Asian Quantum Information Science Conference 2016

Tutorial：
August 28 (Sun), 2016
Main Conference：
August 29 (Mon) – September 2 (Fri), 2016
Venue：Academic Sinica (AS), Taipei, Taiwan

Satellite Workshop on Continuous Variables for Quantum information processing:
September 3 (Sat) - 4 (Sun), 2016
Venue：National Tsing Hua University, Hsinchu, Taiwan

PREFACE

This document collects the abstracts for the talks and posters at the sixteenth Asian Quantum Information Science Conference (AQIS 2016), which is being held at Academia Sinica in Taipei, Taiwan from August 28 through September 2, 2016.

AQIS is the premier regional conference on theoretical and experimental aspects of quantum information processing. AQIS 2016 is the 16th conference in a series that includes EQIS 2001-05 and AQIS 2006-15. The scope of the meeting includes quantum computation, algorithms, and complexity; quantum information theory; techniques for suppressing decoherence; quantum cryptography; quantum communications experiments and theory; implementations of quantum information processing; and quantum processor and computer design.

This is the first year that AQIS has come to Taiwan. Last year it was held at the Korea Institute for Advanced Study in Seoul. Although it has always been held in Asia, AQIS has developed a strong reputation among the international quantum information community and draws participants from around the world. This year, submissions were received from researchers in Algeria, Australia, Austria, Canada, the Czech Republic, Germany, Hong Kong, Hungary, India, Ireland, Japan, Korea, Latvia, Poland, Singapore, Slovakia, Spain, Switzerland, Taiwan, Turkey, the United Kingdom, and the United States. Additional countries represented on the program committee include Brazil, Iran, and the Netherlands. The invited speakers and tutorial lecturers are based in Australia, Canada, Japan, Latvia, the Netherlands, Singapore, and the United States.

This year's program includes 7 invited talks, 4 invited tutorials, 48 contributed talks (12 of which are long talks), and 51 posters. The conference received 115 submissions, including 19 poster-only submissions. The program committee undertook a rigorous evaluation process, writing 287 reviews and carrying out an extensive discussion of the submissions. While any review process is necessarily subjective, we feel the conference program includes many outstanding recent results and reflects well on the current state of quantum information as a field.

We would like to thank everyone who submitted work to the conference for their contributions. We would also like to thank the members of the program committee for their hard work reviewing the submissions, and the steering committee chair, Hiroshi

Imai, for his valuable guidance. Finally, the local organizing committee has played a major role in the success of the conference. We would like to thank them for their support, especially Ray-Kuang Lee for his help as chair and Li-Yi Hsu for his work preparing this abstract book.

Andrew Childs (Chair)
Min-Hsiu Hsieh (Co-chair)
Jiangfeng Du (Co-chair)
August 2016

Steering Committee Chair

Hiroshi Imai (Tokyo)

Program Committee

Andrew Childs (Maryland) (Chair)
Jiangfeng Du (USTC) (Co-Chair)
Min-Hsiu Hsieh (UTS) (Co-Chair)
Steve Bartlett (Sydney)
Salman Beigi (IPM)
Dominic Berry (Macquarie)
Fernando Brandao (Caltech)
Giulio Chiribella (Hong Kong)
Eric Chitambar (Southern Illinois)
Sarah Croke (Glasgow)
Toby Cubitt (UCL)
Runyao Duan (UTS)
Artur Ekert (CQT/Oxford)
Jay Gambetta (IBM)
David Gosset (Caltech)
Daniel Gottesman (Perimeter)
Masahito Hayashi (Nagoya)
Stacey Jeffery (Caltech)
Hyunseok Jeong (Seoul National University)
Yoon-Ho Kim (POSTECH, Korea)
Shelby Kimmel (Maryland)
Francois Le Gall (Tokyo)
Troy Lee (CQT)
Debbie Leung (Waterloo)
Yi-Kai Liu (NIST)
Hoi-Kwong Lo (Toronto)
David Lucas (Oxford)
Xiongfeng Ma (Tsinghua)
Rajat Mittal (IIT Kanpur)
Akimasa Miyake (UNM)
Kae Nemoto (NII)
Jian-Wei Pan (USTC)

Renato Renner (ETH Zurich)
Mark Saffman (Wisconsin)
Wonmin Son (Sogang U, Korea)
Seiichiro Tani (NTT)
John Watrous (Waterloo)
Tzu-Chieh Wei (Stony Brook)
Nathan Wiebe (Microsoft)
Mark Wilde (Louisiana State)
Andreas Winter (Barcelona)
Ronald de Wolf (CWI)
Bei Zeng (Guelph)
Shengyu Zhang (Chinese U Hong Kong)

Organizing Committee

Chii-Dong Chen (Academic Sinica, Taiwan)
Kai-Min Chung (Academic Sinica, Taiwan)
Li-Yi Hsu (Chung Yuan Christian University, Taiwan)
Ching-Yi Lai (Academic Sinica, Taiwan)
Ray-Kuang Lee (National Tsing Hua University, Taiwan)
Yeong-Cherng Liang (National Cheng-Kung University, Taiwan)
Ite A. Yu (National Tsing Hua University, Taiwan)

