Photonic quantum computing - a bright future for many applications

PHILIP WALTHER

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ICFO Auditorium & Online (Zoom)

Profile

Philip Walther is Professor of Physics at the University of Vienna, Austria. His research is dedicated to the development of advanced of quantum technology for applications in quantum information processing and for investigations in quantum science. The experiments are focused on photonic quantum computation and quantum simulation as well as quantum foundations such as indefinite causal structures and the measurement of weak gravitational effects on single photons using table-top setups. He is Fellow of the American Physical Society (APS) and the Optical Society of America (OSA), and member of the Young Academy of the Austrian Academy of Sciences.

Abstract

Quantum photonics allows for a variety of quantum information applications. Here I will

present that quantum photonics platforms show advantages for various quantum computations such as quantum machine learning and in particular reinforcement learning[1], in addition to secure quantum[2] and classical computing tasks[3,4] that require quantu networks. As outlook I will discuss technological challenges for the scale up of photoni quantum computers[5] and remarkable opportunities for special-purpose applications such a neuromorphic circuits[6].

[1]Nature 591, 229 (2021)
[2] npj Quantum Inf. 7, 25 (2021)
[3] Nature Comm. 9, 5225 (2018)
[4] npj Quantum Inf. 7, 98 (2021)
[5] Nature Nanotech. 16, 318 (2021)
[6] Nature Photon. (in press)
Hosted by: Prof. Dr. Lluis Torner