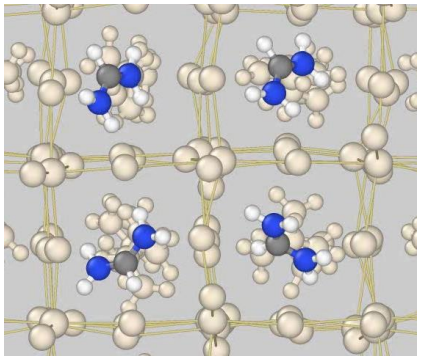
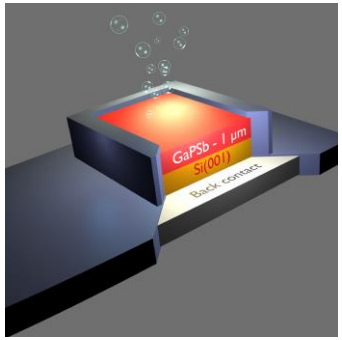
Institut FOTON, Optoelectronics, Heteroepitaxy and Materials - OHM research team, (C. Cornet, Y. Léger)

- OHM ≈ 45 people (20 scientists, 11 engineers/tech, 10-15 non-permanents)
- ≈ 10 people involved in the GDR
- OHM : Materials and devices for photonics and energy harvesting
- Section CNU 28, sec. 08 CNRS, INSIS
- preferential GDR axes: Elaboration & Simulations/Theory

From materials…



…to energy and photonic devices



NAME

GDR Nanomaterials for Energy Applications

ELABORATION
MEASUREMENTS & METROLOGY
SIMULATIONS & THEORY
APPLICATIONS

INSTITUT foton

Fonctions Optiques pour les Technologies de l'informatiON

UNIVERSITÉ DE RENNES 1

INSA

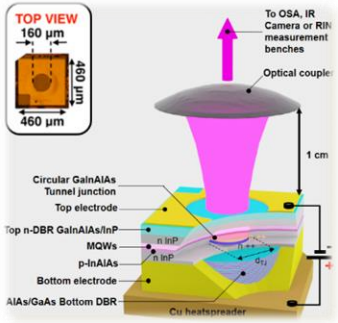
cnrs

Scientific expertise, overview, major themes in relation to the GDR

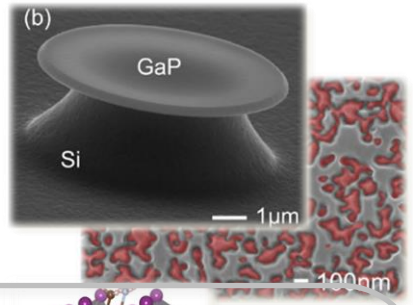
- Physics of photons, phonons, electrons and their coupling is investigated
- Energy conversion studied : photovoltaics & photo-electrochemistry (water splitting)
- Applications targeted: solar energy harvesting/storage (PV solar cells & photo-electrochemical cells for green hydrogen production).

- <u>Lab research area</u> :

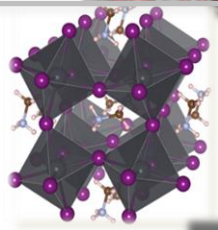
-III-V nanostructured semiconductor lasers



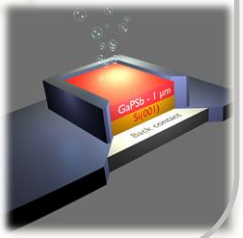
-III-V/Si heteroepitaxy and photonic devices



-Physics of perovskite materials and devices



-Advanced concepts of III-V solar cells and photo-electrochemistry (hydrogen production)



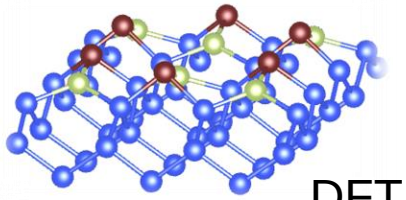
Technical or technological expertise in relation to the GDR issues

- Materials : III-V semiconductors, hybrid perovskites, group IV semiconductors, with 0D, 2D or 3D dimensionality, from the nm scale up to the µm scale.
- Nanostructuration is obtained through bottom-up approach
- elaboration : MBE III-V
- XRD, AFM, EQE and L-I-V for PV solar cells, electroluminescence, visible/IR range
- Advanced optics experiments: Pump-probe femtosecond spectroscopy, cryogenic opto-electronic probe station
- DFT, finite elements, Silvaco, regular user of large scale computational (CINES/IDRIS/TGCC) and experimental (LLB/ILL/ESRF/Argonne/SLAC) facilities

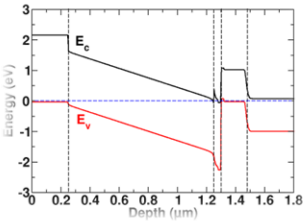
Materials growth

MBE

Simulations



DFT



Devices

Electro-optical characterizations

Processing