Contribution ID: **65**   Type: **not specified**

Quantum images and optical classifiers

Visual information can be manipulated in terms of images, usually captured and then processed through a sequence of computational operations. Alternatively, optical systems can perform such operations directly, reducing computational overhead at the cost of stricter design requirements. We discuss this workflow in the context of quantum technologies. First, we introduce a quantum algorithm that uses the quantum Fourier transform to discard the high spatial-frequency qubits of an image, downsampling it to a lower resolution. Our method allows us to capture, compress, and communicate visual information even with limited resources. Then, we present a quantum optical pattern recognition method for binary classification tasks. Our method classifies patterns without reconstructing their images, encoding the spatial information of the object in the spectrum of a single photon, providing a superexponential speedup over classical methods.

Primary authors: MORGILLO, ANGELA ROSY; TUMBIOLO, EMANUELE; Mr RONCALLO, Simone (Universita' di Pavia)

Co-authors: MACCHIAVELLO, CHIARA; MACCONE, LORENZO; Mr LLOYD, Seth (Massachusetts Institute of Technology)

Presenters: MORGILLO, ANGELA ROSY; TUMBIOLO, EMANUELE; Mr RONCALLO, Simone (Universita' di Pavia)

Session Classification: Caffè e poster (dal N. 9 al N. 51)