

51th Quantum Information Technology (QIT51)

Venue : Sunport Small Hall 1 Takamatsu

Date : Nov. 26~Nov. 28, 2024

Tue, Nov 26

Tue, Nov 26 AM Opening

Chair: Takafumi Ono (Kagawa Univ.)

09:50 - 10:00

09:50-10:00	Opening Address (10 min.)
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Tue, Nov 26 AM Session 1

Chair: Kunihiro Inomata (AIST)

10:00 - 11:00

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| (1) | 10:00-10:20 | Engineering propagating cat states with driving-assisted cavity QED
Seigo Kikura (Waseda Univ.), Hayato Goto (RIKEN), Takao Aoki (Waseda Univ.) |
| (2) | 10:20-10:40 | The Fourier analysis of the finite time for gravity-induced entanglement with optomechanical systems
Kosei Hatakeyama, Miki daisuke, Kazuhiro Yamamoto (Kyushu Univ.) |
| (3) | 10:40-11:00 | Quantum state transfer between fixed-frequency superconducting qubits using an itinerant microwave photon
Takeaki Miyamura, Keika Sunada, Yoshiki Sunada (UTokyo), Zhiling Wang (RQC), Kohei Matsuura, Kenshi Yuki, Jesper Ilves, Yasunobu Nakamura (UTokyo) |
| | 11:00-11:10 | Break (10 min.) |
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Tue, Nov 26 AM Invited Talk 1

Chair: Hirokazu Kobayashi (Kochi Univ. Tech.)

11:10 - 12:00

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| (4) | 11:10-12:00 | [Invited Talk] Current Status and Future Prospects of Dark Matter Search Experiments Using Superconducting Qubits
Tatsumi Nitta (U Tokyo) |
| | 12:00-13:20 | Lunch Break (80 min.) |
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Tue, Nov 26 PM Poster Session

13:20 - 14:50

-	Posters are listed at the end of the Program.
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14:50-15:00 Break (10 min.)

Tue, Nov 26 PM Session 2

Chair: Yutaka Shikano (Univ. Tsukuba)

15:00 - 16:00

- (5) 15:00-15:20 Counterfactual statistics in a three-path interferometer
Holger F. Hofmann (Hiroshima Univ.)
- (6) 15:20-15:40 The Identification of Phase Plate Properties Using Photon-Based Quantum Sensor Networks
Yusuke Machida, Hiroki Kuji (Chuo Univ.), Yuichiro Mori (AIST), Hideaki Kawaguchi (Keio Univ.), Takashi Imoto (AIST), Yuki Takeuchi (NTT), Miku Isizaki, Yuichiro Matsuzaki (Chuo Univ.)
- (7) 15:40-16:00 Comparing incompatibility of qubit observables from an operational perspective
Kensei Torii (Kyoto Univ.), Ryo Takakura (Osaka Univ.), Ryotaro Imaura (Kyoto Univ.)

16:00-16:10 Break (10 min.)

Tue, Nov 26 PM Session 3

Chair: Masahiro Takeoka (Keio Univ.)

16:10 - 17:30

- (8) 16:10-16:30 Tight scaling of key rate for differential-phase-shift quantum key distribution
Akihiro Mizutani (Toyama U.), Toyohiro Tsurumaru (Mitsubishi Electric)
- (9) 16:30-16:50 Fully Passive Quantum Key Distribution Protocols
Wang Wenyan (NAIST)
- (10) 16:50-17:10 Cryptographic Characterization of Quantum Advantage
Tomoyuki Morimae, Yuki Shirakawa (Kyoto Univ.), Takashi Yamakawa (NTT)
- (11) 17:10-17:30 A Priority-Based Scheduling Algorithm for High Concurrency in Quantum Networks
Xinrui Liu, Ruidong Li (Kanazawa Univ.)
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Tue, Nov 26 PM Student Award Ceremony

17:30 - 17:45

17:30-17:45 Student Award Ceremony (15 min.)

18:00-20:00 Banquet (120 min.)

