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Photonic Quantum Technologies with Single Organic Molecules

Friday, 10 May 2024 14:00 (30 minutes)

The generation and manipulation of quantum states of light is required for key applications, such as photonic quantum simulation, linear optical quantum computing, quantum communication protocols, and quantum metrology. In this context, I will present our recent achievements in using single organic molecules as bright and stable sources of coherent single photons in the solid state. Among our recent results, I will show the successful coupling strategies of single molecules to hybrid nanophotonic structures, two-photon interference experiments performed between distinct molecules on the same chip, and the use of organic molecules for quantum communication, as deterministic single-photon sources at room temperature for Quantum Key Distribution protocols. I will conclude with some latest results on the use of molecules as nanoprobes for quantum thermometry and with some insights on the impact of the microscopic electric field environment on the emitter photo-stability and on how we can control it via the combination of two tuning techniques.

Abstract category

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