AQIS'16 Program

Aug28(Sun)	Aug29(Mon)	Aug30(Tue)	Aug31(Wed)	Sep1(Thu)	Sep2(Fri)	Sep3(Sat)	Sep4(Sun)
Tutorial	**Main conference Day1**	**Main conference Day2**	**Main Conference Day3**	**Main Conference Day4**	**Main Conference Day5**	**Satellite Workshop Day1**	**Satellite Workshop Day2**
	Opening remarks 8:40-9:00						
Tutorial 9:00-10:30 Francesco Buscemi	Invited talk 9:00-10:00 Antonio D. Córcoles	Invited talk 9:00-10:00 Andris Ambainis	Invited talk 9:30-10:30 Yaoyun Shi	Invited talk 9:00-10:00 Andrew Dzurak	Invited talk 9:00-10:00 Barbara Terhal		
	Coffee break 10:00-10:30	Coffee break 10:00-10:30		Coffee break 10:00-10:30	Coffee break 10:00-10:30		
Coffee break 10:30-10:50	Long talk 10:30-11:00	Long talk 10:30-11:00	Coffee break 10:30-11:00	Long talk 10:30-11:00	Long talk 10:30-11:00	10:30-11:20 Ping Koy Lam	10:30-11:20 Hyunseok Jeong
Tutorial 10:50-12:20 Tzu-Chieh Wei	Long talk 11:00-11:30	Long talk 11:00-11:30	Invited talk 11:00-12:00 Beni Yoshida	Long talk 11:00-11:30	Long talk 11:00-11:30		
	Long talk 11:30-12:00	Long talk 11:30-12:00		Long talk 11:30-12:00	Long talk 11:30-12:00	11:20-12:10 Alessandro Ferraro	11:20-12:10 Nathan Langford
Lunch 12:20-1:40	Lunch 12:00-2:00	Lunch 12:00-2:00	Excursion Banquet	Lunch 12:00-2:00	Closing remarks 12:00-12:30	Lunch 12:10-2:00	Lunch 12:10-2:00
Tutorial 1:40-3:10 Nathan Langford	Parallel session A 2:00-4:00 / Parallel session B 2:00-4:00	Parallel session A 2:00-4:00 / Parallel session B 2:00-4:00		Invited talk 2:00-3:00 Osamu Hirota.		2:00-2:50 Kentaro Kato	2:00-2:50 Ite A. Yu
Coffee break 3:10-3:30				Coffee break 3:00-3:30		2:50-3:40 Chengjie Zhang	2:50-3:40 Ming-Chang Chen
						Coffee break 3:40-4:10	Coffee break 3:40-4:10
Tutorial 3:30-5:00 Valerio Scarani	Coffee break 4:00-4:30	Coffee break 4:00-4:30		Parallel session A 3:30-5:30 / Parallel session B 3:30-5:30		TBA 4:10-5:00	4:00-6:00 Lab tours
	Poster Session 4:30-6:30	Poster Session 4:30-6:30					
Free Time 5:00-5:30						Coffee break 5:00-5:30	
Reception 5:30-8:00						6:30-8:00 Dinner	6:30-8:00 Dinner

4 tutorials, 7 invited talks, 12 long talks, 36 short talks, and 2 poster sessions

AQIS 2016 PROGRAM

August 28, 2016 (Sunday)

09:00 - 10: 30 *The Theory of Statistical Comparison with Applications in Quantum Information Science*……..…..……...……..….1
Francesco Buscemi (Nagoya University)

10:50 - 12:20 *Introduction to measurement-based quantum computation*……..2
Tzu-Chieh Wei (State University of New York, Stony Brook)

13:40 - 15:10 *Engineering the quantum: probing atoms with light and light with atoms in a transmon circuit QED system*…….……..*3*
Nathan Langford (Delft University of Technology)

15:30 - 17:00 *The device-independent outlook on quantum physics*……..…...…….4
Valerio Scarani (Centre for Quantum Technologies, Singapore)

August 29, 2016 (Monday)

09:00 - 10: 00 **[Invited Talk]** *Superconducting qubit systems: recent experimental progress towards fault-tolerant quantum computing at IBM*……..….5
Antonio D. Córcoles (IBM)

10:30 - 11: 00 **[Long Talk]** *Observation of frequency-domain Hong-Ou-Mandel interference*…….6
Toshiki Kobayashi (Osaka University), Rikizo Ikuta (Osaka University), Shuto Yasui (Osaka University), Shigehito Miki (NICT, Japan), Taro Yamashita (NICT, Japan), Hirotaka Terai (NICT, Japan), Takashi Yamamoto (University of Osaka), Masato Koashi (University of Tokyo), and Nobuyuki Imoto (Osaka University)

11:00 - 11:30 **[Long Talk]** *Realization of the contextuality-nonlocality tradeoff with a qubit-qutrit photon pair*…….…....8
Peng Xue (Southeast University), Xiang Zhan (Southeast University), Xin Zhang (Southeast University), Jian Li (Southeast University), Yongsheng Zhang (University of Science and Technology of China), and Barry C. Sanders (University of Calgary)