Wed, Nov 27

Wed, Nov 27 AM Session 4
Chair: Akinori Kawachi (Mie Univ.)
09:30 - 10:50

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| (12) | 09:30-09:50 | HEAs=BQP
Hokuto Iwakiri, Keita Kanno (QunaSys) |
| (13) | 09:50-10:10 | On computational complexity of unitary and state design properties
Yoshifumi Nakata (Kyoto Univ.), Yuki Takeuchi (NTT), Martin Kliesch (TUHH), Andrew Darmawan (Kyoto Univ.) |
| (14) | 10:10-10:30 | Parameterized Quantum Query Algorithms for Graph Problems
Tatsuya Terao (Kyoto Univ.), Ryuhei Mori (Nagoya Univ.) |
| (15) | 10:30-10:50 | The estimation of fidelity using linear cross-entropy benchmarking in the particle-number conserved random quantum circuits
Takumi Kaneda (Osaka Univ.), Keisuke Fujii, Hiroshi Ueda (Osaka Univ./RKEN) |
| | 10:50-11:00 | Break (10 min.) |
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Wed, Nov 27 AM Invited Talk 2
Chair: Takashi Yamamoto (Osaka Univ.)
11:00 - 11:50

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| (16) | 11:00-11:50 | [Invited Talk] Recent Advances in Quantum Energy Teleportation
Masahiro Hotta (Tohoku Univ.) |
| | 11:50-13:20 | Lunch Break (90 min.) |
| | 13:20-13:30 | Group photo (10 min.) |
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Wed, Nov 27 PM Invited Talk 3
Chair: Wnag Liao (Kochi Univ. Tech.)
13:30 - 14:20

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| (17) | 13:30-14:20 | [Invited Talk] New frontiers of low-overhead fault-tolerant quantum computation
Hayata Yamasaki (UTokyo) |
| | 14:20-14:30 | Break (10 min.) |
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Wed, Nov 27 PM Session 5
Chair: Seiseki Akibue (NTT)
14:30 - 15:10

(18)	14:30-14:50	Fault-tolerance theory of continuous-variable quantum computation under general noise Takaya Matsuura (RIKEN), Nicolas Menicucci (RMIT), Hayata Yamasaki (U-Tokyo)
(19)	14:50-15:10	Connection of surface code patches without postselection in entanglement distillation Moeto Mishima, Toshihiko Sasaki, Masato Koashi (UTokyo)
	15:10-15:20	Break (10 min.)

Wed, Nov 27 PM Session 6
Chair: Akihito Soeda (NII)
15:20 - 16:40

(20)	15:20-15:40	Tradeoff between accessible information and guessing probability of quantum ensembles Michele Dall'Arno (Toyohashi U. of Technology)
(21)	15:40-16:00	Calculating the Entanglement Cost for Distributed Quantum Information Processing Using Algebraic Geometry Seiseki Akibue (NTT), Jisho Miyazaki (University of Tokyo), Hiroyuki Osaka (Ritsumeikan University)
(22)	16:00-16:20	Relativistic quantum Otto engine using a qutrit UDW detector Tomoya Hirotani, Kensuke Gallock-Yoshimura (Kyushu Univ.)
(23)	16:20-16:40	Relativistic quantum Otto engine in Gaussian formalism Yuta Uenaga, Kensuke Gallock-Yoshimura (Kyushu Univ.)

Thu, Nov 28

Thu, Nov 28 AM Session 7 Chair: Takaya Matsuura (RIKEN) 09:30 - 10:50		
(24)	09:30-09:50	Linear-optical fusion boosted by high-dimensional entanglement Tomohiro Yamazaki, Koji Azuma (NTT)
(25)	09:50-10:10	Optical quantum computing method using a hybrid squeezed cat code Shohei Kiryu, Atsushi Okamoto, Akihisa Tomita (Hokkaido Univ.)
(26)	10:10-10:30	Experimental verification of violation of straight-line propagation of photons with a Sagnac interferometer

		Hiroki Yamakami, Yuki Seno, Holger F. Hofmann, Masataka Inuma (Hiroshima Univ.)
(27)	10:30-10:50	Selective frequency upconversion experiment for frequency-multiplexed quantum network Shoichi Murakami, Shunsuke Hiraoka, Toshiki Kobayashi, Takashi Yamamoto, Rikizo Ikuta (Osaka Univ)
	10:50-11:00	Break (10 min.)
Thu, Nov 28 AM Invited Talk 4		
Chair: Takafumi Ono (Kagawa Univ.)		
11:00 - 11:50		
(28)	11:00-11:50	[Invited Talk] Photonic quantum technologies towards the quantum internet Rikizo ikuta (Osaka Univ.)
	11:50-13:20	Lunch Break (90 min.)
Thu, Nov 28 PM Session 8		
Chair: Yoshifumi Nakata (Kyoto Univ.)		
13:20 - 14:40		
(29)	13:20-13:40	Adiabatic transformation by alternating unitaries Takuya Hatomura (NTT)
(30)	13:40-14:00	Algebraic analysis of speed limit for quantum control Go Kato (NICT), Masaki Owari (Shizuoka Univ.), Koji Maruyama (Univ. Toyama)
(31)	14:00-14:20	Fractional quantum Zeno effect in non-Markovian dynamics of open quantum systems Hiroki Nakabayashi, Hayato Kinkawa (UTokyo), Takano Taira (Kyushu Univ.), Naomichi Hatano (UTokyo)
(32)	14:20-14:40	Measurement-induced phase transition for free fermions in a quasiperiodic potential Toranosuke Matsubara, Kazuki Yamamoto, Akihisa Koga (Science Tokyo)
	14:40-14:50	Break (10 min.)
Thu, Nov 28 PM Session 9		
Chair: Kaoru Mizuta (UTokyo)		
14:50 - 15:30		
(33)	14:50-15:10	Numerical Analysis Using Real Quantum Computers Yuki Izumi, Hitoshi Kawahara, Hiroto Suzuki (CTC)

