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Charge and Spin Memory Effects in Molecular Junctions[1] P. D'AMICO, D.A. RYNDYK, Regensburg Uni, G. CUNIBERTI, T.U. Dresden, K. RICHTER, Regensburg Uni — In the field of molecular electronics, effects like charge-memory, bistability and switching between charged and neutral states have been observed in STM [1] and single-molecule junctions [2] experiments. In this work we use model hamiltonians to describe molecular junctions, including electron-electron and electron-vibron interactions as wel as tunneling coupling to the leads. For a molecular level coupled to a vibron and in the presence of leads, we show that upon applying gate or bias voltage, it is possible to observe charge-bistability and hysteretic behavior. Physical quantities like lifetimes, charge-voltage and current-voltage curves are calculated by the master equation method for weak coupling to the leads [3] and at stronger coupling by the equation-of-motion method for noneq. Green functions, performing a systematic analysis of the bistable behaviour of the system for different internal parameters such as the electron-vibron and the lead-molecule coupling [4]. In the case of a spin-degenerate molecular level in a single and double dot molecule with vibrational coupling and in presence of ferromagnetic leads, we consider the possibility to obtain a spin-memory effect. [1] J.Repp et al, Science 305, 493 (04); [2] E.Lortscher et al, Small 2, 973 (06); [3] D.A.Ryndyk et al, PRB 78, 085409 (08); [4] P.D'Amico et al, NJP 10, 085002(08).

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