

عنوان مقاله:

Current Transport Mechanisms in Ballistic Carbon Nanotube Transistors: Channel Diameter Impact

محل انتشار:

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خلاصه مقاله:

Carbon nanotube field effect transistors are most promising devices for semiconducting industry. It's apparent that in future, silicon technology will be replaced by these devices. The channel of these devices is of carbon nanotube (CNT). As a result the CNT properties such as its chirality, that defines its diameter, play an important role in device performance. In this paper we demonstrate the channel diameter impact on tunnelling and thermionic emission current in coaxially CNTFET with doped source drain extensions. The channel is zigzag CNT with (n,0) chirality vector. From simulation results we find that in large n values of channel the tunnelling mechanism dominate by applying low gate voltage and the performance decreases consequently. But in low values, the tunnelling occurs in lower gate bias while on-current stay without any meaningful change and then performance will be better. The on-state current is due to thermionic emission on top of barrier of device.

کلمات کلیدی:

Carbon Nanotube, Field Effect Transistor, Channel Diameter, Device Performance, Quantum Simulation

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