List of Publications

(0-1) Citations 11,000+ (Google Scholar)

(0-2) H-index 56 (Google Scholar)

(0-3) Ten-index 169 (Google Scholar)

1 Scholarly books

(1-1) **M. Hayashi**, *Quantum Information Theory: Mathematical Foundation*, *Graduate Texts in Physics*, Springer (2017). (First edition was published from Springer in 2006).

(1-2) **M. Hayashi**, S. Ishizaka, A. Kawachi, G. Kimura, and T. Ogawa, *Introduction to Quantum Information Science*, *Graduate Texts in Physics*, Springer (2014). (Originally published from Kyoritsu Shuppan in 2012 with Japanese.)

(1-3) **M. Hayashi**, *Group Representation for Quantum Theory*, Springer (2017). (Originally published from Kyoritsu Shuppan in 2014 with Japanese.)

(1-4) **M. Hayashi**, *A Group Theoretic Approach to Quantum Information*, Springer (2017). (Originally published from Kyoritsu Shuppan in 2014 with Japanese.)

2 Refereed journal articles

(2-1) B. Yu and **M. Hayashi**, "Measurement-Device-Independent Detection of Beyond-Quantum State," *New Journal of Physics*, (In press).

(2-2) S. Song, F. Le Gall, and **M. Hayashi**, "Prior Entanglement Exponentially Improves One-Server Quantum Private Information Retrieval for Quantum Messages," *EPJ Quantum Technology*, **11**, 55 (2024).

(2-3) **M. Hayashi** and G. Liu "Generalized quantum Arimoto-Blahut algorithm and its application to quantum information bottleneck," *Quantum Science and Technology*, **9**, 045036 (2024).

(2-4) **M. Hayashi**, "Reverse em-problem based on Bregman divergence and its application to classical and quantum information theory," *Information Geometry*, (In press).

(2-5) **M. Hayashi**, "Iterative minimization algorithm on a mixture family," *Information Geometry*, 2024_Special Issue: Half a Century of Information Geometry, Part 2 (In press).

(2-6) R. Takagi and **M. Hayashi**, "When quantum memory is useful for dense coding," *Letters in Mathematical Physics*, **114**, 88 (2024); Special Issue Honoring Mary Beth Ruskai.

(2-7) H. Arai, B. Yu, and **M. Hayashi**, "Detecting beyond-quantum nonlocality using standard local quantum observables," *Physical Review A, Letter*, **110**, L010201 (2024).

(2-8) H. Arai and **M. Hayashi**, "Derivation of Standard Quantum Theory via State Discrimination," *New Journal of Physics*, **26** 053046 (2024).

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(2-10) **M. Hayashi**, A. Hora, and S. Yanagida, "q-Racah probability distribution," *The Ramanujan Journal*, **64**, 963–990, (2024). https://doi.org/10.1007/s11139-024-00859-w

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(2-12) **M. Hayashi** and Y. Chen, "Non-Adaptive Coding for Two-Way Wiretap Channel with or without Cost Constraints," *IEEE Transactions on Information Theory*, vol. 70, 4611 – 4633 (2024).

(2-13) **M. Hayashi** and Á. Vázquez-Castro, "Covert communication with Gaussian noise: from random access channel to point-to-point channel," *IEEE Transactions on Communications*, vol. 72, issue 3, 1516 – 1531 (2024).

(2-14) Z. Li, H. Zhu, and **M. Hayashi**, "Robust and efficient verification of graph states in blind measurement-based quantum computation," *npj Quantum Information*, vol. 9, 115 (2023).

(2-15) **M. Hayashi** and Y. Ouyang, "Tight Cramér-Rao type bounds for multiparameter quantum metrology through conic programming," *Quantum*, **7**, 1094 (2023).

(2-16) **M. Hayashi** and T. Koshiba, "Universal Adaptive Construction of Verifiable Secret Sharing and Its Application to Verifiable Secure Distributed Data Storage," *IEEE/ACM Transactions on Networking*, Vol. 32, Issue 1, 253-267 (2024).

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(2-18) **M. Hayashi** and N. Warsi, "Commitment capacity of classical-quantum channels," *IEEE Transactions on Information Theory*, Volume: 69, Issue: 8, 5083 – 5099 (2023).

(2-19) **M. Hayashi** and Y. Yang, "Efficient algorithms for quantum information bottleneck," *Quantum*, **7**, 936 (2023).

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(2-42) **M. Hayashi**, "Information Geometry Approach to Parameter Estimation in Hidden Markov Model," *Bernoulli Journal*, 28 (1) 307 - 342 (2022).