11:30 - 12:00 **[Long Talk]** *One-way and reference-frame independent EPR-steering*……..….10
Sabine Wollmann (Griffith University), Raj B. Patel (C Griffith University), Nathan Walk (Griffith University / University of Oxford,), Michael J. W. Hall (Griffith University), Howard M. Wiseman (Griffith University), and Geoff J. Pryde (Griffith University)

14:00 - 16:00 **[Parallel Session A]**

14:00 - 14:20 *Are Incoherent Operations Physically Consistent? — A Physical Appraisal of Incoherent Operations and an Overview of Coherence Measures*…….....12
Eric Chitambar (Southern Illinois University) and Gilad Gour (University of Calgary)

14:20 - 14:40 *Relating the Resource Theories of Entanglement and Quantum Coherence*…..14
Eric Chitambar (Southern Illinois University) and Min-Hsiu Hsieh (University of Technology Sydney)

14:40 - 15:00 *An infinite dimensional Birkhoff's Theorem and LOCC- convertibility*……..….18
Daiki Asakura (The University of Electro-Communications)

15:00 - 15:20 *How local is the information in MPS/PEPS tensor networks*…….....…...20
Anurag Anshu (National University of Singapore), Itai Arad (National University of Singapore), and Aditya Jain (International Institute of Information Technology)

15:20 - 15:40 *Information-theoretical analysis of topological entanglement entropy and multipartite correlations* …….....22
Kohtaro Kato (University of Tokyo), Fabian Furrer (The University of Tokyo/NTT), and Mio Murao.(University of Tokyo)

15:40 - 16:00 *Phase-like transitions in low-number quantum dots Bayesian magnetometry...*24
Paweł Mazurek (University of Gdańsk), Michał Horodecki (University of Gdańsk), Łukasz Czekaj (University of Gdańsk), and Paweł Horodecki (Gdańsk University of Technology / National Quantum Information Centre in Gdańsk)

14:00 – 16:00 **[Parallel Session B]**

14:00 - 14:20 *Separation between quantum Lovász number and entanglement-assisted zero-error classical capacity* ……..…….....……..…..26
Xin Wang (University of Technology Sydney) and Runyao Duan (University of Technology Sydney / Chinese Academy of Sciences)

14:20 - 14:40 *Maximum privacy without coherence, zero-error.*…….....….....28
Debbie Leung (University of Waterloo) and Nengkun Yu (University of Waterloo / University of Technology Sydney / University of Guelph)

14:40 - 15:00 *Unconstrained distillation capacities of a pure-loss bosonic broadcast channel*…….....…….....…….....…….....30
Masahiro Takeoka (National Institute of Information and Communications Technology), Kaushik Seshadreesan (Max-Planck-Institute) and Mark Wilde (Louisiana State University)

15:00 - 15:20 *Quantifying Asymmetric Einstein-Podolsky-Rosen steering*…….....32
Kai Sun (University of Science and Technology of China), Xiang-Jun Ye (University of Science and Technology of China), Jin-Shi Xu (University of Science and Technology of China), and Chuan-Feng Li (University of Science and Technology of China)

15:20 - 15:40 *A Quantum Paradox of Choice: More Freedom Makes Summoning a Quantum State Harder*…….....35
Emily Adlam (University of Cambridge) and Adrian Kent (University of Cambridge / Perimeter)

15:40 - 16:00 *Dimension Witnesses Beyond Non-Classicality Tests*…….....37
Edgar Aguilar (University of Gdańsk), Mate Farkas (University of Gdańsk), and Marcin Pawlowski (University of Gdańsk)

16:30-18:30 **[Poster session]**

Posters

PM1 *A Reconciliation Protocol Based on Polar Codes for CVQKD* …….....….....….....39
Shengmei Zhao (Nanjing University of Posts and Telecommunications), Le Wang (Nanjing University of Posts and Telecommunications), and Hanwu Chen (Southeast University)

PM2 *ABC's of bosonic non-Gaussian channels: photon-added Gaussian channels*…….....41
Krishna Kumar Sabapathy (Universitat Autònoma de Barcelona)

PM3 *An explicit classical strategy for winning a $CHSH_q$ game*…….47
Martin Plesch (Masaryk University / Slovak Academy of Sciences) and Matej Pivoluska (Masaryk University / Slovak Academy of Sciences)

PM4 *Cache-Aware Quantum Circuit Simulation on a GPGPU*……..……...….....49
Masaki Nakanishi (Yamagata University), Naohiro Morioka (Yamagata University), and Kenta Shoji (Yamagata University)

PM5 *Clauser-Horne Bell test with imperfect random inputs*……...…...…...….....51
Xiao Yuan (Tsinghua University, Beijing), Qi Zhao (Tsinghua University, Beijing), and

