

## Single molecule logic gates

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Different classical molecular circuit designs have been proposed for molecule(s) to play an active role in electronic circuits like (1) substituting each device in the circuit by molecule(s) or (2) structuring the molecule itself to be the circuit (i.e. a molecule-circuit). For a one to one device substitution by a molecule, the standard circuit Kirchhoff laws remains as soon as a minimum wiring length is maintained between the interconnected molecules [1]. Below, the Kirchhoff laws have to be modified according to the quantum physics governing the electron transfer process through of a molecule [2]. In this presentation, those new laws will be recalled starting from the series and parallel ones leading to the exponential decay of the conductance of a molecule as a function of its length [3] and to the interesting intramolecular interference effects [4]. The peculiar case of the balancing of a single molecule Wheatstone bridge will be described [5]. Single molecule-OR and AND will be presented [5] leading to new molecule-OR without any rectification [6] and to a complex XOR semi-classical single molecule logic gate [7].

### References:

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