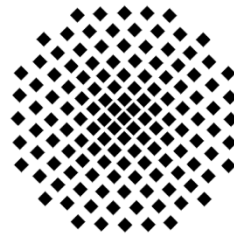


Stuttgarter Physikalisches Kolloquium

Fachbereich Physik, Universität Stuttgart
Max-Planck-Institut für Festkörperforschung
Max-Planck-Institut für Intelligente Systeme

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Universität Stuttgart, Pfaffenwaldring 57, 70569 Stuttgart-Vaihingen

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The quantum dance of single photons – from quantum computing to precision measurements

Philip Walther
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Abstract

Quantum light and in particular single photons provide a versatile technology platform for many quantum applications. The intrinsic advantage of being mobile makes optical quantum system ideally suited for various applications, reaching from quantum computing to precision measurements.

After a brief overview of quantum photonic technology, I will present two entirely different research directions that are based on interferometers for single photons. The first research direction exploits tuneable photonic nanoprocessors for quantum machine learning and neuromorphic computing. I will also discuss technological challenges for the scale up of photonic quantum computers, as well as our group's current work for addressing some of these challenges.

The second research direction is of foundational nature and motivated by the fact that the interplay between the two fundamentally different theories, general relativity and quantum physics, has never been tested experimentally to date. In this talk, I will also present our on-going experimental research aiming to explore the interface between these two theories using a high-precision fiber interferometer that allows to measure the influence of gravity on quantum light.