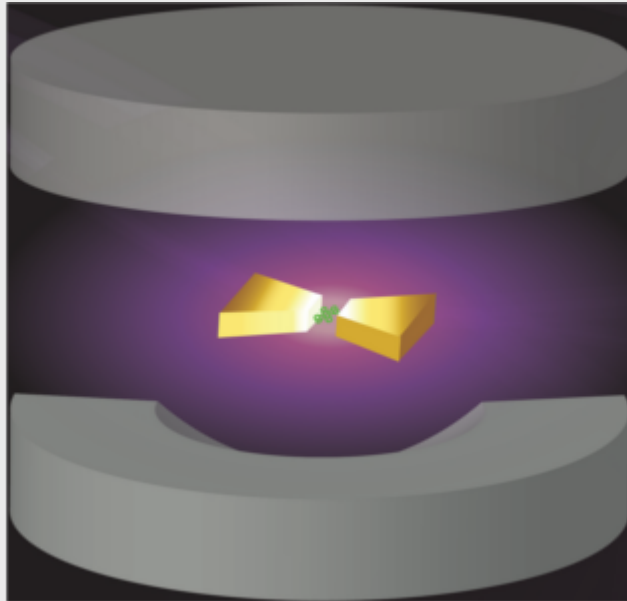


Enhancing Quantum Coherence of Organic Molecules with Nanophotonic Structures



Title: Enhancing Quantum Coherence of Organic Molecules with Nanophotonic Structures.

When: Monday, June 11, (2018), 12:00.

Place: Department of Theoretical Condensed Matter Physics, Faculty of Sciences, Module 5, Seminar Room (5th Floor).

Speaker: Diego Martín Cano, Nano-Optics Division, Max Planck Institute For The Science Of Light, Erlangen, Germany.

The optical coherence lies at the heart of quantum phenomena that arise from the interaction between light and matter. To maintain and control such coherence is crucial for the development of quantum optical technologies, since it is intrinsically involved in the generation of nonclassical features that allow surpassing the capabilities of classical systems. One of the experimental approaches to access this quantum coherence is to use the interaction of light with electronic transitions that are available in solid state emitters. However, the coherence of these transitions is commonly hindered by additional interactions arising from the materials that host the emitters.

In this talk I will present some of our theoretical attempts to propose nanophotonic structures that ameliorate such loss of quantum coherence, with an emphasis on aromatic hydrocarbons in organic crystals [1,2], and to provide fundamental measures to test it [3,4]. These efforts include the exploration of nanostructures embedded in optical microcavities, which we show they provide access to stronger coherent interactions and suppression of emission quenching near metals [5].

References

H. Kelkar, D. Wang, D. Martín-Cano, B. Hoffmann, S. Christiansen, T. Utikal, S. Göttinger, V. Sandoghdar, *Phys. Rev. App.*, 4, 054010 (2015).

- D. Wang, H. Kelkar, D. Martín-Cano, T. Utikal, S. Götzinger, V. Sandoghdar, *Phys. Rev. X*, 7, 021014 (2017).
- D. Martín-Cano, H.R. Haakh, K. Murr, M. Agio, *Phys. Rev. Lett.*, 113, 263605 (2014).
- H. Haakh, D. Martín-Cano, *ACS Photon.*, 2, 1686 (2015).
- B. Gurlek, V. Sandoghdar, D. Martín-Cano, *ACS Photon.*, 5, 456 (2018).