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(6-55) **M. Hayashi** and S. Watanabe "Non-Asymptotic Bounds on Fixed Length Source Coding for Markov Chains," *51st Annual Allerton Conference on Communication, Control, and Computing*, Allerton House, Monticello, Illinois, USA, 2–4, October, 2013.

(6-56) S. Watanabe and **M. Hayashi** "Non-Asymptotic Analysis of Privacy Amplification via Renyi Entropy and Inf-Spectral Entropy ," *2013 IEEE International Symposium on Information Theory (ISIT 2013)*, Istanbul, Turkey, 7–12, July, 2013, pp. 2715-2719.

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(6-69) **M. Hayashi**, "General non-asymptotic and asymptotic formulas in channel resolvability and identification capacity," *Proceedings of International Symposium on Information Theory and its Applications (ISITA 2004)*, Parma, Italy, October 10 – 13, (2004), p. 1562–1567.

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(6-71) **M. Hayashi**, "Estimation of SU(2) action by using entanglement," Proceedings of The 7th International Conference on Quantum Communication, Measurement and Computing, Glasgow, UK, July 25–29 (2004), p.269–272 (Ameriacan Institute of Physics, 2004).

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(6-73) **M. Hayashi**, "General asymptotic formulas for fixed-length quantum entanglement concentration," *Proceedings of 2003 IEEE International Symposium on Information Theory (ISIT 2003)*, Yokohama, June 29 – July 4, (2003), p.431.

(6-74) T. Ogawa and **M. Hayashi**, "On error exponents in quantum hypothesis testing," *Proceedings of 2003 IEEE International Symposium on Information Theory (ISIT 2003)*, Yokohama, June 29 – July 4, (2003), p.479.

(6-75) **M. Hayashi** and H. Nagaoka, "A general formula for the classical capacity of a general quantum channel," *Proceedings of 2002 IEEE International Symposium on Information Theory (ISIT 2002)*, Lausanne, Switzerland, June 30–July 5, (2002), p.71.

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Marbella, Spain, September 19–22, (2000), pp.390-394.

7 Refereed oral presentation without proceeding

(7-1) **M. Hayashi**, "Algorithm for rate distortion theory based on em algorithm," *International Conference on Information Geometry for Data Science*, Hamburg University of Technology, Hamburg, Germany, September 19 – 23, 2022 (online event on Zoom).

(7-2) **M. Hayashi**, "Secure list decoding and its application to bit-string commitment," *Beyond IID in Information Theory 9*, National Taiwan University, Taiwan, September 27 - October 1, 2021 (online event on Zoom).

(7-3) G. Bai, Y.-D. Wu, Y. Zhu, **M. Hayashi**, and G. Chiribella, "Quantum Casual Unravelling," *Beyond IID in Information Theory 9*, National Taiwan University, Taiwan, September 27 - October 1, 2021 (online event on Zoom).

(7-4) S. Song and **M. Hayashi**, "Capacity of Quantum Private Information Retrieval with Colluding Servers," *20th Asian Quantum Information Science Conference*, Sydney, Australia, 7 – 9 December 2020. (online event)

(7-5) G. Bai, Y.-D. Wu, Y. Zhu, **M. Hayashi**, and G. Chiribella, "Efficient Algorithms for Causal Order Discovery in Quantum Networks," *20th Asian Quantum Information Science Conference*, Sydney, Australia, 7 – 9 December 2020. (online event)

(7-6) **M. Hayashi** and N. Cai, "Universal classical-quantum superposition coding and universal classical-quantum multiple access channel coding," *20th Asian Quantum Information Science Conference*, Sydney, Australia, 7 – 9 December 2020. (online event)

(7-7) K. Wang and **M. Hayashi**, "Permutation Enhances Classical Communication Assisted by Entangled States," *20th Asian Quantum Information Science Conference*, Sydney, Australia, 7 – 9 December 2020. (online event)

(7-8) **M. Hayashi**, K. Wang, and K. Fang, "Finite Block Length Analysis on Quantum Coherence Distillation and Incoherent Randomness Extraction," *20th Asian Quantum Information Science Conference*, Sydney, Australia, 7 – 9 December 2020. (online event)

(7-9) Y. Yoshida, H. Arai, and **M. Hayashi**, "Perfect Discrimination in Approximate Quantum Theory of General Probabilistic Theories," *20th Asian Quantum Information Science Conference*, Sydney, Australia, 7 – 9 December 2020. (online event)

(7-10) F. Salek, **M. Hayashi**, and A. Winter, "When are Adaptive Strategies in Asymptotic Quantum Channel Discrimination Useful?," *Beyond IID in Information Theory 8*, Stanford University, USA, November 9 - 13, 2020 (online event on Zoom).