(34)	15:10-15:30	Parametrized Energy-Efficient Quantum Kernels for Network Service Fault Diagnosis Hiroshi Yamauchi (SoftBank), Tomah Sogabe (UEC), Rodney Van Meter (Keio)
	15:30-15:40	Break (10 min.)

Thu, Nov 28 PM Session 10
Chair: Takafumi Ono (Kagawa Univ.)
15:40 - 16:20

(35)	15:40-16:00	Robust ground state energy estimation via adiabatic state preparation using symmetry Hiroki Kuji, Yuta Shingu, Tetsuro Nikuni (TUS), Takashi Imoto (AIST), Kenji Sugisaki (Keio univ.), Yuichiro Matsuzaki (Chuo Univ.)
(36)	16:00-16:20	Discrete time crystals in diamond quantum simulator model under zero magnetic field Naoya Egawa, Joji Nasu (Tohoku Univ.), Kaoru Mizuta (UTokyo)

Thu, Nov 28 PM Closing
16:20 - 16:30

16:20-16:30	Closing Address (10 min.)
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Poster Session

Tue, Nov 26 PM Poster Session
13:20 - 14:50

- (1A) Scalable circuit depth reduction in feedback-based quantum optimization with a quadratic approximation
Don Arai, Ken N. Okada, Yuichiro Nakano, Kosuke Mitarai (Osaka Univ.), Keisuke Fujii (Osaka Univ./RIKEN)
- (2A) Solving Differential Equations Using Quantum Annealing with Continuous Variables
Kazuki Miyanishi, Asuka Koura (Chuo Univ.), Soshun Naito (Tokyo Univ.), Matsuzaki Yuichiro (Chuo Univ.)
- (3A) Noise-Adaptive Quantum Circuit Mapping Using Reinforcement Learning
Tayakama Kosuke (Kyushu Univ)
- (4A) Performance Evaluation of Surface Code Decoders Using Machine Learning under Non-stationary Noise
Toshihide Hinokuma (Kyushu Univ)
- (5A) Analyzing QAOA scaling relation using tensor network
Goro Miki, Yasuhiro Tokura (Tsukuba Univ.)
- (6A) Numerical Simulation Towards the Realization of XYZ Interaction Using Floquet Engineering in Superconducting Qubit Systems
Aoi Fukumura, Kazuhisa Ogawa, Makoto Negoro (Osaka Univ.)
- (7A) The Experiment on Controlling a Superconducting Qubit via Radio over Fiber Technology
Ryota Yamano, Hidehisa Shiomi, Kazuhisa Ogawa, Makoto Negoro (Osaka Univ.)
- (8A) Quantum phase classification via partial tomography of quantum many-body states
Akira Tanji, Naoki Yamamoto (Keio Univ.)
- (9A) Decomposition Method of MCT Gate Considering the T-depth of Each Bit
Koki Hirono, Shigeru Yamashita (Ritsmeikan Univ.)
- (10A) Optimal quantum cracking of classical passwords
Kai Shuriku, Michele Dall'Arno (TUT)
- (11A) Exponentially accurate randomized quantum simulation of open quantum systems with low ancilla overhead
Junpei Kato (MUFG Bank/Keio Univ.), Kaito Wada (Keio Univ.), Kosuke Ito (Toyota Motor Corporation), Naoki Yamamoto (Keio Univ.)

