Workshop on Entanglement and Quantum Decoherence (EQD)

Other Related Topical Meeting:
Quantum Entanglement and Decoherence: 3rd International Conference on Quantum Information (ICQI)

Collocated With:
Advanced Solid-State Photonics

January 28-30, 2008
Nara-Ken New Public Hall
Nara, Japan

Submissions open October 19, 2007 (limited capacity and rolling acceptance)
Housing Deadline: December 25, 2007
Pre-Registration: January 3, 2008

Generous Support for the EQD 2008 Program provided by:

About EQD

January 28-30, 2008

The Workshop on Entanglement and Quantum Decoherence (EQD) is intended to provide an opportunity for extended expert interaction on a number of linked topics that have become widely interesting recently. A shared basis in concepts and techniques that were originally associated with quantum optics can serve as an interface between different specific themes.

These include:

- decoherence effects associated with environmental noise;
- quantification and control of qubit, qutrit, multi-qubit and continuous-variable entanglement;
- correlated and cooperative relaxation and their control;
- adiabatic and non-Markovian evolution of open quantum systems and their control;
- quantum measurements and their back-action;
- quantum trajectories and their relation to quantum dynamics and measurements;
- quantum thermodynamics and its control; and
- quantum entanglement implications outside of the quantum information context.

Reports associated with realizations or phenomenology of the above themes in photonics, nonlinear and quantum optics, spintronics, cold and ultracold atoms and ions, superconductors and other condensed matter systems, are all welcomed and anticipated. Considerations closely related to practical device design and operation fall outside the scope of the Workshop.

EQD will be held in conjunction with the Advanced Solid-State Photonics (ASSP) Topical Meeting at the 2008 OSA Winter Optics and Photonics Congress at the Nara-Ken New Public Hall in Nara, Japan. ASSP and EQD will share the site and hold parallel sessions . Congress participants are welcome at all sessions , space permitting.

Please note that in order to ensure opportunity for extensive personal conversation and interaction during EQD, there will be regular open periods in the program, and total attendance will be strictly limited to 50 people. Registration will be permitted only on a first-come first-served basis.

Meeting Topics To Be Considered

These include:

- effects associated with environmental noise and decoherence;
- quantification and control of qubit, qutrit, multi-qubit and continuous-variable entanglement;
- correlated and cooperative relaxation and their control;
- adiabatic and non-Markovian evolution of open quantum systems and their control;
- quantum measurements and their back-action;
- quantum trajectories and their relation to quantum dynamics and measurements;
- quantum thermodynamics and its control; and
- quantum entanglement implications outside of the quantum information context.

EQD Program Committee

Joseph H. Eberly, *Univ. of Rochester, USA*
Qi-Huang Gong, *Peking Univ., China*
Bei-Lok Hu, *Univ. of Maryland, USA*
Nobuyuki Imoto, *Osaka Univ., Japn*
Gershon Kurizki, *Weizmann Inst. of Science, Israel*
Franco Nori, *RIKEN, Japan and Univ. of Michigan, USA*
Jian-Wei Pan, *Univ. Heidelberg, Germany*
Kun-Chi Peng, *Shanxi Univ., China*
Krzysztof Wodkiewicz, *Univ. Warszawski, Poland*
Ting Yu, *Univ. of Rochester, USA*, **Chair**

Tutorials:

Andreas Buchleitner, *Albert-Ludwigs-Universitaet Freiburg, Germany*

Franco Nori, *RIKEN, Japan, and Univ. of Michigan, USA*

Howard Wiseman, *Griffith Univ., Australia*

Ting Yu, *Univ. of Rochester, USA*

Invited Talks

Hans Briegel, *Innsbruck Univ., Austria*

Pochung Chen, *Natl. Tsing-hua Univ., Taiwan*

Luiz Davidovich, *Univ. Federal Rio de Janeiro, Brazil*

Peter Drummond, *Univ. of Queensland, Australia*

Hsi-Sheng Goan, *Natl. Taiwan Univ., Taiwan*

Hong Guo, *Peking Univ., China*

Bei-Lok Hu, *Univ. of Maryland, USA*

Nobuyuki Imoto, *Osaka Univ., Japan*

Masato Koashi, *Osaka Univ., Japan*

Gershon Kurizki, *Weizmann Inst. of Science, Israel*

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C. K. Law, *The Chinese Univ. of Hong Kong, Hong Kong*

