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Title: Progress and Status of Low Dimensional NEMS Resonators

Abstract:

The advent of low-dimensional nanostructures [1-2] has enabled a plethora of new devices and systems. Among them, nanoelectromechanical systems (NEMS) offers the unique capability of coupling the exquisite material properties found in these atomically-defined nanostructures with their mechanical degree of freedom, opening new opportunities for exploring exotic phenomena at the nanoscale [3-8]. In particular, as these devices driven into mechanical vibration—just as musical instruments—they become essentially nanoscale guitars, drums, tuning folks, etc. By studying the infinitesimal mechanical vibrations in these nanoscale “music instruments”, i.e., listening to the “sound of music” at the nanoscale, researchers can study a number of fundamental physical processes such as absorption, phase transition, anisotropy, and nonlinear processes, and can potentially enable novel signal transduction and logic processing functions [9-10].

References

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Biography:

Zenghui Wang is currently a professor in the Institute of Frontier and Fundamental Sciences (IFFS) at the University of Electronic Science and Technology of China (UESTC). His research interests and expertise primarily focus on nanoscale devices and systems, particularly *Nanoscale Resonators*, and *High-Frequency Resonant Sensors & Transducers*. Prior to joining Case, during 2010-2012, he worked at Cornell University as a postdoc researcher. He earned a Ph.D. degree (2010) from University of Washington, Seattle, for building an ultra-high frequency NEMS resonant sensor with an individual

single-walled carbon nanotube, and using it to detect and study the low-dimensional phase transitions of the atomic layer adsorbed on the nanotube surface. He is an expert on studies of emerging nanoscale devices and sensors based on new materials such as carbon nanotubes, graphene, and other low-dimensional nanomaterials, and has published 20+ research articles in peer-reviewed journals, including *Science*, *Nature Physics*, *Nature Nanotechnology*, *Nature Communications*, *Science Advances*, *Nano Letters*, *ACS Nano*, *Physical Review Letters*, *2D Materials*, etc.,. He has given dozens of invited talks and seminars at peer-reviewed conferences and research universities. He is an Associate Editor for *Micro and Nano Letters*, and has been serving on the Technical Program Committees for *IEEE IFCS*, *IEEE Nano*, and the MEMS/NEMS Technical Group at the *American Vacuum Society (AVS) International Symposium and Exhibition*.