

Abstract Submitted
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Characterization of Doped Nano-Wires with Scanning Tunneling Spectroscopy FREDY ZYPMAN, Yeshiva University — STM in spectroscopic mode, has proven to be a useful technique to extract global and local densities of states (DOS and LDOS) of bulk samples and their surfaces. Most theoretical efforts have concentrated on developing algorithms to convert I-V curves into DOS or LDOS. However, a full theoretical description of such program, encompassing any sample, has not been developed yet. Recently, it has been possible to create metallic chains up to seven-atom long. With this in mind, we have developed a new theoretical solution to the problem of mapping Scanning Tunneling Microscopy current-voltage curves into DOS-Energy curves. Our model is based on a self-consistent solution to the quantum problem of electrons in the presence of an array of atomic clusters. The problem, being simpler than its three dimensional counterparts is solved exactly for DOS and for the current-voltage curves. The main results are that the current-voltage peaks at the position of the energies of the electron in the chain, and when an impurity is present in the chain, its position can be extracted from the value of a universal curve. A universal curve allows the measurement of the position of the impurity from experimentally available data, that is, the peaks of the I-V curve. Work supported by Research Corporation through Grant Number CC5786

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