

CESQ Colloquium

Tuesday March 17 @ 3 PM

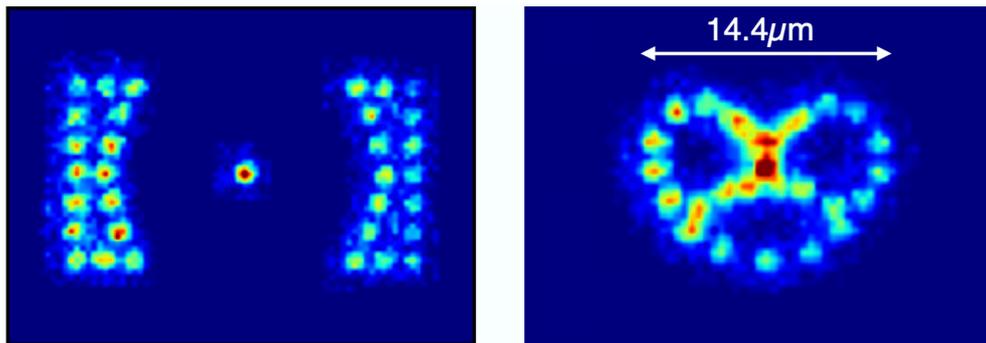
Seminar Room, Centre Européen de Sciences Quantiques,
Campus de Cronenbourg

Stephan Welte

University of Stuttgart

Quantum coherent networks with atom arrays in optical cavities

Neutral-atom arrays within an optical cavity are a promising platform for implementing a quantum internet architecture. In this framework, the atoms within the cavity play the role of stationary qubits, while photons serve as flying qubits, and the cavity provides an efficient atom–light interface. I will present an overview of experiments performed with this system, including the implementation of quantum logic gates between intra-cavity atoms and photons, the generation of optical cat states, and the realization of distributed quantum computing with two connected atom–cavity systems. I will discuss the prospects of this system as a versatile multi-qubit quantum network node for both quantum computation and communication. Looking ahead, a series of experiments is envisioned. I will outline these experiments, including photon-mediated quantum information processing between multiple intra-cavity atoms, the generation of highly entangled photonic cluster states, and the generation of optical Gottesman–Kitaev–Preskill (GKP) states.



Contact: Guido Pupillo (pupillo@unistra.fr), Jérôme Dubail (j.dubail@unistra.fr)