



GEMaC

Groupe d'Étude
de la Matière Condensée

AXIS 3 – QUANTUM NANOPHOTONICS

The activity of the Research axis 3 falls into the domain of quantum nanophotonics. We are first interested in nanosources of light:

- colloidal semiconductor nanocrystals based on CdSe, at the single object level or self-assembled into aggregates,
- colour centres in wide bandgap semiconductor nanostructures (ZnO, hBN, SiC),
- low dimensional hybrid perovskites.

We are also studying their coupling to photonic structures, in particular plasmonic structures, whose resonances are confined within a few nanometres.

» Please do not hesitate to explore our research topics in more details from the side panel.

To investigate the (classical and quantum) optical properties of these various

nanostructures, we combine complementary techniques of near-field optical microscopy as well as confocal microscopy (at room or cryogenic temperatures). These microscopes can be coupled to photon counting devices and spectrometers to obtain emission spectra (fluorescence) of the individual nano-objects studied in the far or near field. Our experimental approach is completed by a modelling activity using the so-called “FDTD” method (for Finite Difference Time Domain).



Team QNP

From left to right: Ayoub Galous, Aymeric Delteil, Andrés Nuñez, Stéphanie Buil, Hien Phan, Damien Garrot, Jean-Pierre Hermier, Christophe Arnold, Tien Thanh Nguyen, Helmi Fartas



The 2025 quantum nanophotonics Christmas tree