



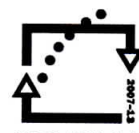
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EVROPSKÁ UNIE



MINISTERSTVO ŠKOLSTVÍ,
MLÁDEŽE A TĚLOVÝCHOVY



OP Vzdělávání
pro konkurenceschopnost

INVESTICE DO ROZVOJE VZDĚLÁVÁNÍ

Název projektu: Mezinárodní centrum pro informaci a neurčitost

Registrační číslo: CZ.1.07/2.3.00/20.0060

Zpráva z účasti na stáži

Datum konání stáže: 18.08.2013 – 6.09.2013
Navštívené pracoviště: Max Planck Institute for the Science of Light, Erlangen,
Nemecko
Zahraniční garant: prof. Gerd Leuchs
Účastník stáže: Vladyslav Usenko, Ph.D.

Stručný popis navštíveného pracoviště

The Max Planck Institute for the Science of Light (MPL) in Erlangen is the part of the Max Planck Society structure, uniting 82 Max Planck Institutes in Germany, being the most prestigious status for a research Institute in Germany. The status of MPI was given to the Institute, which was formed in 2009 on the basis of University Erlangen-Nuremberg. The MPI in Erlangen currently consists of 4 divisions and 2 research groups together with several Technical Development and Service Units. Currently MPI is one of the world leading research Institutes in the field of Optics, including Quantum Optics and Quantum Information Processing.

The visit was done to the Division of Prof. Gerd Leuchs, which is well known as the outstanding experimental group conducting fundamental and applied research in the field of quantum optics and quantum information. It achieved numerous great scientific results, which were published in multiple articles in the high impacted journals.

In particular, the division possesses an open-space quantum optical link, operated by the experimental group of Dr. Christoph Marquardt. It uses a grating-stabilized diode laser, with wavelength of 809 nm that lies within an atmospheric transmission window. The linearly polarized laser beam is transferred to a circularly polarized state and sent through the 1.6 km free-space channel from the institute's building to a tall university building, after having been expanded. This unique experimental set-up was of the particular interest for the research, carried out before and during the visit.

Průběh stáže

The aim of the visit was the joint scientific research in the field of Gaussian states of light and continuous-variable quantum key distribution (CV QKD). In particular, the project aimed at the investigation of nonclassical properties of Gaussian states of light and the possibility to

establish CV QKD channel in conditions of a turbulent atmosphere. Previously the channel characterization data obtained at MPL was used to test the theoretical predictions of the entanglement evolution in the free-space channels and to show the sensitivity of secure CV QKD to the atmospheric turbulence. During the current visit the experiment was performed with the controlled modulation of coherent states and their measurement after the atmospheric channel followed by the characterization of the channel using bright pulses. The visit helped to effectively plan and adjust the parameters of the experiment, the optimal modulation and measurement regimes. Further, the experimental data obtained during the visit was imported and started to be analyzed in order to confirm the theoretical predictions of usability of sub-channel post-selection after the atmospheric channel in the coherent-state based CV QKD protocol.

Navázání kontaktů

The visit led to continuation and further improvement of the fruitful collaboration between the Department of Optics of the Palacky University in Olomouc and the Max Planck Institute for the Science of Light in Erlangen.

Shrnutí stáže

The visit definitely achieved its goals, the scientific collaboration with one of the leading European institutions in the field of quantum optics and quantum information was successfully extended and intensified. The new knowledge on the current research trends in the field was obtained and will be further disseminated to the target group within the scientific seminars.

Fotografická dokumentace



Photo taken during the scientific discussion within the stay, depicted are and Dr. Usenko (left) and Dr. Marquardt (right).

A handwritten signature in blue ink, consisting of a stylized 'U' followed by a flourish.