量子光情報工学講演会のお知らせ

情報通信研究機構（NICT）の佐々木雅英博士（本研究所客員教授）および Bristol 大学の Mark Thompson 博士をお迎えして，以下の講演会を開催致しますので，多数ご来聴下さいますようご案内申し上げます.

問い合わせ先：東北大学電気通信研究所　量子光情報工学研究分野
枝松圭一
TEL: 022-217-5070

記

日時：　2010 年 3 月 15 日（月）14:00~15:30
場所：　電気通信研究所 1 号館 N308 号室

プログラム

14:00　Implementing discrete- and continuous-variable processing in quantum networks
Dr. Masahide Sasaki (NICT)

14:45　Integrated Quantum Photonics
Dr. Mark Thompson (University of Bristol)

15:30　（Informal discussion）

以上

講演要旨

Implementing discrete- and continuous-variable processing in quantum networks

Dr. Masahide Sasaki (NICT)

We first discuss future quantum networks where discrete- variable (DV) and continuous-variable (CV) processings are appropriately used at right places for realizing secure and high capacity communications. We then present recent results, including entanglemt QKD, superconducting single photon detectors, and CV processings. We finally discuss research subjects in attempting to integrate these technologies into quantum networks.

Integrated Quantum Photonics

Dr. Mark Thompson (University of Bristol)

Of the various approaches to quantum computing, photons are particularly appealing for their low-noise properties and ease of manipulation at the single qubit level. Encoding quantum information in photons is also an appealing approach to quantum communication, metrology, measurement and other quantum technologies. However, until recently optical implementations of quantum architectures have been realised using large-scale (bulk) optical elements, bolted onto optical tables. This approach has lead to severe limitations in the miniaturization, scalability and stability of such systems. We have developed an integrated waveguide approach to photonic quantum circuits for high performance, miniaturization and scalability.

This talk presents our latest work in integrated quantum photonics (IQP). We demonstrate high-fidelity silica-on-silicon integrated optical realizations of key quantum photonic circuits, including two-photon quantum interference and a controlled-NOT logic gate. We have demonstrated controlled manipulation of up to four photons on-chip, including high-fidelity single qubit operations, using a lithographically patterned resistive phase shifter. Finally we have used this architecture to implement a small-scale compiled version of Shor's quantum factoring algorithm, and combined it with superconducting single photon detectors.