Graphene nanomechanical resonator based ultra-sensitive mass change detection

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Abstract

Nanoelectromechanical (NEM) systems have attracted a lot of attention since electrical and mechanical degrees of freedom in NEM devices provide great potential for utilizing the devices as sensors and actuators in electronic, mechanical, and photonic applications. Graphene is one of the best candidate materials for the NEM device thanks to its superior mechanical properties as well as high electrical conductivity. In this presentation, graphene NEM resonator based ultra-sensitive mass detection will be demonstrated. The amount of mass loaded on the graphene NEM resonator can be measured by resonant frequency shifts. The sensitivity of frequency change detection by mass loading could be improved by improving the quality of device structure and effective mass of graphene. A new idea of utilizing the non-linear behavior of graphene resonator was applied to our graphene NEM device so that the resolution of frequency change detection could be significantly improved.

Biography

EDUCATION
1999, 2001, 2005 B.S., M.S., Ph.D., Dept. of Physics, Seoul National Univ.
WORK EXPERIENCE
2016- Professor, Ewha Woman's University, Korea
2013-2014 Visiting Professor, NTNU, Norway
2005-2007 PostDoc., Gothenburg Univ., Sweden

RESEARCH
Nano transport & nano electromechanical systems
Ultra-sensitive mass & force detector based on nano mechanical devices.
Carbon nanotube & graphene based nano electronics.
In-situ electromechanical measurement of low dimensional nanostructures.