



COLLOQUIA DI DOTTORATO, A.A. 2021/2022

Dipartimento di Fisica, A101
Giovedì 19 Maggio 2022 ore 16:00

***Quantum Communication with Entangled
Photons from Artificial Atoms***

Rinaldo Trotta

(Università di Roma, La Sapienza)

The prospect of using the quantum nature of light for long distance quantum communication keeps spurring the search and investigation of suitable sources of entangled photons. Semiconductor quantum dots (QDs), also dubbed “artificial atoms”, are arguably one of the most attractive, as they can generate pairs of polarization-entangled photons with high efficiency and with near-unity degree of entanglement. Despite recent advances, however, the exploitation of photons from QDs in advanced quantum communication protocols remains a major open challenge.

In this talk, it will be discussed how photons generated by a GaAs quantum dot can be used to implement quantum teleportation and entanglement swapping protocols with fidelities above the classical limit. Moreover, the first steps towards the construction of a quantum-dot based quantum network for secure communication within the campus of Sapienza University of Rome will be presented. A discussion on future challenges and perspectives will conclude the talk.

The seminar is in presence up to the maximum occupancy of A101 room.