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Molecular electronics: controlled manipulation, noise and graphene architecture

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Citation

Tewari, S. (2018, March 27). *Molecular electronics: controlled manipulation, noise and graphene architecture*. Casimir Research School, Delft. Retrieved from <https://hdl.handle.net/1887/58611>

Version: Not Applicable (or Unknown)

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<http://hdl.handle.net/1887/58611>

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Issue Date: 2018-03-27

Atoms and molecules are the basic units of matter. If we keep dividing a bar of gold or a glass of water into smaller parts, at the end we are left with a single gold atom or a water molecule. We could not divide them further without them losing their identity. At such small dimensions matter starts to lose its macroscopic properties and its behaviour is governed by the rules of quantum mechanics. Molecular electronics is the study of how electrons, which are fundamental particles in nature, flow through these basic units of the matter. A molecule can have various electronic and mechanical degrees of freedom (or eigenstates) with discrete energies. The electrons flowing through the molecule can interact with these degrees of freedom making single molecule devices. Better control and understanding of these interactions and study of how the atomic structure of the macroscopic electrical leads affect the electron - transport forms the main focus of this thesis.



Atomic and Molecular Conductors (AMC) group written using single gold atoms

Casimir PhD series 2018-04

Molecular Electronics

Molecular Electronics

Controlled manipulation, Noise and Graphene architecture

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