

Abstract Submitted
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Energy decay measurements in graphene-based mechanical resonators PETER WEBER, JOHANNES GÜTTINGER, ADRIEN NOURY, JOEL MOSER, ADRIAN BACHTOLD, ICFO - Institut de Ciències Fotoniques, The Barcelona Institute of Science and Technology, 08860 Castelldefels (Barcelona), Spain — Shrinking nanomechanical resonators has led to new record sensitivities in mass and force detection and has provided novel insights into the rich physics of mechanical nonlinearities. However, the high sensitivity and enhanced nonlinearities in ultra small resonators pose new challenges for the detection of motion. This has so far prevented a more detailed investigation of the energy decay, which is the key figure of merit for most technological and scientific applications. Here we present a method to carry out time-resolved energy decay measurements of few-layer graphene resonators. In the high vibration amplitude regime, we observe a strong deviation from previous energy decay measurements. Contrary to expectations, the exponential decay rate decreases abruptly at a few threshold amplitudes. At the lowest measured vibrational amplitude, the energy decay rate is weakest, corresponding to quality factors that can surpass 1 million.

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