

Abstract Submitted
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Progress towards graphene as a quantum-limited electro-mechanical resonator R. G. KNOBEL, A. CHIA¹, Queens University, Department of Physics — With its high stiffness, low density and relatively simple fabrication, graphene promises to be an ideal system for exploring the quantum limits of mechanical measurements. In particular, electronic transport through a graphene sheet suspended over an electrode can be strongly modulated by vibrations of the sheet – whether through the standard field effect which changes the carrier density in the sheet, or through modulation of the Coulomb blockade in quantum dots formed in the sheet. In this work we present the novel fabrication scheme we are using for this work, which involves exfoliation and identification of single-layer graphene sheets on a PMMA layer above a silicon substrate, cross-linking of the PMMA to form supports for the graphene and metal electrodes, and subsequent lithography to form electrodes. Raman scattering measurements before and after patterning confirm the single-layer nature of the graphene, and preliminary low-temperature transport measurements show the feasibility of this system for quantum-limited sensitivity of resonant motion of the sheet.

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