

## Conference Program

WEDNESDAY, November 29, 2006

**Opening Remark** | 8:50-9:05

**Makoto Nagao** (President of NICT)

**Oral Session : Quantum Optics for Information Processing (1)** | 9:05-10:30

Akira Furusawa, Chair

WE1-1  
9:05-9:45 **Philippe Grangier** (Award talk), Alexei Ourjoumtsev, Aurelien Dantan, Rosa Tualle-Broui  
“Generation and detection of propagating light fields with negative Wigner functions.”

WE1-2  
9:45-10:00 **J. S. Neergaard-Nielsen**, B. Melholt Nielsen, C. Hettich, K. Moelmer, E. S. Polzik  
“Narrow bandwidth optical Schroedinger kitten states”

WE1-3  
10:00-10:30 **T. C. Ralph** (Invited talk), A. P. Lund, H. Jeong  
“Efficient coherent state quantum computing by adaptive measurements”

10:30-11:00 **BREAK**

**Oral Session : Quantum Optics for Information Processing and Quantum Measurement**

| 11:00-12:30

Philippe Grangier, Chair

WE2-1  
11:00-11:30 **Masahide Sasaki** (Invited talk)  
“Control of optical continuous variable systems using photon counting and feedforward”

WE2-2  
11:30-12:00 **Aaron J. Miller** (Invited talk), Adriana Lita, Danna Rosenberg, Stephen Gruber, Sae Woo Nam  
“Superconducting photon number resolving detectors: performance and promise”

WE2-3  
12:00-12:30 **Ian A. Walmsley** (Invited talk), J. Lundeen, P. Mosley, L. Zhang, O. Cohen, X. Yang, Ch. Silberhorn  
“Photon technologies for quantum information”

12:30-14:00 **LUNCH**

**Oral Session : Non-Classical Light Sources** | 14:00-15:00

Ian A. Walmsley, Chair

WE3-1  
14:00-14:30 **Franco N. C. Wong** (Invited talk)  
“A toolbox for photonic entanglement generation: ultrabright, ultranarrowband, and ultrafast”

WE3-2  
14:30-15:00 **J. D. Franson** (Invited talk), T. B. Pittman  
“Entangled photon holes”

15:00-15:20 BREAK

**Oral Session : Quantum Measurement and Metrology (1) | 15:20-16:50**

Martin B. Plenio, Chair

WE4-1  
15:20-15:50 **Masanao Ozawa** (Invited talk)  
“Simultaneous measurability of non-commuting observables and the universal uncertainty principle”

WE4-2  
15:50-16:20 **Seth Lloyd** (Invited talk)  
“Quantum illumination”

WE4-3  
16:20-16:50 **Giacomo Mauro D'Ariano** (Invited talk)  
“How to derive the Hilbert-space formulation of quantum mechanics from axioms on experimental accessibility and simplicity”

16:50-17:10 BREAK

**Oral Session : Quantum Measurement and Metrology (2) | 17:10-18:25**

Timothy C. Ralph, Chair

WE5-1  
17:10-17:25 **Vittorio Giovannetti**, Seth Lloyd, Lorenzo Maccone  
“Quantum metrology”

WE5-2  
17:25-17:55 **Hideo Mabuchi** (Invited talk), John Stockton  
“Quantum parameter estimation with cold atomic spins”

WE5-3  
17:55-18:10 **Jonathan P. Dowling**  
“Linear optical quantum computing, imaging, and metrology”

WE5-4  
18:10-18:25 **Masahiro Takeoka**, Masahide Sasaki, Norbert Luetkenhaus  
“Implementing projective measurements with linear optics”

**THURSDAY, November 30, 2006**

**Oral Session : Quantum Repeaters (1) | 9:00-10:30**

Yoshihisa Yamamoto, Chair

TH1-1  
9:00-9:30 **Jacob Taylor**, Mikhail Lukin (Invited talk)  
“Progress towards implementation of quantum repeaters”

TH1-2  
9:30-10:00 **A. Kuzmich** (Invited talk), D. N. Matsukevich, T. Chaneliere, S. D. Jenkins, S. -Y. Lan, M. S. Chapman, T. A. B. Kennedy  
“Quantum telecommunication with atomic ensembles”