Xiongfeng Ma (Tsinghua University, Beijing)
PM6 *Creating cat states in one-dimensional quantum walks using delocalized initial states*……...53
Wei-Wei Zhang (Beijing University of Posts and Telecommunications / University of Calgary), Sandeep K. Goya (Beijing University of Posts and Telecommunications / University of Calgary), Fei Gao (Beijing University of Posts and Telecommunications), Barry C. Sanders (University of Calgary / University of Science and Technology of China/ Canadian Institute for Advanced Research), and Christoph Simon (University of Calgary)
PM7 *Entropic uncertainty relations for successive generalized measurements* ……....64
Kyunghyun Baek (Sogang University), Gwangil Bae (Sogang University), and Wonmin Son (Sogang University / University of Oxford)
PM8 *Fault-tolerant quantum computation using a maximum-likelihood decoder with the GKP code states*……...……...……..…...66
Kosuke Fukui (Hokkaido University), Akihisa Tomita (Hokkaido University), and Atsushi Okamoto (Hokkaido University)
PM9 *Generation and Characterization of Quantum Cluster States using Surface Acoustic Waves* …….68
MG Majumdar and CHW Barnes
PM10 *Generation and evaluation of entanglement using multiple single photon sources and linear optics*……..……..……...…..……...73
Jun-Yi Wu (Hiroshima University) and Holger F. Hofmann (Hiroshima University)
PM11 *Geometrical distance on quantum channels*…….……..……..…..…..75
Haidong Yuan (The Chinese University of Hong Kong) and Chi-Hang Fred Fung (Huawei Technologies Canada)
PM12 *Group covariance of q-ary PSK coherent-state signals coded by codes over extension field* $\mathbb{F}_q$……..……...77
Minami Tanaka (Aichi Prefectural University), Asuka Ohashi (Ritsumeikan University), and Tsuyoshi Sasaki Usuda (Aichi Prefectural University)
PM13 *Intensity fluctuation suppression in a decoy-state quantum key distribution transmitter*…...79
Kensuke Nakata (Hokkaido University), Akihisa Tomita (Hokkaido University), Yu Kadosawa (Hokkaido University), Kazuhisa Ogawa (Hokkaido University), and Atsushi Okamoto (Hokkaido University)
PM14 *Measurement based quantum computation and Quantum Error correction codes*…….…...81
Abhishek Sharma (SRM University), Divyanshi Bhatnagar (SRM University), and Atipriya Bajaj (SRM University)
PM15 *Multipartite key distribution in networks* ……...86
Stefan Bäuml (NTT) and Koji Azuma (NTT)
PM16 *Permutation-invariant quantum codes from polynomials*……..……..88
Yingkai Ouyang (Singapore University of Technology and Design)

PM17 *Quantum algorithm for association rules mining*……..…….…….... 92
Chao-Hua Yu (Beijing University of Posts and Telecommunications / State Key Laboratory of Cryptology), Fei Gao (Beijing University of Posts and Telecommunications), and Qiao-Yan Wen (Beijing University of Posts and Telecommunications)
PM18 *Quantum Chinese Chess*……..…..……..... 94
Chan Ming Shen (Chung Yuan Christain University), Jei Wei Chang (Chung Yuan Christain University), Wei-Kai Lin (Academia Sinica) Yanlin Chen (Academia Sinica), and Li-Yi Hsu (Chung Yuan Christain University)
PM19 *Quantum Coherence - Their origin and trade-off relations*…….…….…….....96
R. Chandrashekar (New York University / NYU-ECNU Institute of Physics at NYU Shanghai,), P. Manikandan (Ramakrishna Mission Vivekananda College), J. Segar (Ramakrishna Mission Vivekananda College), and Tim Byrnes (New York University / NYU-ECNU Institute of Physics at NYU Shanghai / National Institute of Informatics)
PM20 *Quantum homomorphic encryption from quantum codes*……....…….....98
Yingkai Ouyang (Singapore University of Technology and Design), Si-Hui Tan, and Joseph Fitzsimons (Singapore University of Technology and Design / National University of Singapore)
PM21 *Quantum information approach to Bose-Einstein condensation of composite bosons*…...101
Su-Yong Lee (Korea Institute for Advanced Study / National University of Singapore) Jayne Thompson (National University of Singapore), Sadegh Raeisi (National University of Singapore/ Friedrich-Alexander-Universität Erlangen-Nürnberg), Pawel Kurzyński (National University of Singapore / Adam Mickiewicz University), Dagomir Kaszlikowski (National University of Singapore), and Jaewan Kim (Korea Institute for Advanced Study)
PM22 *Quantum key distribution without monitoring signal disturbance by using heralded pair-coherent sources*…….…….....103
Le Wang (Nanjing University of Posts and Telecommunications) and Shengmei Zhao (Nanjing University of Posts and Telecommunications)
PM23 *Spin blockade of Heavy-Holes in Double Quantum Dots*……..…….....105
Jo-Tzu Hung (The University of New South Wales), Bin Wang (The University of New South Wales / University of Science and Technology of China), Alexander R. Hamilton (The University of New South Wales), and Dimitrie Culcer (The University of New South Wales)
PM24 *Unified View of Quantum Correlations and Quantum Coherence*…..…….....107
Kok Chuan Tan (Seoul National University), Hyukjoon Kwon (Seoul National University), Chae-Yeun Park (Seoul National University), and Hyunseok Jeong (Seoul National Univ.)

