Elishakoff, Isaac; **Challamel, Noël**; **Soret, Clément**; **Bekel, Yannis**; **Gomez, Thomas**

Virus sensor based on single-walled carbon nanotube: improved theory incorporating surface effects. (English) Zbl 1327.74016

Philos. Trans. R. Soc. Lond., Ser. A, Math. Phys. Eng. Sci. 371, No. 1993, Article ID 20120424, 14 p. (2013).

Summary: In this paper, we deal with the theoretical framework for a single-walled carbon nanotube serving as a virus or bacterium sensor, with the complicating influences of non-locality and surface effects taken into account. It is demonstrated that these effects are not negligible as is often assumed in the literature; they may greatly influence both the vibration behaviour as well as the identification process of the virus or bacterium.

MSC:

74A60 Micromechanical theories
74K10 Rods (beams, columns, shafts, arches, rings, etc.)

Keywords:

carbon nanotubes; nanosensors; Bresse-Timoshenko beams; non-local effects; surface effects

Full Text: DOI

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