

LOGIC GATES INTEGRATED IN A SINGLE MOLECULE : THE EUROPEAN PICO-INSIDE INTEGRATED PROJECT

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The integration of a single logic gate inside a single molecule requires 5 different steps :

- (1) A clear choice of the intramolecular architecture to perform a logic function.
- (2) An atomic scale technology to precisely perform the in and out on a single molecule in a multi-access planar technology with a precision better than 0.05 nm.
- (3) An interconnection technology from the atomic scale to the macroscopic scale respecting the atomic precision of the measurement performed on the single molecule logic gate.
- (4) A good design and chemical synthesis to get the molecular board where the logic gate is integrated but also all the ancillary equipments for the molecule to behave as expected on the surface in the middle of the N atomic wires or pads.
- (5) A good molecular surface science theory to be able to predict the conformation and adsorption sites of the large logic gate molecule in the N-electrode planar nano-junction taking into account the electronic band structure of the surface with a number of atoms larger than 10 000.

With an atomic scale technology perspective, the European Pico-Inside integrated project was set up in September 05 to explore how those 5 steps can be firmly established to invent a new technology of computation away from the Moore's law roadmap. The first results of Pico-inside will be presented.

