

# APCWQIS 2015

## PROGRAMME

### MONDAY, 30 NOVEMBER 2015

- 08:00 – 08:45 REGISTRATION/COFFEE/TEA
- 08:45 – 09:00 WELCOME
- SESSION 1 CHAIR Jevon Longdell  
09:00 – 10:00 M1 (Keynote)  
Yasunobo Nakamura  
Hybrid Quantum Systems Based on Collective Degrees of Freedom in Solids
- 10:00 – 10:30 M2 (Invited)  
Franco Nori  
Quantum Spin Hall Effect of Light  
*K. Y. Bliokh and Franco Nori*
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- 10:30 – 11:00 MORNING TEA
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- SESSION 2 CHAIR Ping Koy Lam  
11:00 – 11:30 M3 (Invited)  
Howard Wiseman  
Experimental Proof of Non-Local Wavefunction Collapse for a Single Particle Using Homodyne Measurements  
*Howard Wiseman, Maria Fuwa, Shuntaro Takeda, Akira Furusawa, Marcin Zwierz, Eric Cavalcanti, and Chris Foster*
- 11:30 – 12:00 M4 (Invited)  
Stephen Chen  
Towards Quantum Conversion of Microwave and Optical Photons Using Erbium Doped Crystal  
*X. Fernandez-Gonzalvo, L. A. Williamson, Y.H. Chen, C. Yin, S. Rogge, and J. J. Longdell*
- 12:00 – 12:30 M5  
Bill Munro  
Quantum Hybridization: Two Wrong's Making a Right  
*W. J. Munro, Y. Matsuzaki, K. Kakuyanagi, H. Toida, N. Mizuochi, K. Nemoto, K. Semba, H. Yamaguchi, and S. Saito*

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12:30 – 14:00

LUNCH

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SESSION 3

14:00 – 14:30

CHAIR Andrew Doherty

**M6 (Invited)**

Hsi-Sheng Goan

**Open Quantum System Dynamics and Quantum Control for Quantum Information processing**

14:30 – 15:00

**M7**

Qiong-Yi He

**Classifying Directional Gaussian Entanglement, EPR Steering, and Discord**

*Q. Y. He, Q. H. Gong, and M. D. Reid*

15:00 – 15:30

**M8**

Elica Kyoseva

**Arbitrarily Accurate Composite Pulses for Dynamical Quantum Control**

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15:30 – 16:00

AFTERNOON TEA

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SESSION 4

16:00 – 16:30

CHAIR Jaewan Kim

**M9 (Invited)**

Leong Chuan Kwek

**Towards Atomtronic Devices with Ring-Shaped Optical Lattices**

16:30 – 17:00

**M10**

Arkadiusz Orłowski

**From Classical Universal and Reversible Logical Operations to Quantum Computation**

17:00 – 17:25

**M11**

Wen-Fei Cao

**Highly Efficient Quantum Key Distribution Immune to Detector Attacks**

*Wen-Fei Cao, Yi-Zheng Zhen, Yu-Lin Zheng, Zeng-Bing Chen, Nai-Le Liu, and Kai Chen*

17:25 – 17:50

**M12**

Youngrong Lim

**Robust-to-Loss Entanglement Swapping in Optical Hybrid States**

*Youngrong Lim, Jaewoo Joo, Timothy P. Spiller, and Hyunseok Jeong*

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18:30 – 20:30

RECEPTION & POSTER SESSION

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## TUESDAY, 1 DECEMBER 2015

08:15 – 09:00 REGISTRATION/COFFEE/TEA

SESSION 1 CHAIR Howard Carmichael  
09:00 – 10:00 TU1 (Keynote)  
Gerard Milburn  
Engineered Quantum Systems

10:00 – 10:30 TU2 (Invited)  
Ping Koy Lam  
Surpassing the No-Cloning Limit with a Hybrid Probabilistic Linear Amplifier  
*J. Y. Haw, J. Zhao, J. Dias, S. M. Assad, M. Bradshaw, R. Blandino T. C. Ralph, T. Symul, and P. K. Lam*

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10:30 – 11:00 MORNING TEA

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SESSION 2 CHAIR Maarten Hoogerland  
11:00 – 11:30 TU3 (Invited)  
Choo Hiap Oh  
Robust Quantum Metrological Scheme Based on Quantum Fisher Information  
*Xiao-Ming Lu, Sixia Yu, and C.H. Oh*

