

[Quantum Spain Seminar: PyTheus: automated discovery of quantum experiments](#)

Objectives

Abstract: Photonic technologies are main players in the second quantum revolution, providing better sensors, secure communications, and quantum-enhanced computation. Such endeavors require generating specific quantum states or efficiently performing quantum tasks. The design of the corresponding optical experiments, historically powered by human creativity, is being slowly automated by novel algorithms. Unfortunately, these tools are often restricted to very specific use cases and are difficult to generalize, which limits their practical implementation. To overcome these challenges, we developed PyTheus, a highly-efficient, open-source digital discovery framework based on a graph-based representation of optical setups, which includes a wide range of modern experimental devices. PyTheus produces interpretable designs to solve complex experimental problems, like entanglement generation and distribution. Aiming for the simplest solutions, our software provides deeper understanding to human researchers, which can generalize the findings. Therefore, PyTheus can accelerate the development of quantum optics and related technologies.



Short bio: Carlos Ruiz

Gonzalez graduated in Physics for the Autonomous University of Barcelona in 2019. Then he moved to Delft, in the Netherlands, to pursue a MSc Degree in Applied Physics. After a short internship in VeriQloud, a quantum security firm, he moved to Erlangen, Germany, to start his PhD in the Artificial Scientist Lab, led by Mario Krenn. Since 2021, he tries to accelerate scientific discovery using AI tools. His main research area is the inverse design of quantum optics experiment.



Speakers

Speaker: Carlos Ruiz González, PhD Candidate at Max Planck Institute for the Science of Light

Host: Alba Cervera, Quantic Senior Research Engineer, CASE, BSC

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