August 30, 2016 (Tuesday)

09:00 - 10: 00 **[Invited Talk]** *The largest possible gaps between quantum and classical Algorithms*……109
Andris Ambainis (University of Latvia)

10:30 - 11: 00 **[Long Talk]** *Higher-Effciency Quantum Algorithms for Simulation of Chemistry*……*110*
Ryan Babbush (Google), Dominic W. Berry (Macquarie University), Ian D. Kivlichan (Harvard University), Annie Y. Wei (Harvard University), Dean Southwood (Macquarie University), Peter J. Love (Tufts University), and Alań Aspuru-Guzik (Harvard University)

11:00 - 11:30 **[Long Talk]** *Perfect commuting-operator strategies for linear system games*.....*113*
Richard Cleve (University of Waterloo), Li Liu (University of Waterloo), and William Slofstra (University of Waterloo)

11:30 - 12:00 **[Long Talk]** *A Four-Round LOCC Protocol Outperforms All Two-Round Protocols in Reducing the Entanglement Cost for A Distributed Quantum Information Processing*…..*115*
Eyuri Wakakuwa (University of Electro-Communications), Akihito Soeda(University of Tokyo), and Mio Murao (University of Tokyo)

14:00 - 16:00 **[Parallel Session A]**

14:00 - 14:20 *Universal Quantum Emulator*……..…….……..*117*
Iman Marvian (MIT) and Seth Lloyd (MIT)

14:20 - 14:40 *Characterizing Supremacy in Near Term Quantum Devices*……...…….…..…119
Sergio Boixo (Google), Sergei Isakov(Google), Vadim Smelyanskiy (Google), Ryan Babbush (Google), Ding Nan (Google), Zhang Jiang (NASA), John Martinis (Google), and Hartmut Neven (Google)

14:40 - 15:00 *Factoring with Qutrits: Application of Improved Circuit Synthesis on Two Ternary Architectures*……..……..……...*122*
Alex Bocharov (Microsoft), Shawn X. Cui (UCSB), Martin Roetteler (Microsoft), and Krysta M.Svore (Microsoft)

15:00 - 15:20 *Space-Efficient Error-Reduction for Unitary Quantum Computations*……....*125*
Bill Fefferman (University of Maryland), Hirotada Kobayashi (National Institute of Informatics), Cedric Yen-Yu Lin (University of Maryland), Tomoyuki Morimae (Gunma University), and Harumichi Nishimura (Nagoya University)

15:20 - 15:40 *Hamiltonian quantum computer in one dimension*…..……..……...…127
Tzu-Chieh Wei (State Uiversity of New York at Stony Brook) and John C. Liang (Rumson-Fair Haven Regional High School)

15:40 - 16:00 *Nonlocal correlations: Fair and Unfair Strategies in Bayesian Game*…..……129
Arup Roy (Indian Statistical Institute), Amit Mukherjee (Indian Statistical Institute), Tamal Guha (Indian Statistical Institute), Sibasish Ghosh (Institute of Mathematical Sciences), Some Sankar Bhattacharya (Indian Statistical Institute), and Manik Banik (Institute of

Mathematical Sciences)

14:00 – 16:00 **[Parallel Session B]**

14:00 - 14:20 *Bell Correlations in Many-Body Systems*……..…..……131
Jean-Daniel Bancal (University of Basel), Roman Schmied (University of Basel), Baptiste Allard (University of Basel), Matteo Fadel (University of Basel), Valerio Scarani (National University of Singapore), Philipp Treutlein (University of Basel), and Nicolas Sangouard (University of Basel)

14:20 - 14:40 *Reliable and robust entanglement witness*……..……..……133
Xiao Yuan (Tsinghua University, Beijing), Quanxin Mei (Tsinghua University, Beijing), Shan Zhou (Tsinghua University, Beijing), and Xiongfeng Ma (Tsinghua University, Beijing)

14:40 - 15:00 *Separability of Bosonic States*……..……..……135
Nengkun Yu (University of Technology Sydney / University of Waterloo / University of Guelph)

15:00 - 15:20 *A geometric approach to entanglement quantification with polynomial measures*……..……..……..…… 137
Bartosz Regula (University of Nottingham) and Gerardo Adesso (University of Nottingham)

15:20 - 15:40 *An Improved Semidefinite Programming Upper Bound on Distillable Entanglement and Nonadditivity of Rains' Bound*..……..……..139
Xin Wang (University of Technology Sydney) and Runyao Duan (University of Technology Sydney / Chinese Academy of Sciences)

15:40 - 16:00 *Extendability, complete extendability and a measure of entanglement for Gaussian states*……..……..……...141
B. V. Rajarama Bhat (Indian Statistical Institute), K. R. Parthasarathy (Indian Statistical Institute), and Ritabrata Sengupta (Indian Statistical Institute)

