

Abstract Submitted
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Bistability and oscillatory motion of graphene nano-membranes on silicon dioxide TORGE MASHOFF, MARCO PRATZER, VIKTOR GERINGER, RWTH Aachen University, TIM ECHTERMEYER, MAX LEMME, AMO GmbH, MARCUS LIEBMANN, MARKUS MORGENSTERN, RWTH Aachen University — The truly two-dimensional material graphene is an ideal candidate for nanoelectromechanics due to its large strength and high electron mobility. Here, we show that a monolayer of graphene on SiO₂ provides natural, ultra-small membranes of diameters down to 3 nm within its intrinsic rippling. These membranes can be lifted either reversibly or hysteretically by the tip of a scanning tunneling microscope (STM). The clamped-membrane model including van-der-Waals and dielectric forces explains the results quantitatively. Application of an AC-voltage oscillates the nanomembrane, which might lead to a completely novel approach to controlled quantized oscillations or single atom mass detection.

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