A Network of Communicating Nanoparticles Can Cover a Wider Area and Perform More Network Processing

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- **Abstract:**

- Nano-network is a nano- scale communication network between nano-devices. Nano-devices face specific challenges in performance due to limitations in processing power management capabilities . Hence, these devices are expected to perform simple tasks that require different and novel approaches. Molecular communication is a new information and communication solution that operates based on biological mechanisms and systems.Two nanoparticles can communicate with each other through chemical signaling..

- **Keywords:** Nanocommunications , terahertz , electromagnetic waves , nanoantenna

• Introduction

Data transfer between two nanoparticles can increase the capabilities and applications of nanodevices compared to their single operation mode in terms of both complexity and range of performance. This complex and flawless process with a wide coverage area can be named nano(data_communication) or Nano_telecommunicatison. Regarding the communication structure between two nanoparticles through chemical signaling, the measurement function requires them to be located inside the environment from which parameters must be measured, and the area covered by a nanonetwork is limited to its surroundings. This is while a network of communicating nanoparticles can cover a wider area and perform more network processing . In addition, there are several nanocommunication technologies that require the use of external excitation and measurement to work. Wireless communication between nanonetwork and micro and macro devices and equipment can meet this need.

A simple nanocommunication device consists of a carbon nanotube that forms two electrodes. These magnetic communication particles are exposed to different large molecules, causing some of them to bind to the surface of the carbon nanotube. In nanocommunication, different molecules give off unique acoustic signals related to the properties of the molecules. The strength of the interaction between the carbon nanotubes and the molecules is derived from the noise signals. In nanocommunication, the interaction of electronic nanoparticles with carbon nanotubes changes the signal produced by the carbon nanotube device following the absorption of specific single molecules. This is because the absorbing molecule creates a trap state in the carbon nanotube, which causes it to conduct. This means that carbon nanotube-based nanocommunication devices are very sensitive. They can detect an unprecedented amount of single molecules. The ability to characterize single molecules using highly sensitive nanoelectronics is an exciting prospect in the field of sensors, especially for neuroscience and biosensor applications. The use of acoustic signals to detect molecular activity ((interaction) or (active orbital)) is attractive. In nanocommunicators and nanoparticle-based electronic interactions based on carbon nanotubes, the sensitivity of signal detection may be increased by the generation of controllable noise. These nanocommunicator devices based on carbon nanotubes demonstrate the possibility of identifying individual molecules through their unique noise particles in current nanocommunicator signals. Improved knowledge of the molecular origin and nanoparticle-based electronic interactions based on carbon nanotubes noise should lead to the development of electronics that use noise to improve their performance rather than degrade it.

Highly sensitive carbon nanotube-based nanocommunication device :

Note: In nano-telecommunication, the interaction with carbon nanotube-based electronic nanoparticles changes the signal produced by the carbon nanotube device following the absorption of specific single molecules. This is because the absorbing molecule creates a trap state in the carbon nanotube, which causes it to conduct.

This means that nanocommunicators based on carbon nanotubes are very versatile and can detect an unprecedented amount of single molecules. The ability to characterize single molecules using highly sensitive nanoelectronics is an exciting prospect in the field of sensors, especially for neural and biosensor applications. The use of acoustic signals to detect molecular activity ((interaction) or (active orbital)) is attractive. In nanocommunicators and nanoparticle-based electronic interactions based on carbon nanotubes, the sensitivity of signal detection may be increased by the generation of controllable noise. These nanocommunicators based on carbon nanotubes demonstrate that it is possible to detect single molecules through their unique noise particles in current nanocommunicator signals. Improved knowledge about the molecular origin and interaction with nanoparticle-based electronic interactions should lead to the development of electronics that use noise to improve their performance rather than degrade it.

A network of communicating nanoparticles can cover a wider area and perform more network processing

The kinetic inductance per unit length of a nanotube is ten thousand times greater than the magnetic inductance per unit length of conventional antennas. Therefore, the wave speed will be 100 times smaller than the speed of light. The efficiency of a classical nanotube antenna is of the order of -90 dB, which will be due to resistive losses. This is while. The dimensions of the antenna and the nanosystem or nanosensor assembly, the operating frequency, power losses, the range and dimensions of the sensor network, the structure and capabilities of the power system and the physical communication platform between the different parts of a nanosystem are major factors and parameters, each of which is decisive in some way and determines the manufacturing capability and performance of the final system. A network of communicating nanoparticles can cover a wider area and perform more network processing . In addition, there are several nanocommunication technologies that require the use of external excitation and measurement to work. Wireless communication between nanonetworks and micro and macro devices and equipment can meet this need.

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