PhD position for the Project: Tensor and polynomial optimisation for quantum information networks

The successful candidate will be part of the Quantum Information Theory research group led by Prof. Dr. Antonio Acín.

The standard quantum information scenario broadly studied so far consists of two communicating users, Alice and Bob, exchanging quantum information through a channel. However, recent progress in quantum technologies make more complex networks of more than two users connected by different channels, not necessarily one-to-one, within reach. This raises important computational challenges due to the fact that the dimension of the network grows exponentially with the number of users.

The objectives of this PhD thesis are (i) to design efficient methods for the detection and characterisation of correlations in arbitrary networks based on tensor and polynomial optimisation and (ii) study their use for the construction of quantum information protocols. A key element in the project will be the use of techniques from convex optimisation theory, such as moment-type semi-definite programming hierarchies.

Secondment and international collaborations: The project involves an exciting network of collaborators and will include several secondments abroad in top European institutes and companies.

Requirements

Candidates must hold a degree in Physics, Computer Science and/or Engineering. Interest in computational methods and convex optimisation is desirable.

Application procedure

The formal application should be submitted online via our currently open PhD Call: https://jobs.icfo.eu/?detail=806

Candidates may contact jobs@icfo.eu for informal enquiries regarding the application, as well as address scientific enquiries to Prof. Dr Antonio Acín (antonio.acin@icfo.eu). Deadline: September 26, 2023.