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Theory of Molecular Electron Transport

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Thanks to the curiosity and devoted research of physicists and chemists over the past century and a half, electron transport in extended system has been a well understood phenomenon and has lead to today's all pervasive, monolithic, microelectronics technology. However, despite intense interest and ensuing research since the 1950s, an understanding of electron transport in confined systems, such as molecules and nano-scale atomic particles, remains limited. In this talk, I shall present an overview of our current understanding of the physics and chemistry of electron transport in molecules and at the molecule-solid interface. The effect of electronic structure, chemical bonding, physical dimension, stereochemistry, and external perturbation on molecular electron transport will be discussed.