Optomechanical interaction driven by complexity

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Precision is a virtue in science in general and nanotechnology in particular where carefully fabricated nanometer-scale devices hold great promise in both classical and quantum regimes. Ground-state cooling or phonon amplification require, for example, a sideband resolved photon-phonon coupling where unavoidable imperfections often impose severe performance limits. However, imperfection and disorder are ubiquitous in Nature and emerge with a role particularly important in nanoscale devices.

In this talk, I will explore the limits imposed by imperfection in different nanodevices, but not only. In certain cases, disorder may be invoked to enable new functionalities and can be exploited to enhance the light-matter interaction in different fields of nanotechnology such as quantum photonics [1], nonlinear photonics [2], phononics [2] and optomechanics [3].

References

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