16:30-18:30 **[Poster session]**

Posters

PT1 *A lower bound on expected communication cost of quantum state redistribution*……...…143
Anurag Anshu (National University of Singapore)

PT2 *An approximated single photon state generation from coherent states entangled with qubits by measuring qubits*……..……...……167
Fumiaki Matsuoka (Hokkaido University) and Akihisa Tomita (Hokkaido University)

PT3 *Asymptotic Convertibility of Entanglement: A General Approach to Entanglement Concentration and Dilution*……..……..……169
Yong Jiao (University of Electro-Communications), Eyuri Wakakuwa (University of Electro-Communications), and Tomohiro Ogawa (University of Electro-Communications)

PT4 *Attenuated quantum channel with probabilistic transmissivity*……171
Kenshiro Kita (Aichi Prefectural University), Shinji Koyama (Aichi Prefectural University), Minami Tanaka (Aichi Prefectural University), and Tsuyoshi Sasaki Usuda (Aichi

Prefectural University)
PT5 *Bridging the theory and experiment for device-independent quantum information*……..….173
Pei-Sheng Lin (National Cheng Kung University), Denis Rosset (National Cheng Kung University), and Yeong-Cherng Liang (National Cheng Kung University)
PT6 *Device-independent witnesses for entanglement depth: a case study*…….……175
Jui-Chen Hung (National Cheng Kung University) and Yeong-Cherng Liang (National Cheng Kung University)
PT7 *Estimation on the execution time of a quantum computer from the analysis on quantum assembly code*……..…….……..……177
Yongsoo Hwang (Electronics and Telecommunications Research Institute) and Byung-Soo Cho (Electronics and Telecommunications Research Institute)
PT8 *Generating tripartite nonlocality from bipartite resources*…….……....179
Zhaofeng Su (University of Technology Sydney) and Yuan Feng (University of Technology Sydney)
PT9 *Graph-Associated Entanglement Cost of Multipartite State in Exact and Finite-Block-Length Approximate Construction*……..…….….181
Hayata Yamasaki (University of Tokyo), Akihito Soeda (University of Tokyo), and Mio Murao (University of Tokyo)
PT10 *Homological codes and abelian anyons*……..……..……..183
Péter Vrana (Budapest University of Technology and Economics) and Máté Farkas (Budapest University of Technology and Economics / University of Gdańsk)
PT11 *On Thermalisation of Two-Level Quantam Systems*…….....……185
Sagnik Chakraborty (The Institute of Mathematical Sciences), Prathik Cherian J (The Institute of Mathematical Sciences), and Sibasish Ghosh (The Institute of Mathematical Sciences)
PT12 *Optimization of Quantum Circuits with Multiple Outputs*……..……..188
Masato Onoda (Ritsumeikan University), Kouhei Kushida (Ritsumeikan University), and Shigeru Yamashita (Ritsumeikan University)
PT13 *Parallelization of Braiding Operations for Topological Quantum Computation*…….…..190
Kotaro Hoshi (Ritsumeikan University) and Shigeru Yamashita (Ritsumeikan University)
PT14 *Performance of Coupled Systems as Quantum Thermodynamic Machines*…..……..…..192
George Thoma (The Institute of Mathematical Sciences), Manik Banik (The Institute of Mathematical Sciences), and Sibasish Ghosh (The Institute of Mathematical Sciences)
PT15 *Quantum Algorithm for Linear Equations with a Circulant Matrix*……...……..195
Souichi Takahira (Aichi Prefectural University), Asuka Ohashi (Ritsumeikan University), Tomohiro Sogabe (Nagoya University), and Tsuyoshi Sasaki Usuda (Aichi Prefectural University)
PT16 *Quantum Circuit Design of Integer Division Optimizing Ancillary Qubits and T-count*……. 197

Himanshu Thapliyal (University of Kentucky), T. S. S. Varun (University of Kentucky), and Edgard Munoz-Coreas (University of Kentucky)

PT17 *Quantum Computation with Flying Electron Spin Qubits in Surface Acoustic Wave Systems* ……..……..*199*
David Arvidsson-Shukur (University of Cambridge / Hitachi Cambridge Laboratory), Jacek Mosakowski (University of Cambridge / Hitachi Cambridge Laboratory), Mrittunjoy Guha-Majumdar (University of Cambridge / Hitachi Cambridge Laboratory), Ward Haddadin (University of Cambridge), and Crispin Barnes (University of Cambridge)

PT18 *Quantum input-output algorithms for quantum systems with limited controllability*…….…...202
Ryosuke Sakai (University of Tokyo), Akihito Soeda (University of Tokyo), and Mio Murao (University of Tokyo)

PT19 *Quantum Media Conversion Between SAW Driven Flying Electron-Spin Qubits and Flying Photon-Polarization Qubits*……..……..……..……..……...204
H. V. Lepage (University of Cambridge) and C. H. W. Barnes (University of Cambridge)