(7-11) **M. Hayashi**, K. Wang, and K. Fang, "Finite Block Length Analysis on Quantum Coherence Distillation and Incoherent Randomness Extraction," *Beyond IID in Information Theory 8*, Stanford University, USA, November 9 - 13, 2020 (online event on Zoom).

(7-12) R. Takagi, K. Wang, and **M. Hayashi** "Application of the Resource Theory of Channels to Communication Scenarios," *Beyond IID in Information Theory 8*, Stanford University, USA, November 9 - 13, 2020 (online event on Zoom).

(7-13) H. Zhu and **M. Hayashi**, "Efficient Verification of Pure Quantum States in the Adversarial Scenario" *Quantum Information Processing 2020 (QIP)*, Shenzhen, China, January 6 – 10, 2020.

(7-14) S. Song and **M. Hayashi**, "Capacity of Quantum Private Information Retrieval with Multiple Servers" *19th Asian Quantum Information Science Conference*, Seoul, Korea, August 19 – 23, 2019.

(7-15) **M. Hayashi**, "Verification of Graph state, Hypergraph state, and Weighted graph state" *Beyond iid Conference*, University of Technology Sydney, Sydney, Australia, July 1–5, 2019.

(7-16) Z. Fan, Z. Yao, **M. Hayashi**, and W. Eddy, "Quantifying time-varying sources in magnetoencephalography: A discrete approach," *The 3rd International Conference on Econometrics and Statistics (EcoSta 2019)*, the National Chung Hsing University (NCHU), Taichung, Taiwan, June 25 – 27 ,2019.

(7-17) H. Zhu and **M. Hayashi**, "Universally Fisher-symmetric informationally complete measurements," *18th Asian Quantum Information Science Conference*, Nagoya, Japan, September 8 – 12, 2018.

(7-18) Y. Yang, G. Chiribella and **M. Hayashi**, "Attaining the ultimate precision limit in quantum state estimation," *18th Asian Quantum Information Science Conference*, Nagoya, Japan, September 8 – 12, 2018. (It was selected as a Plenary Contributed Talk.)

(7-19) Y. Yang, G. Bai, G. Chiribella, and **M. Hayashi**, "Compression for identically prepared qudit states," *Quantum Information Processsing (QIP 2018).* QuTech at Delft University of Technology, Delft, The Netherlands, January 15 - 19, 2018.

(7-20) **M. Hayashi**, "Secure wireless communication under spatial and local Gaussian noise assumptions," *10th International Conference on Information Theoretic Security (ICITS2017) Workshop Track*, Hong Kong, China, November 29 – December 2, 2017.

(7-21) **M. Hayashi**, M. Owari, G. Kato, and N. Cai, " Secrecy and Robustness for Active Attack in Secure Network Coding and its Application to Network Quantum Key Distribution," *10th International Conference on Information Theoretic Security (ICITS2017) Workshop Track*, Hong Kong, China, November 29 – December 2, 2017.

(7-22) A. Vazquez-Castro and **M. Hayashi**, "Information-theoretic Physical Layer Security for Satellite Channels," *10th International Conference on Information Theoretic Security (ICITS2017) Workshop Track*, Hong Kong, China, November 29 – December 2, 2017.

(7-23) K. Ito and **M. Hayashi**, "Optimal performance of generalized heat engines with finite-size baths of multiple conserved quantities beyond i.i.d. scaling," *14th Granada Seminar on Quantum Systems in and out of Equilibrium: Fundamentals, dynamics and applications,* Facultad de Ciencias, Universidad de Granada, Granada, Spain, 20-23 June, 2017.

(7-24) K. Fujii and **M. Hayashi**, "Verifiable fault-tolerance in measurement-based quantum computation," *Asian Conference on Quantum Information Science (AQIS 17)*, National University of Singapore, Singapore, September 4 - 8, 2017.

(7-25) Y. Yang, G. Bai, G. Chiribella, and **M. Hayashi**, "Compression for Quantum Population Coding," *Asian Conference on Quantum Information Science (AQIS 17)*, National University of Singapore, Singapore, September 4 - 8, 2017.

(7-26) Y. Yang, G. Chiribella, and **M. Hayashi**, "Optimal compression for identically prepared qubit states," *The 20th workshop on Quantum Information Processing (QIP 2017)*, Washington, Seattle, USA, 16-20, January, 2017.