TH1-3  
10:00-10:30 **A. I. Lvovsky** (Invited talk), J. Appel, E. Figueroa, G. Guenter, F. Vewinger, K. -P. Marzlin  
“Electromagnetically-induced transparency in systems with multiple excited levels”

10:30-11:00 BREAK

**Oral Session : Quantum Repeaters (2) | 11:00-11:45**

Alexander I. Lvovsky, Chair

TH2-1  
11:00-11:30 **Y. Yamamoto** (Invited talk), T. D. Ladd, P. van Loock, K. Nemoto, W. J. Munro  
"Quantum repeater based on dispersive cavity QED interaction between matter qubits and coherent state field"

TH2-2  
11:30-11:45 **H. Kosaka**, T. Kutsuwa, K. Arai, Y. Rikitaka, K. Ono, H. Imamura, T. Takagahara, Y. Mitsumori, K. Edamatsu  
"Quantum state transfer from a photon to an electron spin for building a quantum repeater"

**Oral Session : Quantum Repeaters (3) Atom Optics | 11:45-12:30**

Alexander I. Lvovsky, Chair

TH3-1  
11:45-12:00 **Takao Aoki**, Barak Dayan, E. Wilcut, W. P. Bowen, A. S. Parkins, H. J. Kimble, T. J. Kippenberg, K. J. Vahala  
"Strong coupling between one atom and a microtoroidal resonator"

TH3-2  
12:00-12:15 **Julien Laurat**, Hugues de Riedmatten, Daniel Felinto, Chin-wen Chou, Erik W. Schomburg, Steven J. van Enk, H. Jeff Kimble  
"Efficient retrieval of a single excitation stored in an atomic ensemble"

TH3-3  
12:15-12:30 **Wenjamin Rosenfeld**, Stefan Berner, Juergen Volz, Markus Weber, Harald Weinfurter  
"Remote state preparation of an atomic qubit"

12:30-14:00 **LUNCH**

**POSTER Session 1 | 14:00-16:00**

16:00-16:30 **BREAK**

**Oral Session : Quantum Cryptography (1) | 16:30-18:30**

Nicolas Gisin, Chair

TH4-1  
16:30-17:00 **Norbert Luetkenhaus** (Invited talk), Hauke Hauseler, Tobias Moroder, Geir-Ove Myhr, Johannes Rigas, Otfried Guehne  
"Verifying quantum entanglement in quantum optical systems"

TH4-2  
17:00-17:30 **Akihisa Tomita** (Invited talk)  
"Recent development on practical quantum key distribution systems"

TH4-3  
17:30-18:00 **Horace P. Yuen** (Invited talk)  
"Mathematical modeling of physical and engineering systems in quantum cryptography"

TH4-4  
18:00-18:30 **Prem Kumar** (Invited talk)  
"Practical quantum communication and cryptography for WDM optical networks"

FRIDAY, December 1, 2006

**Oral Session : Quantum Optics for Information Processing (2) | 9:00-10:30**

Gregoire Ribordy, Chair

- FR1-1      **Akira Furusawa** (Invited talk)  
9:00-9:30      “Quantum information networks”
- FR1-2      **Ping Koy Lam** (Invited talk), Nicolai B. Grosse, Thomas Symul, Magdalena Stobinska,  
9:30-10:00      Timothy C. Ralph  
“From side-band squeezing to photon anti-bunching”
- FR1-3      **A. Ourjoumtsev**, R. Tualle-Brouri, A. Dantan, J. Laurat, Ph. Grangier  
10:00-10:15      “Generation and analysis of complex quantum states of light with negative Wigner  
functions”
- FR1-4      **Alessandro Zavatta**, Valentina Parigi, Marco Bellini  
10:15-10:30      “Experimental nonclassicality of single-photon-added thermal light states”
- 10:30-11:00      **BREAK**

