGHEAD, PAUL MCEUEN, Cornell University — We fabricate nanoelectromechanical graphite resonators and drive the resonators electrostatically. Graphite sheets are suspended over trenches in $SiO_2$ and contacted to electrodes. Mechanical vibrations of the graphite sheets are actuated by applying a radio frequency voltage relative to a doped silicon back-gate, and the resonance frequency is tuned by varying an additional DC gate voltage. Mechanical vibrations are detected optically by laser interferometry. We detect the thermal motion of the resonators, and use the equipartition theorem to calibrate the amplitude of motion. For example, a 5nm graphite sheet at room temperature has thermal motion on resonance of 200 fm/ $Hz^{1/2}$, and shows a driven linear response in displacement up to 6 nm, comparable to the thickness of the resonator. The unusually small mass, electrically active material and reasonable dynamic range indicate that graphite resonators would make excellent force and charge sensors.

Arend van der Zande
Cornell University

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