(7-27) K. Ito, W. Kumagai, and **M. Hayashi**, "Asymptotic Entanglement Preservability of LOCC Conversions," *14th Asian Quantum Information Science Conference (AQIS2014),* Shirankaikan, Kyoto, Japan, August 20–24, 2014.

(7-28) **M. Hayashi** and S. Watanabe "Non-Asymptotic Analysis of Privacy Amplification for Markov Chains," *The 7th International Conference on Information Theoretic Security (ICITS 2013) Workshop Track*, Singapore, November, 28–30, 2013.

(7-29) W. Kumagai and **M. Hayashi**, "Quantum hypothesis testing for quantum Gaussian states," *Bernoulli Society Satellite Meeting to the ISI World Statistics Congress 2013*, The University of Tokyo, Tokyo, Japan, September 2–4, 2013.

(7-30) M. Tomamichel and **M. Hayashi**, "A hierarchy of information quantities for the finite block length analysis of quantum tasks," *The 15th workshop on Quantum Information Processing (QIP 2013)*, Beijing, China, 21–25, January, 2013. (Available online: http://arxiv.org/abs/1208.1478).

(7-31) W. Kumagai and **M. Hayashi**, "Irreversibility of entanglement concentration for pure state" *The* 12^{th} *Asian Conference on Quantum Information Science (AQIS 2012)*, Suzhou, China, 23–26, August, 2012. (Available online: http://arxiv.org/abs/1205.4370).

(7-32) M. Owari and **M. Hayashi**, "Asymptotic local hypothesis testing between a pure bipartite state and the completely mixed state," *The 2nd Institute of Mathematical Statistics Asia Pacific Rim Meeting*, Epochal Tsukuba, Tsukuba, Japan, 2–4, July, 2012. (Available online: http://arxiv.org/abs/1105.3789).

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(7-34) L. Chen and **M. Hayashi**, "Classifying tripartite pure states in quantum information science and tensor rank," *The 2nd Institute of Mathematical Statistics Asia Pacific Rim Meeting*, Epochal Tsukuba, Tsukuba, Japan, 2–4, July, 2012.

(7-35) T. Tsurumaru and **M. Hayashi**, "Dual universality of hash functions and its applications to classical and quantum cryptography" *QCRYPT 2011: First Annual Conference on Quantum Cryptography*, Zürich, Switzerland 12–16, September, 2011.

(7-36) **M. Hayashi**, "Theoretical analysis and implementation on QKD with the decoy-state method," *Theory and Realisation of Practical Quantum Key Distribution*, University of Waterloo, June 11 – 14, 2007

(7-37) F. Buscemi, **M. Hayashi**, and M. Horodecki, "A general entropic approach to the information-disturbance tradeoff problem in quantum measurements," *Third Asia Pacific Conference on Quantum Information Science*, Nanyang Executive Center, Singapore, 30 July – 2 August, (2007).

(7-38) **M. Hayashi**, D. Markham, M. Murao, M. Owari, and S. Virmani, "Entanglement and group symmetries: stabilizer, symmetric and anti-symmetric states," *Asian Conference on Quantum Information Science (AQIS 07)*, Shiran Kaikan, Kyoto University, Japan, September 3 - 6, (2007), p. 24–25.

(7-39) **M. Hayashi**, "Prior entanglement between senders enables perfect quantum network coding," *Asian Conference on Quantum Information Science (AQIS 07)*, Shiran Kaikan, Kyoto University, Japan, September 3 – 6, (2007), p.38–39.

(7-40) F. Buscemi, **M. Hayashi**, and M. Horodecki, "A general entropic approach to the information-disturbance tradeoff problem in quantum measurements," *Asian Conference on Quantum Information Science (AQIS 07)*, Shiran Kaikan, Kyoto University, Japan September 3 – 6, (2007), p.40–41

(7-41) **M. Hayashi**, "General theory for decoy-state QKD with arbitrary number of intensities," *Asian Conference on Quantum Information Science (AQIS 07)*, Shiran Kaikan, Kyoto University, Japan September 3 – 6, (2007), p.75–76

(7-42) J. Hasegawa, **M. Hayashi**, T. Hiroshima, and A. Tomita, "Security analysis and experiment of decoy state quantum key distribution incorporating finite statistics," *Asian Conference on Quantum Information Science (AQIS 07)*, Shiran Kaikan, Kyoto University, Japan September 3 – 6, (2007), p.77–78

(7-43) F. Buscemi, **M. Hayashi**, and M. Horodecki, "INFORMATION EXTRACTION VERSUS IRREVERSIBILITY IN QUANTUM MEASUREMENT PROCESSES," *Noise Information & Complexity Quantum Scale*, Ettore Majorana Centre, Erice (Sicily), Italy, 4th – 10th November (2007).

