

Abstract Submitted  
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**Radio Frequency Electrical Transduction of Graphene Mechanical Resonators** CHANGYAO CHEN, VIKRAM DESHPANDE, YUEHANG XU, FRANK DIRENNO, ALEXANDER GONDARENKO, DAVID HEINZ, SHUAIMIN LIU, PHILIP KIM, JAMES HONE, Columbia University — We report radio frequency (RF) electrical readout of graphene mechanical resonators. The mechanical motion is actuated and detected directly by using a vector network analyzer (VNA), employing a local gate to minimize parasitic capacitance. Resist-free doubly-clamped samples with resonant frequency in MHz range, Q factor  $\sim 10,000$  at 77 K and signal-to-background ratio of over 20 dB, are demonstrated. In addition to being over two orders of magnitude faster than the electrical RF mixing method, this technique paves the way for use of graphene in RF devices such as filters and oscillators.

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