

Molecule logic gate or surface atomic scale circuits

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At the atomic scale, there are 2 ways of implementing a complex logic gate: atom by atom at the surface of a material or in a molecule also interconnected at the surface of a material. Quantum designs are leading to gates with a large calculating power and a short calculation time as compared to a classical design. In a quantum design, the complexity increase is based on the manipulation of states in a dual space with no correlation with the expansion in space of the final gate. In a classical design, it is based on the accumulation in space of independent devices following for example Shannon like design rules. We will compare classical and quantum design from the point of view of their intrinsic performances but also from a more practical point of view: how a quantum design resists the interconnection when constructing the calculator.