(7-44) **M. Hayashi**, K. Iwama, H. Nishimura, R. Raymond, and S. Yamashita, "Quantum Network Coding," *QIP 2006 - The 9th Workshop on Quantum Information Processing (QIP 06)*, Paris, January 16 – 20, (2006).

(7-45) **M. Hayashi**, "Practical Evaluation of Security for Quantum Key Distribution," *Asian conference on Quantum Information Science 2006 (AQIS 06)*, BeiJing Friendship Hotel, BeiJing, China, September 1–4, (2006), p. 9–10.

(7-46) M. Owari and **M. Hayashi**, "The relationship between local copying and local discrimination," *ERATO conference on Quantum Information Science 2005 (EQIS 05)*, JST, Tokyo, August 26–30, (2005), pp. 31–32.

(7-47) D. Markham, S. Virmani, M. Owari, M. Murao, **M. Hayashi**, "Local Discrimination and multipartite entanglement measures," *ERATO conference on Quantum Information Science 2005 (EQIS 05)*, JST, Tokyo, August 26–30, (2005), pp. 91–92.

(7-48) T. Tsuda, B.S. Shi, A. Tomita, **M. Hayashi**, K. Matsumoto, and Y.K. Jiang, "Hypothesis testing for an entangled state produced by spontaneous parametric down conversion," *ERATO conference on Quantum Information Science 2005 (EQIS 05)*, JST, Tokyo, August 26–30, (2005), pp. 57–58.

(7-49) T. Hiroshima and **M. Hayashi**, "Finding a maximally correlated state – Simultaneous Schmidt decomposition of bipartite pure states," *ERATO conference on Quantum Information Science 2004 (EQIS 04)*, Tokyo, September 1–5, (2004), pp. 43–44.

(7-50) **M. Hayashi**, H. Imai, K. Matsumoto, M. B. Ruskai and T. Shimono, "Qubit channels which require four inputs to achieve capacity: Implications for additivity conjectures," *ERATO conference on Quantum Information Science 2004 (EQIS 04)*, Tokyo, September 1–5, (2004), pp. 45–46.

(7-51) **M. Hayashi**, "Estimation of SU(2) action by using entanglement," *ERATO conference on Quantum Information Science 2004 (EQIS 04)*, Tokyo, September 1–5, (2004), pp. 68–69.

(7-52) Y. Tsuda, **M. Hayashi** and K. Matsumoto, "Hypothesis testing for entanglement," *ERATO conference on Quantum Information Science 2004 (EQIS 04)*, Tokyo, September 1–5, (2004), pp. 70–71.

(7-53) **M. Hayashi** and K. Matsumoto, "Quantum universal variable-length source coding," *ERATO Workshop on Quantum Information Science 2002 (EQIS 02)*, Tokyo, September 5-8, (2002), pp. 31–32.

(7-54) F. Morikoshi, **M. Hayashi**, M. Koashi, K. Matsumoto, and A. Winter, "Error exponents for entanglement concentration," *ERATO Workshop on Quantum Information Science 2002 (EQIS 02)*, Tokyo, September 5-8, (2002), pp.46-47.

(7-55) **M. Hayashi**, "Optimal sequence of POVMs in the sense of Stein's lemma in quantum hypothesis testing," *ERATO workshop on Quantum Information Science 2001 (EQIS 01)*, Tokyo, September 6-8, (2001), p.20.

8 Invited talks in international meetings

(8-1) **M. Hayashi**, "When is Cramer-Rao bound useful?" *Quantum measurement and control: third week of the WINQ Program on Complex and Quantum System*, Nordita, the Nordic Institute for Theoretical Physics, Stockholm, Sweden, May 13 - 17, 2024.

(8-2) **M. Hayashi**, "Estimation of group action via non-commutative Fourier transform," *Towards Infinite Dimension and Beyond in Quantum Information workshop*, Instituto de Matemáticas, the University of Granada (IMAG), Granada, Spain, May 5 - 10, 2024.

(8-3) **M. Hayashi**, "Entanglement measures for detectability," *Materials Informatics symposium*, Advanced Materials Thrust, Function Hub, HKUST-Ganzhou, December 16-17, 2023.