PT20 *Quantum Multiclass Support Vector Machine with Quantum One Against All Approach for Big Data Classification*…….……..……...206
Arit Kumar Bishwas (Amity University), Ashish Mani (Amity University), and Vasile Palade (Coventry University)

PT21 *Reducing Loops for Topological Cluster State Quantum Computation*……..…..208
Kentaro Haneda (Ritsumeikan University), Shigeru Yamashita (Ritsumeikan University), Simon Devitt (Riken), and Kae Nemoto (National Institute of Informatics)

PT22 *Reduction of computation complexity of classical optimal decoding by adiabatic quantum computation*……..……..……...210
Yuta Nishino (Aichi Prefectural University), Souichi Takahira (Aichi Prefectural University), Akihito Kadoya (Aichi Prefectural University), Asuka Ohashi (Ritsumeikan University), and Tsuyoshi Sasaki Usuda (Aichi Prefectural University)

PT23 *Reduction of Quantum Cost by Changing the Functionality*……...……...212
Nurul Ain Binti Adnan (Ritsumeikan University), Kouhei Kushida (Ritsumeikan University), and Shigeru Yamashita (Ritsumeikan University)

PT24 *Regularized Boltzmann entropy determines possibility of macroscopic adiabatic transformation*……..……..……...214
Hiroyasu Tajima (RIKEN) and Eyuri Wakakuwa (University of Electro-Communications)

PT25 *States evolution of a quantum-feedback-enhanced single photon source*…….....216
C. Y. Chang (Georgia Institute of Technology / Georgia Tech Lorraine), D. S. Citrin (Georgia Institute of Technology / Georgia Tech Lorraine), L. Lanco (LPN/CNRS), and P. Senellart (LPN/CNRS)

PT26 *Steering fraction and its application to the superactivation of Einstein-Podolsky-Rosen steering*……..……218

Chung-Yun Hsieh (Tsing Hua University, Hsinchu), Yeong-Cherng Liang (National Cheng Kung University), and Ray-Kuang Lee (Tsing Hua University, Hsinchu / National Center for Theoretical Science)

PT27 *Visualizing the sets of 3-local and 3-quantum correlations*……....……..…...220

Rui-Yang You (National Cheng Kung University), Denis Rosset (National Cheng Kung University / University of Geneva), and Yeong-Cherng Liang (National Cheng Kung University)

August 31, 2016 (Wednesday)

9:30 - 10: 30 **[Invited Talk]** *Trustworthy Quantum Information: Highlights and Challenges*.....222
Yaoyun Shi (University of Michigan)

11:00 - 12: 00 **[Invited Talk]** *Quantum error-correction in black holes*……..…….....223
Beni Yoshida (Perimeter)

September 1, 2016 (Thursday)

09:00 - 10: 00 **[Invited Talk]** *Spin-based quantum computing in a silicon CMOS-compatible platform*……..…….…..……..……...224
Andrew Dzurak (UNSW)

10:30 - 11: 00 **[Long Talk]** *Storage of multiple single-photon pulses emitted from a quantum dot in a solid-state quantum memory* ……..……..225
Jian-Shun Tang (University of Science and Technology of China), Zong-Quan Zhou (University of Science and Technology of China), Chuan-Feng Li (University of Science and Technology of China), and Guang-Can Guo (University of Science and Technology of China)

11:00 - 11:30 **[Long Talk]** *Experimentally Secure Relativistic Bit Commitment*…….……...227
Matej Pivoluska (Masaryk University / Slovak Academy of Sciences), Marcin Pawlowski (University of Gdańsk) and Martin Plesch (Masaryk University / Slovak Academy of Sciences)

11:30 - 12:00 **[Long Talk]** *Quantum Key Distribution Network for Multiple Applications*……....229
A. Tajima (NEC), T. Kondoh (NEC), T. Ochi (NEC), M. Fujiwara (National Institute of Information and Communications Technology), K. Yoshino (NEC), H. Iizuka (NEC), T. Sakamoto (NEC), A. Tomita (Hokkaido University), E. Shimamura (NEC), S. Asami (NEC), and M. Sasaki (National Institute of Information and Communications Technology)

14:00 - 15: 00 **[Invited Talk]** *New Technologies by Fusion of Macroscopic Quantum Physics and Classical Information Science*……..……..……..……...*231*
Osamu Hirota (Tamagawa University)

15:30 – 17:30 **[Parallel Session A]**

15:30 – 15:50 *Quantum Calderbank-Shor-Steane Stabilizer State Preparation by Classical Error-Correcting Codes*……..…….…….……..238
Ching-Yi Lai (Academia Sinica), Yicong Zheng (National University of Singapore / Yale-NUS College), and Todd Brun (USC)

15:50 – 16:10 *New quantum error-correcting codes for a bosonic mode*……...……..…...240
Marios H. Michael (Yale University / University of Cambridge), Matti Silveri (Yale University / University of Oulu), R. T. Brierley (Yale University), Victor V. Albert (Yale University), Juha Salmilehto (Yale University), Liang Jiang (Yale University) and S. M. Girvin (Yale University)

