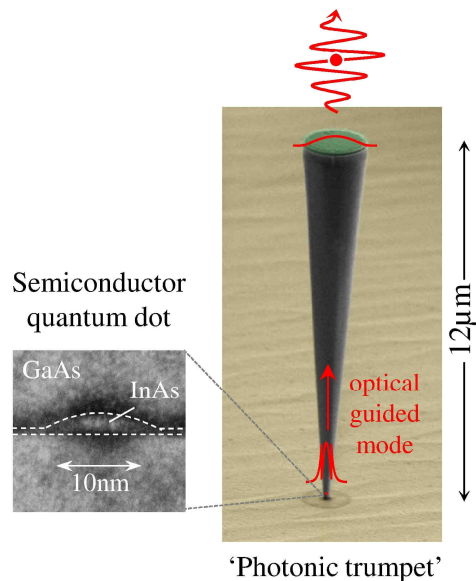


# Quantum dots in nanowires, a novel solid-state platform for quantum optics and hybrid nanomechanics

Julien Claudon

CEA Genoble (France)

Semiconductor quantum dots are artificial atoms with exceptional optical properties, which are also sensitive probes of their photonic and mechanical environment. In this seminar, I will first briefly review the recent development of tapered nanowire antennas, which efficiently funnel the quantum dot (QD) emission into a directive output beam. Such antennas find direct applications to the realization of bright sources of non-classical states of light [1-3], and more generally to solid-state quantum optics. In the second part of the talk, you will see that material strain, which naturally occurs during the vibration of a nanowire, efficiently couples the QD emission energy to the wire vibration amplitude. The resulting hybrid nanomechanical system [4] has a strong potential for sensing applications [5] and, with further improvements, could contribute to the fundamental exploration of the classical-quantum boundary.



## References:

- [1] J. Claudon *et al.*, Nature Photon. **4**, 174 (2010).
- [2] M. Munsch *et al.*, Phys. Rev. Lett. **110**, 177402 (2013).
- [3] P. Stepanov *et al.*, Appl. Phys. Lett. **107**, 141106 (2015).
- [4] Y. Yeo *et al.*, Nature Nanotech. **9**, 106 (2014).
- [5] M. Munsch *et al.*, submitted.