(8-4) **M. Hayashi**, "Secure network coding with adaptive attack," *Workshop on Information Theory and Related Fields - In Memory of Ning Cai*, Bielefeld, Germany, November 24–26, 2023

(8-5) **M. Hayashi**, "Iterative Minimization Algorithm on Mixture Family," *2023 International Workshop on Learning and Information Theory (WOLIT'23)*, Shenzhen, Guangdong, July 3 – 5, 2023.

(8-6) **M. Hayashi**, "Two-Server Oblivious Transfer for Quantum Messages," *The International Workshop on General-Purpose Quantum Computing and Information Theory* June 13 – 15, 2023. (Online)

(8-7) **M. Hayashi**, "Obstacles to international scientific collaborations for China," *4th ASEAN plus Three (10+3) Young Scientists Forum*, hosted by the Ministry of Science and Technology of the People's Republic of China and the People's Government of Guangxi Zhuang Autonomous Region, Nanning, Guangxi, September 15, 2022 (Hybrid).

(8-8) **M. Hayashi**, "Special functions in quantum statistical estimation," *International Symposium on Orthogonal Polynomials, Special Functions and Applications (OPSFA)*, Montreal, Canada, June 13-17, 2022 (Online).

(8-9) **M. Hayashi**, "Estimation of quantum state and quantum channel," *International Conference on Quantum Information and Foundations* Physics and Applied Mathematics Unit, Indian Statistical Institute, Kolkata, India, February, 14–24, 2022 (Online).

(8-10) **M. Hayashi**, "Secure list decoding and its application to bit-string commitment," *Workshop in Algebraic Geometry code (II)*, Shenzhen MSU-BIT University, Shenzhen, China, December 11 – 16 (2021) (Hybrid style).

(8-11) **M. Hayashi**, "Estimation of quantum state and quantum channel," *Bernoulli-IMS 10th World Congress in Probability and Statistics*, Seoul, Korea, July 19 – 23 (2021) (Online).

(8-12) **M. Hayashi**, "Information-Theoretic Anonymous Cryptographic Protocols (Plenary Talk)," *ISITA2020 - The International Symposium on Information Theory and Its Applications*, Kapolei, Hawai'i, USA, October 24 – 27, 2020 (Online).

(8-13) **M. Hayashi**, "Quantum Information Processing over Quantum Network (Plenary Talk)," *SPCOM 2020 - International Conference on Signal Processing and Communications*, Indian Institute of Science, Bangalore, India, July 19-24, 2020 (Online).

(8-14) **M. Hayashi**, "Overview about previous finite size results," *QKD Security Proof Workshop 2020*, University of Waterloo & University of Toronto, Canada, July 15-17, 2020 (Online).

(8-15) **M. Hayashi**, "Quantum Private Information Retrieval with Multiple Servers," *The 2019 Workshop on Probability and Information Theory (WPI 2019)*, The University of Hong Kong, August 19-22, 2019.

(8-16) **M. Hayashi**, "Verification of commuting quantum computations via fidelity estimation of weighted graph states," *Mini-Workshop on Quantum Verification*, Fudan University, Shanghai, China, August 16-18, 2019.

(8-17) **M. Hayashi**, "Secure Quantum Network Code without Classical Communication," *Summer Workshop on Quantum Algorithm and Quantum Software* Peng Cheng Laboratory, Shenzhen, China, August 12 - 16, 2019.

(8-18) **M. Hayashi**, "Verification of commuting quantum computations via fidelity estimation of weighted graph states," *Quantum information and string theory 2019* Yukawa Institute for Theoretical Physics (YITP), Kyoto University, Kyoto, Japan, May 27-June 28, 2019.

(8-19) **M. Hayashi**, "Perfect Discrimination of Non-Orthogonal Separable Pure States on Bipartite System in General Probabilistic Theory" *Interactions between Noncommutative Analysis and Quantum Information Theory* Institute for Advanced Study in Mathematics, Harbin Institute of Technology, June 1-5, 2019.

(8-20) **M. Hayashi**, "Asymptotic decoupling property and mixing condition and Hidden Markovian Process in quantum system," *Mathematical Aspects in Current Quantum Information Theory 2019 (MAQIT 2019)*, Seoul National University, Seoul, Korea, May 20-24, 2019.

(8-21) **M. Hayashi**, "Finite-length security analysis in quantum key distribution," *2019 Annual meeting for quantum information of the Chinese Institute of Electronics*, Jinan, China, May 11-12, 2019.

(8-22) **M. Hayashi**, "Measurement-Based Quantum Computation and Its Verification," *Second Hong Kong-Shenzhen Workshop on Quantum Information Science*, Southern University of Science and Technology, Shenzhen, China, November 26 - 29 2018.

