33rd RAP Seminar

The 33rd Seminar on RIKEN Center for Advanced Photonics

Language: Japanese

Date: **May 13 (Fri) 15:30 - 16:30, 2016**

Location: **Cooperation Center, 3F, W319, Wako Campus, RIKEN**

(理研 和光キャンパス 研究交流棟3階会議室 W319)

Title: **Hybrid Quantum Information Processing**

ハイブリッド量子情報処理

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We are working on hybrid quantum information processing, which combines two methodologies of quantum information processing – qubits and continuous variables (CVs). More precisely, we encode quantum information onto single-photon-based qubits and utilize CV quantum processors to realize universal optical quantum computing. The advantage of this methodology is that we can have both high-fidelity nature of qubits and determinisity of CV quantum processors. In other words, we can enjoy both particle- and wave-nature of quantum mechanics. Towards this goal we performed various things, which include quantum error correction with nine-party CV entanglement [1], teleportation of Schrödinger's cat state [2], adaptive homodyne measurement with phase-squeezed states [3], deterministic teleportation of time-bin qubits [4], creation of ultra-large-scale CV cluster states [5], and generation and measurement of CV entanglement on a chip [6].

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