- (12A) Numerical simulation of quantum error corrected remote quantum gate on realistic noise model
Kazuki Suzuki (Keio Univ.), Yasunari Suzuki (NTT), Kazufumi Tanji (Keio Univ.), Yuuki Tokunaga (NTT), Masahiro Takeoka (Keio Univ.)
- (13A) Shuttling for Scalable Trapped-ion Quantum Computers using MAPP
Yuto Matsuda (Ritsumeikan Univ.), Daniel Schoenberger (TUM), Shigeru Yamashita (Ritsumeikan Univ.), Robert Wille (TUM)
- (14A) Transformation Rules for Probability Measures on the Space of Pure States
Haruhi Kazama (Keio Univ.), Naoki Yamamoto (KQCC)
- (15A) Toward highly sensitive quantum infrared spectroscopy using ridge-waveguide quasi-phase-matching device
Hayato Kishida, Yu Mukai (Kyoto Univ.), Mamoru Hisamitsu, Katsuhiko Tokuda (Shimadzu Corp.), Ryo Okamoto, Shigeki Takeuchi (Kyoto Univ.)
- (16A) Error estimation of quantum eigenvalue transformation with Trotterization on low energy subspace
Kishimoto Ryuta (UT), Mizuta Kaoru (UT/RIKEN), Koashi Masato (UT)
- (17A) Numerical simulation of quantum dynamic programming and noise evaluation on NISQ devices
Souta Kojima, Atsushi Okamoto, Akihisa Tomita (Hokkaido Univ.)
- (18A) Bright Illumination Attack on BB84 with Passive and Asymmetric Basis Selection
Toshitsugu Kato, Akihisa Tomita (Hokkaido Univ.)
- (19A) Simple Quantum Error-Correcting Output Codes for Multi-class Quantum Classifiers
Shunsuke Nomoto, Wojciech Roga, Masahiro Takeoka (Keio Univ.)
- (20A) Isolated zero point generation by propagation-manipulation of photon pair via SPDC with structured light
Takumi, Hirokazu (KUT)
- (21A) Construction of CSS Codes based on Spatially Coupled Non-Binary QC-LDPC Codes with Minimum Cycle Length 12
Daiki Komoto, Kenta Kasai (Science Tokyo)
- (22) Verification of Efficient Circuit Implementation in Geometrical Optimization of Quantum Circuits on Riemannian Manifolds
Riku Ikeda, Naoki Yamamoto (Keio)
- (23) Single-photon generation by selectively exciting a single rare-earth ion in optical fiber
Kaito Shimizu, Kazutaka Katsumata, Tomo Osada, Kaoru Sanaka (TUS)

- (24) Geometrical scheduling of adiabatic control without information of energy spectra
Yuta Shingu (Tokyo Univ. of Sci.), Hatomura Takuya (NTT)
- (25) Feature extraction by photon-based quantum extreme learning machine – Analysis of non-classical high-dimensional nonlinear projection –
Akio Yoshizawa (AIST)
- (26) Numerical investigation of strong-to-weak symmetry breaking states in stochastic dephasing quantum circuits
Takahiro Orito (UTokyo, ISSP), Yoshihito Kuno (Akita Univ.), Ikuo Ichinose (Nitech)
- (27) Analysis of Dynamics under Optimal Control in the Adiabatic Regime
Takayuki Suzuki (NICT/RIKEN)
- (28) A semi-device independent approach to quantum simulability
Michele Dall’Arno (Toyohashi U. of Technology)
- (29) Generalized Second Law of Thermodynamics in Quantum Feedback-Controlled Steady-Cycle Heat Engines
Kenta Koshihara, Kazuya Yuasa (Waseda Univ.)
- (30) System configuration for high-count-rate multi-party quantum entanglement distribution
Atsushi Taniguchi, Yasuyuki Sanari, Momoko Miura, Shun Kawakami, Mori Watanabe, Yoshihide Tonomura, Koichi Takasugi (NTT)
- (31) Delay control of photon transmission in quantum communication
Yasuyuki Sanari, Atsushi Taniguchi, Yoshihide Tonomura, Koichi Takasugi (NTT)
- (32) Security of time-bin BB84 protocol with passive interferometer
Shun Kawakami, Koji Azuma, Atsushi Taniguchi, Yoshihide Tonomura, Koichi Takasugi (NTT)
- (33) Quantum algorithm for the radiative transfer equation
Asuka Igarashi (NII), Shiro Kawabata (AIST/Housei Univ.), Tadashi Kadowaki (AIST/DENSO), Akihito Soeda (NII/SOKENDAI)
- (34) Mitigating Side-Channel Attacks on QKD Devices with Trusted Nodes – Novel Active Control Methods for QKD-Related Functions and Data Protection –
Masakazu Ono (NICT), Ken-ichiro Yoshino, Noriyuki Ueno (NEC), Fumie Ono, Katsumi Fujii, Mikio Fujiwara (NICT)
- (35) Quantum concentration inequalities for adversarial setups exploiting permutation symme
Takaya Matsuura (RIKEN), Shinichiro Yamano (UTokyo), Yui Kuramochi (UEC), Toshihiko Sasaki, Masato Koashi (UTokyo)