**Oral Session : Quantum Optics for Information Processing (3) | 11:00-12:30**

Gerard J. Milburn, Chair

- FR2-1      **Barry C. Sanders** (Invited talk)  
11:00-11:30      “Optical quantum information processing”
- FR2-2      **W. J. Munro** (Invited talk), Kae Nemoto, P. van Loock, T. P. Spiller,  
11:30-12:00      Samuel L. Braunstein, G. Milburn  
“QUBUS computation”
- FR2-3      **Jeffrey H. Shapiro** (Invited talk), Mohsen Razavi  
12:00-12:30      “Continuous-time cross-phase modulation and quantum computation”
- 12:30-      **LUNCH**
- 13:00-      **Excursion**

SATURDAY, December 2, 2006

**Oral Session : Quantum Information Theory | 9:00-10:30**

William K. Wootters, Chair

- SA1-1      **Nobuyuki Imoto** (Invited talk)  
9:00-9:30      “TBD”
- SA1-2      **Michal Horodecki** (Invited talk)  
9:30-10:00      “Private key beyond entanglement distillation”

SA1-3      **Martin B. Plenio** (Invited talk), M. J. Hartmann, F. G. S. L. Brandao  
10:00-10:30      “Quantum phase transitions with photons and polaritons”

10:30-11:00      **BREAK**

**Oral Session : Quantum Computation | 11:00-11:45**

Seth Lloyd, Chair

SA2-1      **Hans J. Briegel** (Invited talk)  
11:00-11:30      “Universality and classical simulation of quantum computation”

SA2-2      **Michael Varnava**, Daniel E. Browne, Terry Rudolph  
11:30-11:45      “Cluster state quantum computing tolerant to Qubit Loss”

**Oral Session : Quantum Optics for Information Processing (4) | 11:45-12:30**

Seth Lloyd, Chair

SA3-1      **Harald Weinfurter** (Invited talk), Mohamed Bourennane, Otfried Guehne, Nikolai Kiesel,  
11:45-12:15      Wieslaw Laskowski, Reinhold Pohlner, Christian Schmid, Geza Toth, Pavel Trojek,  
Rupert Ursin, Ulrich Weber, Witlef Wieczorek, Anton Zeilinger, Marek Zukowski  
“Linear optics quantum logic and multi-photon entanglement”

SA3-2      **Shigeki Takeuchi**, Tomohisa Nagata, Ryo Okamoto, Keiji Sasaki, Jeremy O'Brien  
12:15-12:30      “Four photon NOON state interferometer”

12:30      [Conference Photo](#)  
\*Please get together at the registration counter of QCMC2006

12:30-14:00      **LUNCH**

**POSTER Session 2 | 14:00-16:00**

16:00-16:30      **BREAK**

**Oral Session : Quantum Cryptography and Quantum Communications Systems | 16:30-18:25**

Charles H. Bennett, Chair

SA4-1      **Gregoire Ribordy**, Hugo Zbinden (Invited talk), Alexios Beveratos, Nicolas Gisin,  
16:30-17:00      Olivier Landry, Jeroen van Houwelingen  
“Recent progress in Quantum Key Distribution”

SA4-2      **H. Takesue**, E. Diamanti, C. Langrock, M. M. Fejer, Y. Yamamoto  
17:00-17:15      “100 km secure key distribution using low-jitter up-conversion detectors”

SA4-3      **Nicolas Gisin** (Invited talk)  
17:15-17:45      “Long distance entanglement swapping: a first step to a quantum repeater?”

SA4-4      **William K. Wootters** (Award talk), Daniel Sussman  
17:45-18:25      “Discrete phase space and minimum-uncertainty states”

19:00- BANQUET

SUNDAY, December 3, 2006

**Oral Session : Non-Classical Light Sources | 9:00-10:30**

Franco N. C. Wong, Chair

SU1-1  
9:00-9:30 **Andrew Shields** (Invited talk), Mark Stevenson, Robert Young, Paola Atkinson, Ken Cooper, David Ritchie  
“A semiconductor device for generating pairs of entangled photons”

SU1-2  
9:30-10:00 **Dirk Bouwmeester** (Invited talk)  
“Solid-state cavity QED and multi-photon interferometry”