11:30 – 12:00 TU4 (Invited)  
Wei-Min Zhang  
General Non-Markovian Dynamics in Open Quantum Systems

12:00 – 12:30 TU5  
Serguei Fedortchenko  
Squeezed States of Light in the THz and Mid-IR Ranges  
*S. Fedortchenko, S. Huppert, A. Vasanelli, Y. Todorov, C. Sirtori, A. Keller, T. Coudreau, and P. Milman*

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12:30 – 14:00 LUNCH

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SESSION 3 CHAIR Choo Hiap Oh  
14:00 – 14:30 TU6  
Sabine Wollman  
Observation of Genuine One-Way Einstein-Podolsky-Rosen Steering  
*Sabine Wollmann, Nathan Walk, Adam J. Bennet, Howard M. Wiseman, and Geoff J. Pryde*

14:30 – 15:00	<p><b>TU7</b>  Morgan Weston  <b>High Heralding Efficiency Source of Polarization-Entangled Photons</b>  <i>M. M. Weston, H. M. Chrzanowski, S. Wollmann, S. Slussarenko and G. J. Pryde</i></p>
15:00 – 15:30	<p><b>TU8</b>  Luke Helt  <b>Nonlinear Quantum Optics in Lossy <math>\chi^{(2)}</math> Waveguides</b>  <i>L. G. Helt and M. J. Steel</i></p> <hr/>
15:30 – 16:00	<p><b>AFTERNOON TEA</b></p> <hr/>
<p><b>SESSION 4</b>  16:00 – 16:30</p>	<p><b>CHAIR</b> Ivan Deutsch  <b>TU9 (Invited)</b>  Arne Laucht  <b>A Dressed Spin Qubit in Silicon</b>  <i>A. Laucht, R. Kalra, J. P. Dehollain, S. Simmons, J. T. Muhonen, F. A. Mohiyaddin, S. Freer, F. E. Hudson, K. M. Itoh, D. N. Jamieson, J. C. McCallum, A. S. Dzurak, and A. Morello</i></p>
16:30 – 17:00	<p><b>TU10</b>  Ivonne Guevara  <b>Quantum State Smoothing</b>  <i>Ivonne Guevara and Howard M. Wiseman</i></p>
17:00 – 17:25	<p><b>TU11</b>  Luting Xu  <b>Quantum Trajectories Under Frequent Measurements in Non-Markovian Environment</b>  <i>Luting Xu and Xin-Qi Li</i></p>
17:25 – 17:50	<p><b>TU12</b>  Toshio Croucher  <b>Fluctuation in the Erasure of a Qubit</b>  <i>Toshio J. Croucher and Joan A. Vaccaro</i></p> <hr/>
17:50 –	<p><b>EVENING FREE</b></p> <hr/>

## WEDNESDAY, 2 DECEMBER 2015

08:15 – 09:00 REGISTRATION/COFFEE/TEA

SESSION 1 CHAIR Blair Blakie

09:00 – 10:00 W1 (Keynote)

Rainer Blatt

Quantum Information Science with Trapped Ca<sup>+</sup> Ions

10:00 – 10:30 W2 (Invited)

Ivan Deutsch

Control and Measurement of Atomic Spins

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10:30 – 11:00

MORNING TEA

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SESSION 2 CHAIR Howard Wiseman

11:00 – 11:30 W3 (Invited)

Valerio Scarani

Device-Independent Self-Testing

11:30 – 12:00 W4 (Invited)

Matthew McKague

Applications of Self-Testing for Quantum Information Tasks

12:00 – 12:30 W5

Jane Thompson

Quantum is Almost Always Simpler

*Jayne Thompson, Andrew Garner, Vlatko Vedral, Mile Gu*

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12:30 –

AFTERNOON & EVENING FREE

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# THURSDAY, 3 DECEMBER 2015

08:15 – 09:00 REGISTRATION/COFFEE/TEA

SESSION 1 CHAIR Mikkel Anderson

09:00 – 9:30 TH1 (Invited)

Kae Nemoto

**A Quantum Network Architecture with NV<sup>-</sup> Centers**

*Kae Nemoto, Michael Trupke, Simon Devitt, Michael Hanks, Jorg Schmiedmayer, and William Munro*

9:30 – 10:00 TH2 (Invited)

Andrew White

**Psi vs Psi**

10:00 – 10:30 TH3 (Invited)