16:10 – 16:30 *Entanglement-Assisted Quantum Communication Beating the Quantum Singleton Bound*……...……....243
Markus Grassl (Max-Planck-Institute)

16:30 – 16:50 *Symmetry-protected topologically ordered states for universal quantum computation*……....245
Hendrik Poulsen Nautrup (Universality Innsbruck) and Tzu-Chieh Wei (Stony Brook

University)

16:50 – 17:10 *Universal Quantum Computing with Arbitrary Continuous-Variable Encoding.*247
Hoi-Kwan Lau (Ulm University) and Martin Plenio (Ulm University)

17:10 – 17:30 *Measurement-based quantum computation with mechanical oscillators.*……....249
Alessandro Ferraro (Queens University), Oussama Houhou (Université de Constantine), Darren Moore (Queens University), Mauro Paternostro (Queens University), and Tommaso Tufarelli (University of Nottingham)

15:30 – 17:30 **[Parallel Session B]**

15:30 – 15:50 *Tripartite-to-bipartite entanglement transformation by stochastic local operations and classical communication and the classification of matrix spaces*……..251
Yinan Li (University of Technology Sydney), Youming Qiao (University of Technology Sydney), Xin Wang (University of Technology Sydney), Runyao Duan (University of Technology Sydney / Chinese Academy of Sciences)

15:50 – 16:10 *Information gain and disturbance in quantum measurements revisited*…...….253
Francesco Buscemi (Nagoya University), Siddhartha Das (Lousiana State University), and Mark M. Wilde (Lousiana State University)

16:10 – 16:30 *Information Broadcasting During Decoherence*…….……....255
Jarek K. Korbicz (Gdańsk University of Technology / National Quantum Information Centre in Gdańsk)

16:30 – 16:50 *Characterizing the long-term behavior of a quantum ensemble*…….……...257
Hao-Chung Cheng (National Taiwan University / University of Technology Sydney), Min-Hsiu Hsieh (University of Technology Sydney), and Marco Tomamichel (University of Sydney)

16:50 – 17:10 *Strict inequalities for quantum f-divergences and Rényi divergences*…….…..259
Fumio Hiai (Tohoku University), Milán Mosonyi (Technische Universität München / Budapest University of Technology and Economics)

17:10 – 17:30 *Concavity of Auxiliary Function in Classical-Quantum Channels*…..……..…...261
Hao-Chung Cheng (National Taiwan University / University of Technology Sydney) and Min-Hsiu Hsieh (University of Technology Sydney)

September 2, 2016 (Friday)

09:00-10:00 **[Invited Talk]** *Encoding a Qubit into an Oscillator using Phase Estimation*……...263
Barbara Terhal (RWTH Aachen)

10:30-11:00 **[Long Talk]** *Fault-Tolerant Error Correction for non-Abelian Anyons*…….……...264
Guillaume Dauphinais (Université de Sherbrooke) and David Poulin (Université de Sherbrooke)

11:00-11:30 **[Long Talk]** *Quantum Noise Spectroscopy*…….……..266
Gerardo Paz Silva (Griffith University), Leigh M. Norris (Dartmouth College), and Lorenza Viola (Dartmouth College)

11:30-12:00 **[Long Talk]** Decoupling with Random Diagonal-Unitaries…….....269
Yoshifumi Nakata (University of Tokyo / Universitat Autónoma de Barcelona), Christoph Hirche (Universitat Autónoma de Barcelona), Ciara Morgan (University College Dublin), and Andreas Winter (Universitat Autónoma de Barcelona / Catalan Institution for Research and Advanced Studies)

12:00-12:30 Closing remarks

September 3, 2016 (Saturday) (Day 1 of satellite workshop)

10:30 - 11:20 *Quantum information storage using spin-echo and stationary light*……271
Ping Koy Lam (National Australian University)
11:20 - 12:10 *Quantum state reconstruction for confined continuous-variable systems*……...272
Alessandro Ferraro (Queens University)
14:00 - 14:50 *How not to use entangled coherent states in classical information processing*……273
Kentaro Kato (Tamagawa University)
14:50 - 15:40 *Detecting continuous-variable entanglement and discord by local orthogonal Observables*……...274
Chengjie Zhang (Soochow University)
16:10 - 17:00 *TBA*……....275
Christoph Marquardt (Max Planck Institute for the Science of Light)

September 4, 2016 (Sunday) (Day 2 of satellite workshop)

10:30 - 11:20 *All-optical quantum computation and communication beyond single-photon qubits*……...…….……276
Hyunseok Jeong (Seoul National University)
11:20 - 12:10 TBA..……..277
Nathan Langford (Delft University of Technology)
14:00 - 14:50 *Introduction to AMO activities in Phys/NTHU*
Ite A. Yu (National Tsing Hua University, Hsinchu)
14:50 - 15:40 *Introduction to attosecond lasers in IPT/NTHU*
Ming-Chang Chen (National Tsing Hua University, Hsinchu)
16:00 - 18:00: Lab tours (AMO groups in Phys/NTHU and Andy Kung's lab in IPT/NTHU)