SU1-3  
10:00-10:30 **Keiichi Edamatsu** (Invited talk), Goro Oohata, Ryosuke Shimizu  
“Polarization entanglement of photons from a biexciton”

10:30-10:45 BREAK

**POSTER Session 3 | 10:45-12:45**

12:45-14:00 LUNCH

**Oral Session : Quantum Optics for Information Processing (5) | 14:00-15:00**

Prem Kumar, Chair

SU2-1  
14:00-14:30 **P. G. Kwiat** (Invited talk), J. Altepeter, J. Barreiro, E. Jeffrey, T. -C. Wei  
“Exploring the limits of quantum communication”

SU2-2  
14:30-15:00 **Jian-Wei Pan** (Invited talk), Qiang Zhang, Alexander Goebel, Claudia Wagenknecht, Yu-Ao Chen, Bo Zhao, Tao Yang, Alois Mair, Joerg Schmiedmayer  
“Experimental quantum teleportation of a two-qubit composite system”

15:00-15:20 BREAK

**Parallel Session : A | 15:20-16:50**

Barry C. Sanders, Chair

SU3A-1  
15:20-15:35 **Masato Koashi**  
“Efficient quantum key distribution with practical sources and detectors”

SU3A-2  
15:35-15:50 **Christian Kurtsiefer**, Ivan Marcikic, Alexander Ling, Darwin Gosal, Antia Lamas-Linares  
“Free-space quantum key distribution using polarization entangled photons”

SU3A-3 **Jerome Lodewyck**, Simon Fossier, Rosa Tualle-Brouri, Thierry Debuisschert, Philippe Grangier  
15:50-16:05 "Implementation of a continuous variables quantum key distribution setup over long distances"

SU3A-4 **F. Sciarrino**, M. Ricci, F. De Martini, R. Filip, L. Mista Jr.  
16:05-16:20 "Realization of a minimal disturbance quantum measurement"

SU3A-5 **Witlief Wieczorek**, Nikolai Kiesel, Christian Schmid, Reinhold Pohlner, Geza Toth, Enrique Solano, Harald Weinfurter  
16:20-16:35 "Experimental analysis of a symmetric four-photon entangled state"

SU3A-6 **Akimasa Miyake**, Caroline Kruszynska, Hans J. Briegel, Wolfgang Duer  
16:35-16:50 "Entanglement purification protocols for all graph states"

**Parallel Session : B | 15:20-16:50**

Masanao Ozawa, Chair

SU3B-1 **Christopher A. Fuchs**  
15:20-15:35 "More on the quantumness"

SU3B-2 **J. A. Vaccaro**  
15:35-15:50 "Group theoretic formulation of complementarity"

SU3B-3 **S. D. Bartlett**, R.W. Spekkens, M. R. R. Dowling, T. Rudolph  
15:50-16:05 "How to observe a coherent superposition of an atom and a molecule"

SU3B-4 **John Jeffers**, Stephen M. Barnett, James D. Cresser, David T. Pegg  
16:05-16:20 "Measurement master equation"

SU3B-5 **Lev B. Levitin**, Tommaso Toffoli  
16:20-16:35 "Energy dissipation in reversible computing"

SU3B-6 **V. P. Belavkin**  
16:35-16:50 "On relative fidelities for quantum channels"

16:50-17:10 **BREAK**

**Oral Session : Quantum Oscillators | 17:10-18:10**

Jeffrey H. Shapiro, Chair

SU4-1 **G. J. Milburn** (Invited talk), A. K. Ringsmuth, M. Schlosshauer  
17:10-17:40 "Measurement and control of quantum electromechanical systems."

SU4-2 **Paolo Tombesi** (Invited talk), Marco Lucamarini, Stefano Pirandola, David Vitali  
17:40-18:10 "Entanglement formation and its exploitation in macroscopic resonators"

**Closing Session** | 18:10-18:50

Osamu Hirota, Chair

SU5-1     **C. H. Bennett**  
18:10-18:40     “Summary talk”

SU5-2     **Jeffrey Shapiro** (Chairman of the conference)  
18:40-18:50     “Closing remarks”