

Abstract Submitted  
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**Negative differential resistance in molecular conductors** MORTKO KOZHUSHNER, Institute of Chemical Physics, RAS, IVAN OLEYNIK, University of South Florida — Negative differential resistance  $\sigma_d=dI/dV<0$  has been observed in numerous experiments that measured conductance through organic molecules. We will discuss the fundamental mechanism of negative differential resistance in molecular conductors. The origin of NDR is in the nontrivial evolution of resonant conductance states of a molecular conductor in external electric field. These resonant states are the states of positive and negative molecular ions (electron and hole states). In an electric field, the resonant levels are lowered and their wave functions become assymetrical. This results in an initial increase of the resonant molecular current as a resonant level appears in the interval of energies  $[E_F, E_F-eV]$  and a subsequent decrease of the current as the asymmetry in localization at the right and left interfaces is amplified upon further increase of applied bias.

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