(8-23) **M. Hayashi**, "Secure physical layer network coding versus secure network coding," *2018 IEEE Information Theory Workshop*, Guangzhou, China, November 25 – 29, 2018.

(8-24) **M. Hayashi**, "Quantum stopwatch: How to store time in a quantum memory," *Wolfson - SUSTech meeting*, Wolfson College, Oxford, UK, November, 6 – 8, 2018.

(8-25) **M. Hayashi**, "Verification of Measurement-Based Quantum Computation," *AQIS2018 Kyoto satellite workshop on quantum computing*, Panasonic Auditorium, Yukawa Hall, Yukawa Institute for Theoretical Physics, Kyoto University, Kyoto, Japan September 13, 2018.

(8-26) **M. Hayashi**, "Attaining the ultimate precision limit in quantum state estimation," *International Workshop on Quantum Tomography (IWQT)*, Fudan University, Shanghai, China, July 30 - August 3, 2018.

(8-27) **M. Hayashi**, "Attaining the ultimate precision limit in quantum state estimation," *Hong Kong-Shenzhen Workshop on Quantum Information Science*, Southern University of Science and Technology, Shenzhen, China, May 21-24 2018.

(8-28) **M. Hayashi**, "Secure wireless communication and its application to satellite communication," Japan-Singapore Workshop on Coding and Information Theory, School of Physical & Mathematical Sciences, Nanyang Technological University, Singapore, March 4-7, 2018.

(8-29) **M. Hayashi**, "Asymptotic decoupling property and mixing condition and Hidden Markovian Process in quantum system," Hong Kong Workshop on Quantum Information Foundations: Focus on Physics of the Observer, Department of Computer Science, University of Hong Kong, Hong Kong, January 8-11, 2018.

(8-30) **M. Hayashi**, "Verification of Measurement-Based Quantum Computation," *IHP conference on Quantum Information Theory.*, Institut Henri Poincaré, Paris, France, December 11- 15, 2017.

(8-31) **M. Hayashi**, "Verification of Measurement-Based Quantum Computation," *International Workshop on Quantum Computing and Quantum Information Processing 2017*, Academy of Mathematics and Systems Science, Beijing, China, November 12 - 14, 2017.

(8-32) **M. Hayashi**, "Asymptotic Analysis for Hidden Markovian Process with Quantum Hidden System," *2017 IEEE Information Theory Workshop*, Kaohsiung, Taiwan, November 6 - 10, 2017.

(8-33) **M. Hayashi**, "Role of Hypothesis Testing in Quantum Information Theory," *Asian Conference on Quantum Information Science (AQIS 17)*, National University of Singapore, Singapore, September 4 - 8, 2017.

(8-34) **M. Hayashi**, "Verification of Measurement-Based Quantum Computation," *Trustworthy Quantum Information*, Université Pierre et Marie Curie, Paris, France, June 19 - 21, 2017.

(8-35) **M. Hayashi**, "Secure wireless communication under spatial and local Gaussian noise assumptions," *2016 Shannon Workshop*, Shanghai Jiao Tong University, Shanghai, December 14-16, 2016.

(8-36) **M. Hayashi**, "Implementable quadratic enhancement in quantum metrology," Hong Kong Workshop on Quantum Information and Foundations, Hong Kong, May 4-7, 2016.

(8-37) **M. Hayashi**, "Shannon Theoretic Analysis for Classical and Quantum Information Security," *Nexus of Information and Computation Theories, Secrecy and Privacy Theme*, Institut Henri Poincaré, Paris, France, March 21 - April 1, 2016.

(8-38) **M. Hayashi**, "Measurement-based Formulation of Quantum Heat Engine and Optimal Efficiency with Finite-Size Effect," *Beyond I.I.D. in Information theory*, Banff, Canada, July 5-10, 2015.

(8-39) **M. Hayashi**, "Classical and Quantum Information Theoretical Analysis for Security," *Mathematical Tools of Information-Theoretic Security Workshop*, Paris, France, September 23-25, 2015.

(8-40) **M. Hayashi**, "Information Geometry Approach to Estimation and Hypothesis Testing for Markov Chains," A Symposium on the History of Functional Analysis, Xi'an, China, May 8-11, 2015.

(8-41) **M. Hayashi**, "Tight asymptotic bounds on local hypothesis testing between a pure bipartite state and the white noise state," *Workshop on Quantum Metrology, Interaction, and Causal Structure*, Beijing, China, December 1–5, 2014.