You-Quan Li, *Zhejiang Univ., China*

Yu-Xi Liu, *RIKEN, Japan*

Koji Maruyama, *RIKEN, Japan*

Sahin K. Ozdemir, *Osaka Univ., Japan*

Jian-Wei Pan, *Univ. Heidelberg, Germany*

Margaret D Reid, *Univ. of Queensland, Australia*

YiJing Yan, *Hong Kong Univ. of Science and Technology, Hong Kong*

Li You, *Georgia Tech., USA*

Jian-Qiang You, *Fudan Univ., China   and RIKEN, Japan*

Weiping Zhang, *East China Normal Univ., China*

Suhail Zubairy, *Texas A&M Univ., USA*

Karol Zyczkowski, *Jagiellonian Univ., Poland*

Invited Research Updates:

M. Al-Amri, *KACST and King Khalid Univ., Saudi Arabia*

Vincent Boyer, *NIST and Univ. Maryland, USA*

Chung-Hsien Chou, *Natl. Cheng Kung Univ., Taiwan*

Z. Fieck, *Univ. of Queensland, Australia*

Ying Gu, *Peking Univ., China*

J. R. Johansson, *RIKEN, Japan*

Jin Woo Jun, *Inje Univ., Korea*

Shi-Yuin Lin, *Natl. Center for Theoretical Science, Taiwan*

Kazuya Yuasa, *Waseda Univ., Japan*

Paper Preparation

Papers must be submitted electronically in PDF format.

If you have any questions regarding the paper preparation process, please contact Ting Yu at osaeqd08@pas.rochester.edu.

Requirements

A completed electronic submission is due prior to the published deadline. A complete submission will include the following:

- [1-page paper](#)

Adherence to the instructions for preparation of the abstract and summary is imperative. Emailed or faxed submissions will not be accommodated. Failure to complete any of the preceding requirements may result in rejection of a paper. Registration and submission for technical sessions are open to all members of the scientific and technical community. It is incumbent on the authors to obtain appropriate approval to present their work to this international forum.

Style Guide

This style guide is a reference for all submitting authors and has remained consistent with past years' format and style.

Please make sure that your paper contains **no non-English font packages** (for example, Japanese fonts, Korean fonts, Chinese fonts, etc.) in the body of your paper summary as well as in **all figures and tables.** Any characters in these fonts cannot be seen by reviewers. In the past, we have had particular trouble with MS-PGothic, MS-Gothic and MS-Mincho.

You may also use this [Word document](#) or these [LaTeX style files](#) to create your paper. If you do so, **you must convert the document to PDF before uploading it into the submission system.** Converting your file to PDF protects the integrity of your work and ensures that there are no errors introduced in the conversion process.

Requirements

1-page paper The one-page paper is a summary of the author's work and will be reproduced directly from the material submitted for the conference *program book.* The style guide provides a visual representation of the paper format. The summary should not exceed one page and must be typed with the page layout set to 8.5-inch x 11-inch, with 1-inch margins on all sides. Within one page, the author must include all text, including a 35-word abstract, title, authors, equations, drawings, tables, photographs, figures and references. The text should be single-spaced.

The title of the talk and the primary author's name, affiliation, address, telephone and fax numbers, and email address must appear on the first page with all additional authors and their affiliation. Refrain from the use of asterisks, acknowledgments, job descriptions or footnotes. Cite references at the end of the summary. If the paper is accepted, it will be included in the *Conference Program*.

Submissions

To be considered for acceptance for the Workshop on Entanglement and Quantum Decoherence (EQD), be sure to submit the 1-page summary via to osaeqd08@pas.rochester.edu.

In an effort to keep the meeting comfortable for easy discussion, the number of registrants will be strictly limited.

To assist planning for travel, submitted papers will be reviewed, and decisions will be made beginning 19 October 2007. The number of places in the program remaining open will be updated here every second Friday afternoon.

Places currently remaining open = 60.

Click Modes of Presentation to view details on the presentation types offered at this meeting.
Click Paper Preparation to view details on submission requirements, peer review and the style guide.

Questions regarding the paper submission and review process can be directed to the Ting Yu osaeqd08@pas.rochester.edu at any time.

