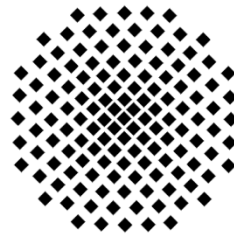


Stuttgarter Physikalisches Kolloquium

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

Ansprechpartner: Prof. Harald Giessen
E-Mail: giessen@physik.uni-stuttgart.de
Telefon: 0711 - 685-65111



Dienstag, 22. Januar 2019

16:15 Uhr

Hörsaal V 57.01

Universität Stuttgart, Pfaffenwaldring 57, 70569 Stuttgart-Vaihingen

Gastgeber: Prof. Peter Michler & Dr. Simone Portalupi, Universität Stuttgart, Telefon: 0711 - 685-65226

Quantum Communications in space for fundamental tests and applications

Paolo Villoresi
University of Padua

Abstract

The paradigm shift that Quantum Communications represent vs. classical counterpart allows envisaging the global application of Quantum Information protocols as the cryptographic key distribution as well as of the use of the qubits as a probe for fundamental tests of Quantum Mechanics and Gravity on a scale beyond terrestrial limits.

We shall report on the extension of tests on basic principles of Quantum Mechanics using Quantum Communications to an orbiting terminal in Space. Indeed, it was possible to demonstrate the Quantum Communications with Low-Earth-Orbit satellites using polarization degree of freedom to encode the qubits. Temporal modes used to demonstrate the quantum interference along a Space channel will be also described.

The recent results on the extension to Space of the Gedankenexperiment proposed by John Wheeler on the wave- particle duality, then about the very nature of the quantum entities, will be described.