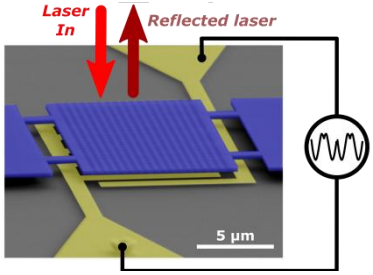
Open position for Post-doc

Non-linear dynamics of nano-optomechanical resonators

Optomechanical interactions allow now for reading but also tailoring, via optical forces, the motion of mechanical oscillators such as suspended photonic crystal membranes. Integrating mechanical resonant excitation for such structures opens up the scope of possibilities by reaching nonlinear behaviour. Thus we were already able to investigate much nonlinear dynamical behaviour (sub- and super-harmonics resonances [1], stochastic [2] and vibrational [3] resonances…) on such device (figure below).



Suspended photonic crystal membrane (purple) and interdigitated electrode (yellow) placed 400 nm below

Beyond these nonlinear dynamical behaviours, a large variety of noise-assisted phenomena occurring in coupled nonlinear systems is the focus of vivid on-going endeavours, including noise-aided synchronization, chaos and emergence of bifurcation structures.

Nonlinear dynamics in optomechanical resonator can cause both the optical and the mechanical modes to evolve from periodic to chaotic oscillations. Despite recent progress and growing interest on nonlinear dynamical effects occurring in Nano-OptoElectroMechanical systems (NOEMs), optomechanical chaos and stochastic resonance remain largely unexplored experimentally in such research field. Further experimental and theoretical studies on chaos and stochastic resonance in optomechanical systems of high dimensionality will not only substantially deepen our understanding of noise-induced processes in non-linear NOEMs but also cast the bases for their use in noise-aided high-precision measurements and noise-assisted detection of weak signals. Such platforms also hold great potential for applications due to their integration and possible scaling up to network size.

The post-doc will be involved from the fabrication of the device to the investigation of nonlinear optomechanical effects. She/He will work under the EU Horizon 2020 FET Proactive project Hybrid Optomechanical Technologies (HOT).

[1] Chowdhury et al, Appl. Phys. Lett. **108**, 163102 (2016)
[2] Chowdhury et al, accepted in Physical Review Letters
[3] Chowdhury et al, in preparation

Please send the following application documents to: Rémy BRAIVE
(e-mail address: remy.braive@ c2n.upsaclay.fr)

- Cover letter expressing your motivation in the position
- CV