Enhancing the performance of Graphene NEMS[1] MARSHA PAR-
MAR, Indian Inst of Science — In recent past Nanoelectromechanical systems
(NEMS) have got several sensing based applications such as force, spin, charge
and mass sensors. These devices due to their smaller size, operate in very high
frequency regime (MHz - GHz) and have very high quality factors (10^2 -10^5). Nev-
ertheless these devices are limited by their comparatively smaller linear operational
range. Electromechanical devices based on 2D materials are extremely sensitive to
strain. We studied the effect of strain on the performance of single layer Graphene
NEMS. Our results reveal that the strain in Graphene NEMS can be tuned to in-
crease the linear operational range. We report a 25 dB increase in dynamic range
by tuning the strain from 10^{-3} at room temperature to 10^{-2} at 200K. This increase
in dynamic range is also accompanied by partial cancellation of elastic and electro-
static nonlinearities. The resulting mass resolution estimated from the experimental
data is 100 yg...................[1] which is one order of magnitude better than previously
reported values. Reference: 1. Parmar, M. M., Gangavarapu, P. R. Y. & Naik, A.
K. Dynamic range tuning of graphene nanoresonators. *Applied Physics Letters* **107,**
113108 (2015).

[1]1.Department of Science and technology, India. 2.CSIR, India.

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