

# **Nano-electromechanics of carbon nanotubes - coupling single electron effects and vibrational motion**

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Carbon nanotubes are not just great electronic conductors. They are very light, with an extreme tensile strength. By now, nanotubes are used in many technological applications, ranging from bullet proof vests to surfboards or bike frames. Here, we will talk about the mechanical properties of single such molecules. The lowermost mechanical vibration mode is the transversal (or bending) mode, where the nanotube vibrates as we know it from a violin or piano string. It so far shows up in quasi-classical beam mechanics experiments, but also displays fascinating interactions between single electron effects and vibrational motion. Experiments today reach all the way to optomechanics with a single nanotube, where the vibration couples coherently to a microwave resonator field.