

Abstract Submitted
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Tunneling mechanisms of transport in single organic molecules

IVAN OLEYNIK, University of South Florida, MORTKO KOZHUSHNER, VLADIMIR POSVYANSKII, Institute of Chemical Physics, RAS — Electron transport in one-dimensional organic molecular structures exhibits unique and intriguing properties that cannot be explained using traditional concepts of solid state physics and/or quantum chemistry of organic molecules. We present a new theoretical approach to study tunneling phenomena in single organic molecular systems that provides an explanation of the experimental observations within a conceptually simple and unified framework. The tunneling in metal/organic-molecule/metal systems is considered as a sub-barrier scattering of tunneling electrons off the electrons and nuclei of the molecular wire and is described using the powerful technique of scattering operators. We will discuss the unique features of the tunneling electron spectrum, the combined mechanisms of ordinary and resonant tunneling, and other phenomena that are important for understanding and interpreting experiments.

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