

Abstract Submitted
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Image potential and molecular conductance IVAN OLEYNIK, MORTKO KOZHUSHNER, University of South Florida — The image potential plays an important role in condensed matter physics including tunneling phenomena at surfaces, but its role in molecular conductance has not been thoroughly investigated. We discuss the influence of the image potential on molecular conductance. It is known that the predominant mechanism of conductance in relatively long organic molecules is resonant tunneling, i.e. the current between electrodes is due to resonant transfer of electrons via the resonant levels of the negative molecular ion (electron states) or/and the levels of positive molecular ion (hole states). Both the energies and wave functions of these resonant states are influenced by the dynamic image potential of the tunneling electron due to the presence of both electrodes. The physics of the image potential is governed by the relative balance between the plasmon energy of electrodes and the band width of the molecular resonant states. In particular, the image potential may lower the resonant electronic levels by as much as 1 eV or raise the resonant hole levels by the same amount. We will discuss interesting phenomena associated with image potential including possible diode effects in symmetric molecules.

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