ICFO

SEMINAR: Automated design of quantum optical experiments for device-independent quantum key distribution

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Blue Lecture Room

Device-independent quantum key distribution (DIQKD) reduces the vulnerability to side-channel attacks of standard QKD protocols by removing the need for characterized quantum devices. The higher security guarantees come however, at the price of a challenging implementation.

Here, we tackle the question of the conception of an experiment for implementing DIQKD with photonic devices. We introduce a technique combining reinforcement learning, optimisation algorithm and a custom efficient simulation of quantum optics experiments to automate the design of photonic setups maximizing a given function of the measurement statistics. Applying the algorithm to DIQKD, we get unexpected experimental configurations leading to high key rates and to a high resistance to loss and noise. These configurations might be helpful to facilitate a first implementation of DIQKD with photonic devices and for future developments targeting improved performances.

Hosted by: Prof. Dr. Antonio Acin