

focus



A way towards single molecule activation and computing

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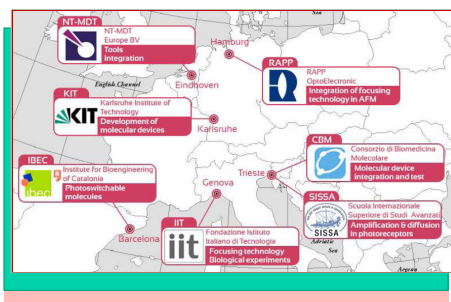
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"There is plenty of room at the bottom"

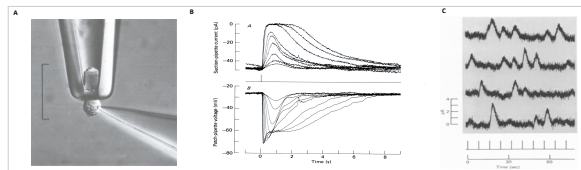
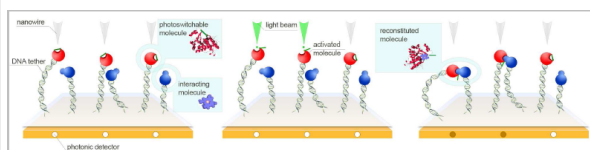
More than 50 years have passed since the famous Richard Feynman's statement. It was 1959 and this revolutionary claim probably sounded as ambitious as intrepid. What, at that time, could appear unlikely, today is something more than a theory.

focus is the project funded by the European Commission within the Seventh Framework Programme coordinated by SISSA that aims to give an important contribute to the nanotech challenge.

7 partners x 4 EU countries for an ambitious aim



Biological molecules, their actions and functions will be used as models for designing and testing new molecular devices for amplification and information processing. Thanks to this innovative strategy, the project will be able to provide important contributes to the investigation of molecular computation in a biological environment with an unprecedented resolution.



FOCUS will develop photo-switchable molecules and, in order to activate them, will construct new photonic tool using Plasmon Polariton technology, enabling focused light spots with a diameter around just 10 nm. Through these two important innovations the project will provide the technology to activate single molecules, with dimensions in the nm range – with a precise temporal and spatial localization. Moreover the photonic devices will be able to simultaneously activate light-sensitive molecules at specific locations separated by 50/100 nm. With this innovative combination of Photonics, Chemistry and Biology the project will provide: i) the experimental tools for understanding single molecule computation in a biological environment and ii) achieve proofs of concept for molecular computation providing the basis to understand how information is processed at a molecular and atomic scale.

In the different project steps

- biological solutions will be used as an inspiration source. Understanding single molecule computation in the nervous system will provide suggestions and proofs of concept for using of single molecules in an artificial computational environment.
- biological processes can be used as an efficient model to explore the role of diffusion in computation and information processing at a molecular level. A new concept establishing the controlled diffusion as a simple and efficient way to interconnect and interface molecules will be developed
- using new photonic devices and photo-switchable molecules, FOCUS will design and develop new prototypes of molecular devices, based on nanografted molecules where the input and output will be read by photonic devices