EQD Program 2008

	Sunday, January 27, 2008	
12:00 pm-6:00 pm	Registration	Entrance Foyer
	Monday, January 28, 2008	
8:00 am - 6:00 pm	Registration	Entrance Foyer
8:00 am - 8:10 am	**Opening remarks**	Conference Room 1 (CRM 1)
	8:10 am-10:00 am **Session: Entanglement in open quantum systems** Chair: **M. Reid**	
8:10 am -9:00 am	Tutorial: **H. Wiseman** (Griffith, Australia) Entanglement in open quantum systems: decoherence, monitoring, control, and Schroedinger's "steering"	CRM 1
9:00 am– 9:30 am	**Hans Briegel** (Innsbruck, Austria) Entanglement in quantum many-body systems far away from thermodynamic equilibrium	CRM 1
9:30 am- 10:00 am	**B.L. Hu** (Maryland, USA) Quantum entanglement under non-Markovian dynamics of two qubits interacting with a common electromagnetic field	CRM 1
10:00 am –11:00 am	**Coffee Break**	Reception Hall
	11:00 am-12:30 pm **Session: Entanglement decoherence** Chair: **B. L. Hu**	
11:00 am -11:30 am	**Luiz Davidovich** (Rio de Janeiro, Brazil) Entanglement and decoherence	CRM 1
11: 30 am-12:00 am	**Hsi-Sheng Goan** (Natl. Taiwan Univ) Non-Markovian reduced dynamics and entanglement evolution of central spin models	CRM 1
12:00 am -12:30 am	**Sahin Kaya Ozdemir** (Osaka, Japan) Ancilla assisted decoherence suppression for photonic qubits	CRM 1
12:30 am - 2:00 pm	**Lunch Break**	

	2:00 pm – 3:50 pm **Session: Non-Markovian dynamics** Chair**: H. Wiseman**	
2:00 pm – 2:45 pm	Tutorial**: Ting Yu** (Rochester, USA) Approaches to non-Markovian quantum open systems: From quantum trajectories to master equations	CRM 1
2:45 pm -3:15 pm	**Yi Jing Yan** (HKUST, Hong Kong) Dynamics of dissipative electronic systems and quantum transport: Hierarchical equations of motion approach	CRM 1
3:15 pm -3:45 pm	**Pochung Chen** (Natl Tsing-Hua, Taiwan) Dynamical decoupling induced renormalization of the non-Markovian dynamics	CRM 1
3:45 pm -4:15 pm	**Coffee Break**	Reception Hall
	4:15 pm – 5:35 pm **Session: Entanglement in many-body systems** Chair: **Weiping Zhang**	
4:15 pm-4:45 pm	**Karol Zyczkowski** (Jagiellonian, Poland) Geometry of quantum entanglement	CRM 1
4:45 pm -5:15pm	**Zbigniew Ficek** (Queensland, Australia) Entanglement evolution between two isolated multi-qubit systems	CRM 1
5:15 pm-5:35 pm	**Chung-Hsien Chou** (Cheng Kung, Taiwan) Quantum Brownian motion of a macroscopic object in a general environment	CRM 1
5:35pm-8:00 pm	**Dinner Break**	
	8:00 pm – 9:30 pm **Session: Quantum information and applications** Chair: **M. Suhail Zubairy**	
8:00 pm-8:20 pm	**V. Boyer** (NIST & Univ. of Maryland, USA) Production of entanglement images with a 4-wave mixer	CRM 1
8:20 pm -8:40 pm	**Ying Gu** (Peking, China) Quantum memory, quantum phase gate and polarization entangled photon pairs in a coherent atomic system	CRM 1

