

## Utilizing Quantum Chemistry for Nanotechnology: Electron and Spin Movement in Molecular Devices

**Authors :** Mahsa Fathollahzadeh

**Abstract :** The quick advancement of nanotechnology necessitates the creation of innovative theoretical approaches to elucidate complex experimental findings and forecast novel capabilities of nanodevices. Therefore, over the past ten years, a difficult task in quantum chemistry has been comprehending electron and spin transport in molecular devices. This thorough evaluation presents a comprehensive overview of current research and its status in the field of molecular electronics, emphasizing the theoretical applications to various device types and including a brief introduction to theoretical methods and their practical implementation plan. The subject matter includes a variety of molecular mechanisms like molecular cables, diodes, transistors, electrical and visual switches, nano detectors, magnetic valve gadgets, inverse electrical resistance gadgets, and electron tunneling exploration. The text discusses both the constraints of the method presented and the potential strategies to address them, with a total of 183 references.

**Keywords :** chemistry, nanotechnology, quantum, molecule, spin

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