Cris Calude

**Quantum Indeterminism, Unpredictability and Randomness Revisited**

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10:30 – 11:00

MORNING TEA

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SESSION 2 CHAIR Valerio Scarani

11:00 – 11:30 TH4 (Invited)

Andrew Doherty

**On-Chip Microwave Quantum Hall Circulator**

*A. C. Doherty, A. C. Mahoney, J. I. Colless, S. J. Pauka, and D. J. Reilly*

11:30 – 12:00 TH5

Mark Sadgrove

**Composite Methods in Nanofiber Based Quantum optics**

*Mark Sadgrove, Jameesh Keloth, Ramachadrarao Yalla, Kali. P. Nayak, and Kohzo Hakuta*

12:00 – 12:30 TH6

Mile Gu

**Replicating the Benefits of Closed Time-Like Curves Without Breaking Causality**

*Xiao Yuan, Syed M. Assad, Jayne Thompson, Jing Yan Haw, Vlatko Vedral, Timothy C. Ralph, Ping Koy Lam, Christian Weedbrook, and Mile Gu*

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12:30 – 14:00

LUNCH

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SESSION 3 14:00 – 14:30	CHAIR Renbao Liu TH7 Arkady Fedorov <b>Probing Contextuality with Superconducting Qubits</b> <i>Markus Jerger, Yarema Reshitnik, Kristinn Juliusson, Markus Oppliger, Anton Potocnik, Nathan Langford, and Arkady Fedorov</i>
14:30 – 15:00	TH8 Patrick Ledingham <b>A Cavity-Enhanced Room-Temperature Broadband Raman Memory</b> <i>P. M. Ledingham, D. J. Saunders, J. H. D. Munns, T. F. M. Champion C. Qiu, K. T. Kaczmarek, E. Poem, I. A. Walmsley, J. Nunn</i>
15:00 – 15:30	TH9 Yu-Cheng Chang <b>Observation of High-Order Transitions in a Transmon Qubit Coupled to a Coplanar Waveguide Cavity</b> <i>Yu-Cheng Chang, Ze-Yan Chen, Jyh-Yang Wang, and Chii-Dong Chen</i>
15:30 – 16:00	<hr/> <b>AFTERNOON TEA</b> <hr/>
SESSION 4 16:00 – 16:30	CHAIR Mark Sadgrove TH10 Joseph Ho <b>Realizing Noiseless Linear Amplification with Weak Measurements</b> <i>Joseph Ho, Allen Boston, Matthew Palsson, and Geoff J. Pryde</i>
16:30– 17:00	TH11 Jared Cole <b>Using Qubits as a Tool in Materials Science: Unravelling the Mystery of Two-Level Defects in Amorphous Solids</b>
17:00 – 17:25	TH12 Robert Pfeifer <b>Surprises from Simple Anyonic Systems</b>
17:25 – 17:50	TH13 Xin-Qi Li <b>Quantum Weak Measurements and Weak Values in Circuit QED</b>
19:00 – 22:00	<hr/> <b>CONFERENCE DINNER</b> <hr/>

## FRIDAY, 4 DECEMBER 2015

08:15 – 09:00 REGISTRATION/COFFEE/TEA

SESSION 1 CHAIR Scott Parkins

09:00 – 09:30 F1 (Invited)

Ren-Bao Liu

**Dynamical Decoupling Based Detection of Nuclear Spin Correlations**

09:30 – 10:00 F2

Amita Deb

**Rydberg Blockade with Ultracold Ensembles in Programmable Tweezers**

*Amita B. Deb and Niels Kjærgaard*

10:00 – 10:30 F3

Raj Patel

**A Quantum Fredkin Gate**

*Raj B. Patel, Joseph Ho, Franck Ferreyrol, Timothy C. Ralph, and Geoff J. Pryde*

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10:30 – 11:00

MORNING TEA

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SESSION 2 CHAIR Bill Munro

11:00 – 11:30 F4 (Invited)

Jaewan Kim

**Qudit**

11:30 – 12:00 F5

Gerardo Paz-Silva

**Quantum Noise Spectroscopy**

*Gerardo A. Paz-Silva, L. Norris, L. Viola, and H. Wiseman*

12:00 – 12:30 F6

Chii-Dong Chen

**Detecting Spin Accumulation Induced Magnetocapacitance in a Ferromagnetic Single Electron Transistor**

*T. H. Lee and C. D. Chen*

12:30 – 12:45 APCWQIS 2016 & CLOSE