8:40 pm -9:00 pm	**J.R. Johansson** (RIKEN, Japan) Dynamics of a superconducting qubit coupled to quantum two-level systems in its environment	CRM 1
9:00 pm -9:30 pm	**Kazuya Yuasa** (Waseda, Japan) Master equation in the presence of initial correlation with reservoir	CRM 1
Tuesday, January 29, 2008		
8:00 am - 9:50 am **Session: Entanglement dynamics and decoherence** Chair**: L. Davidovich**		
8:00 am-8:50 am	Tutorial: **Andreas Buchleitner** (Freiburg, Germany) Measures and dynamics of entanglement	CRM 1
8:50 am-9:20 am	**C.K. Law** (CUHK, Hong Kong) Negativity of Gaussian states in a noisy environment: Interpretations and applications	CRM 1
9:20 am-9:50 am	**Gershon Kurizki** (WIS, Israel) What is decoherence and how to control it?	CRM 1
9:50 am-10:20 am	**Coffee Break**	Reception Hall
10:20 am- 11:50 am **Session: Entanglement in AMO systems** Chair: **Andreas Buchleitner**		
10:20 am-10:50 am	**Li You** (Georgia Tech. USA) Multi-party quantum correlation and entanglement	CRM 1
10:50 am -11:20 am	**Peter D. Drummond** (Queensland, Australia) Unambiguous signatures: entanglement, EPR and Bell	CRM 1
11:20 am -11:50 am	**Weiping Zhang** (East China Normal, China) Atomic coherence and matter-wave Goos-Hanchen-Like shifts	CRM 1
	TBD	
No sessions on Tuesday afternoon		
Welcome to EQD Reception in Hagoromo Room, Nara Nikko Hotel Tuesday 7:00 pm-9:00 pm		

Wednesday, January 30, 2008		
8:00 am - 9:50 am **Session: Solid state systems** Chair: **Hans Briegel**		
8:00 am -8:50 am	Tutorial**:** **Franco Nori** (RIKEN, Japan and Michigan, USA) Quantum-information-processing using superconducting qubit circuits	CRM 1
8:50 am - 9:20 am	**J.Q.You** (RIKEN, Japan and Fudan, China) Low-decoherence flux qubit	CRM 1
9: 20 am - 9:50 am	**Yu-Xi Liu** (RIKEN, Japan) Controllable inter-qubit couplings in superconductor quantum circuits	CRM 1
9:50 am -10:00 am	**Discussions**	CRM 1
10:00 am - 11:00 am	**Coffee Break**	Reception Hall
11:00 am- 12:30 pm **Session: Atom-Photon systems** Chair**: Li You**		
11:00 am -11:30 am	**M. Suhail Zubairy** (Texas A & M, USA) Quantum Lithography and microscopy	CRM 1
11:30 am -12:00 pm	**Hong Guo** (Peking, China) Manipulation of photon-atom momentum entanglement	CRM 1
12:00 pm -12:30 pm	**Yuao Chen** (Heidelberg, Germany) Experimental quantum information processing with atoms and photons	CRM 1
12:30 pm - 2:00 pm	**Lunch Break**	
2:00 pm-3:30 pm **Session: Entanglement: Foundations** Chair: **Peter Drummond**		
2:00 pm -2: 30 pm	**M.D. Reid** (Queensland, Australia) Macroscopic EPR paradoxes	CRM 1
2:30 pm -3:00 pm	**Yu Shi** (Fudan, China) Is quantum information relevant to particle physics?	CRM 1
3:00 pm -3:20 pm	**Shih-Yuin Lin** (Natl. Center for Theor. Sci., Taiwan) Disentanglement of atoms in relativistic motion	CRM 1
3:20 pm - 4:30 pm	**Discussions and Coffee Break**	Reception Hall

	4:30 pm -6:00 pm **Atomic-Solid Interface** Chair**: Franco Nori**	
4:30 pm-5:00 pm	**Gui -Lu Long** (Tsinghua, Beijing, China) Composition entropies in multi-partite quantum system and duality quantum computers	CRM 1
5:00 pm-5:30 pm	**You-Quan Li** (Zhejiang, China) Spin current and spin hall effects	CRM 1
5:30 pm–6:00 pm	**Koji Maruyama** (RIKEN, Japan) Entanglement purification by natural spin-spin interactions and single spin measurements	CRM 1
6:00 pm -6:10 pm	**Closing remarks**	CRM 1
	POSTERS (Wednesday)	
Wednesday	**M. Al-Amri** (King Khalid Univ., Saudi Arabia) Entanglement of two-qubits near plasmonic band gap	CMR 1
Wednesday	**Zbigniew Ficek** (Queensland, Australia) Engineering of stationary entanglement between distant atoms coupled to a cavity field	CMR 1
Wednesday	**Jin Woo Jun** (Inje Univ., Korea) Dynamical localization and environmental noise: a quantum trajectory	CMR 1