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Applications of induced coherence without induced emission

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Quantum effects have led to novel concepts that overcome classical possibilities. Of these interaction-free measurement and high-contrast ghost imaging have received notable attention. Here, we exploit a non-linear single-photon interference experiment introduced in the early 1990s to study fundamental aspects of quantum optics and also show its applications to quantum imaging and spectroscopy. Our experiments use spontaneous parametric down conversion, but require no coincidence detection. We discuss the role of quantum indistinguishability in quantum imaging and measures of continuous-variable correlations in SPDC. We also establish a connection between path indistinguishability and the degree of polarization of the light in our experiment, thus presenting both theoretically and experimentally a case where the partial polarization of a light beam has a solely quantum origin.

Biography

Gabriela Barreto Lemos has completed her PhD from the Federal University of Rio de Janeiro (Brazil), working with theoretical quantum chaos and open quantum system dynamics. She went on to do experiments in quantum information, quantum chaos, optics quantum imaging. She is currently finishing her Post-doc at IQOQI-Vienna under the supervision of Prof. Anton Zeilinger.

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