

Quantum transport: managing energy at the nanoscale for technological alternatives

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Responsible of NQS group, Nanoscale Quantum devices Simulations













5 departments for linking fundamental research to applications

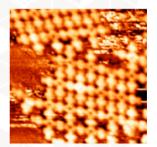


Revealing nanostructures : Build, visualize, probe Modelling and processing for the nanotechnologies

From the atom to the material: analysing and understanding mechanisms

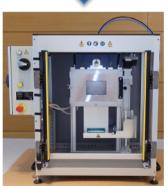
Specific environments: from interaction to the system From the emerging device to ecoenergetics systems

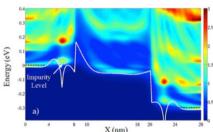


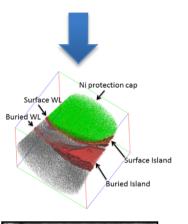




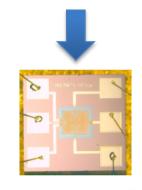


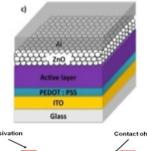


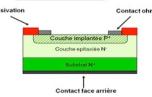


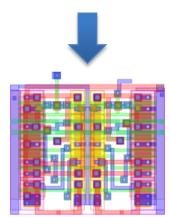


























NQS - Nanoscale Quantum devices Simulations

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NQS - Nanoscale Quantum devices Simulations

- condensed matter system modelling
- quantum transport simulation

Energy management at the nanoscale

Time-resolved dynamics

Hybrid photovoltaics-thermoelectricity (CPT, IRDEP, LPMMC)

Photovoltaics

New concepts (LPICM, LAAS, Univ. de Tokyo)

2D-Materials (CINAM, NSEE, ETH Zürich)







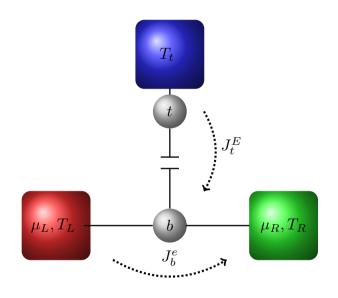






Thermal transport in a nanoscopic thermal machine

Hybrid photovoltaics-**thermoelectricity** (CPT, IRDEP, LPMMC)



Coulomb interaction for enhanced performances of thermal machine

- Powerful Coulomb-drag thermoelectric engine, Phys. Rev. B 96, 115414 (2017)
- Comparative study between heat and power driven refrigerators with Coulomb-coupled quantum dots, Phys. Rev. B 100, 195427 (2019)









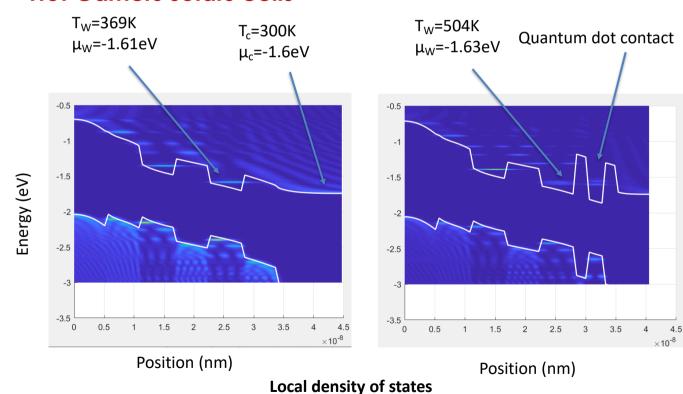




Nanoscale design for fight against thermalization losses

Hybrid photovoltaics-thermoelectricity (CPT, IRDEP, LPMMC)

Hot Carriers solars cells









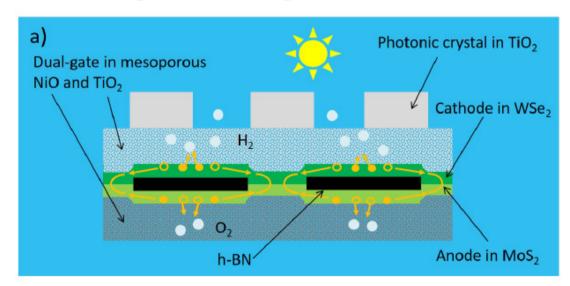


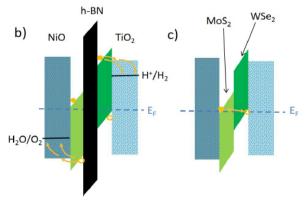




Hydrogen solar gated monolayer

2D-Materials (CINAM, NSEE, ETH Zürich)













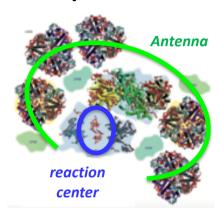


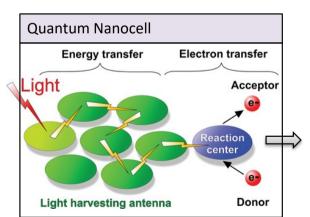


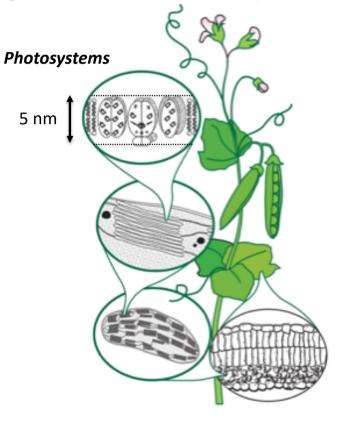
Time-resolved dynamics

Bio-inspired Nanosystems









Robert Blankenship

Molecular Mechanisms of Photosynthesis







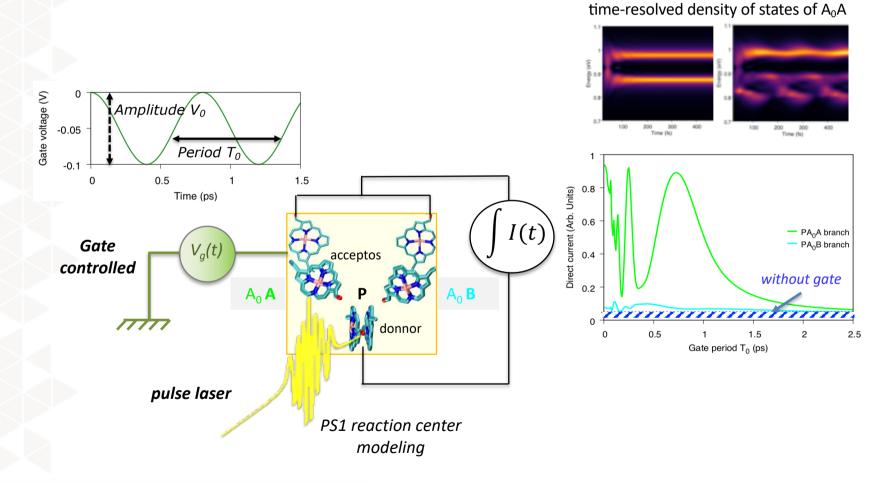






Time-resolved dynamics

Gaining inspiration from the working of natural nanosystems

















Institut Matériaux Microélectronique Nanosciences de Provence

Thank you for your attention



Linking fundamental research to applications within our fields of expertise