

Abstract Submitted
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Performance of graphene nanoelectromechanical resonators
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JAMES HONE, Columbia University — Given the enormous stiffness and low mass
density, graphene is an ideal candidate for nanoelectromechanical (NEMS) applica-
tions. Here, we demonstrate the fabrication and electrical integration of monolayer
graphene resonators, and report their response to changes in mass and temperature.
The resonant frequencies are in the megahertz range, and could be tuned by applied
gate voltage. The quality factor increases with decreasing temperature, reaching
10,000 at 5 K. We also build a continuum mechanic model to understand the exper-
imental data, which reveals the mass density and built-in strain of graphene, as well
as its unusual negative thermal expansion coefficient.

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