Qeios

Peer Review

Review of: "The main difference is that the current distribution is alternating with a wavelength that is 100 times smaller than the free space wavelength for a given thermal frequency"

Ricardo Oliviera[1]

1. Chemical Engineering, The Africa-America Institute, New York, United States

With noticing that the nanodipole L/d is significantly reduced, it cannot be used . is completely excluded. Because here the electrons are only allowed to move along the conductor string and therefore the current distribution is effectively one-dimensional. In addition to the fact that the electrons only move in one dimension, there are two important issues. Also happens, large inductance and resistance. These characteristics create a very different behavior for nanotube antennas compared to classical antennas. In one-dimensional electric conductors such as nanotubes, the skin depth mode

The main difference is that the current distribution is alternating with a wavelength that is 100 times smaller than the free space wavelength for a given thermal frequency. The wavelength of the current distribution depends on the wave speed in that mode. If the speed of the wave is the same as the speed of light, the wavelength of the current distribution is the wavelength of electromagnetic waves in free space. On the other hand, the wave speed in nanotubes is about one hundred times lower than the speed of light. This is because in circuit theory, the wave speed is equal to the inverse of the square root of the capacitive capacitance per unit length multiplied by the inductive capacitance per unit length.

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Conclusion :

In general, in order to receive the electromagnetic wave in the space, the dimensions of the antenna must be on the order of the wavelength of the input to its surface. Due to the very small dimensions of nano sensors, nano antennas need to have a very high working frequency to be usable.

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Declarations

Potential competing interests: No potential competing interests to declare.