(8-42) **M. Hayashi**, "Generalized entropies and quantum security," *AJW2014 Australia-Japan Workshop on Mutiuser Quantum Networks 2014*, University of Technology, Sydney, Sydney, Australia, October, 22 - 24, 2014

(8-43) **M. Hayashi**, "Finite-length analysis for secret random number generation and coding theorems," (in Organized Session: Classical and Quantum Secure Network) *2014 International Symposium on Information Theory and Its Applications (ISITA 2014)*, Melbourne, Australia, 26 - 29, October 2014.

(8-44) **M. Hayashi** and S. Watanabe, "Non-asymptotic and asymptotic analyses on Markov chains in several problems," *2014 Information Theory and Applications Workshop*, Catamaran Resort, San Diego (USA), February 9-14, 2014.

(8-45) **M. Hayashi**, "Estimation of group action with energy constraint and its application to uncertainty relations on S^1 and S^3," *Nagoya Winter Workshop on Quantum Information, Measurement, and Foundations*, Nagoya University, March 3-7, 2014.

(8-46) **M. Hayashi**, "Asymptotic conversion of probability distribution and entangled state," *Beyond I.I.D.*, National University of Singapore, May 19-21, 2014.

(8-47) **M. Hayashi**, "Generalized entropies," *New Frontiers of Quantum Information Theory*, Palazzo dei Capitani del Popolo, Ascoli Piceno (Italy), July, 7-11, 2014.

(8-48) **M. Hayashi**, "Estimation of group action under the energy constraint," *Workshop on Quantum Metrology, Interaction, and Causal Structure*, Beijing, China, December 9–13, 2013.

(8-49) T. Tsurumaru and **M. Hayashi**, "Dual universality of hash functions and its applications to quantum cryptography," *Third International Quantum Science Symposium Asia-2013 on 'Quantum Information to Communications & Quantum Systems to Spintronics, Semi-conductors',* Tokyo, Japan, November 25 – 26, 2013.

(8-50) **M. Hayashi**, "Large deviation type evaluation in information theoretic security," *Workshop on Beyond i.i.d. in information theory*, Cambridge, UK, January, 8–11, 2013.

(8-51) **M. Hayashi**, "Large deviation type evaluation in information theoretic security," *Japan-Singapore Workshop on Multi-user Quantum Networks*, Centre for Quantum Technologies, National University of Singapore, Singapore, September, 17–20, 2012.

(8-52) **M. Hayashi**, "Security bound with privacy amplification in quantum system," *The International Symposium on Quantum Information and Quantum Logic*, Zhejiang University, Hangzhou, China, August, 10–13, 2012.

(8-53) **M. Hayashi**, "Weaker entanglement guarantees stronger entanglement," *5th Asia-Pacific Workshop on Quantum Information Science (5th APWQIS)*, Nanyang Technological University, Singapore, May, 25–28, 2011.

(8-54) **M. Hayashi**, "Phase estimation with photon number constraint," *2nd International Conference on Quantum Information and Technology*, National Institute of Informatics, Tokyo, Japan, October, 21–22, 2010.

(8-55) **M. Hayashi**, "Quantum statistical state estimation and quantum Cramer-Rao bound," *IISA-ISPS 2010 International Conference on Statistics, Probability, Operations Research, Computer Science and Allied Areas*, Department of Statistics, Andhra University, Visakhapatnam, India, 4–7, January, 2010. (This is one conference to celebrate the 90th birthday of Professor C. R. Rao, who is the most influential leading researcher in Statistics.)

(8-56) **M. Hayashi**, "Quantum statistical state estimation and quantum Cramer-Rao bound," *International Conference on Frontiers of Interface between Statistics and Sciences*, Hyderabad, India, 30 December 2009–2 January 2010. (This is the other conference to celebrate the 90th birthday of Professor C. R. Rao, who is the most influential leading researcher in Statistics.)

(8-57) **M. Hayashi**, "Quantum universal coding protocols and universal approximation of multi-copy states," *International Conference on Quantum Information and Technology*, National Institute of Informatics, Tokyo, Japan, 2–5, December, 2009.

(8-58) **M. Hayashi**, "Quantum key distribution I & II," *EQuaLS3, Expository Quantum Lecture Series 3*, Institute for Mathematical Research and Physics Department, Faculty of Science, University Putra Malaysia, Malaysia, 9–13, November, 2009.

(8-59) **M. Hayashi**, "Quantum universal coding protocols and universal approximation of multi-copy states," *OCPA6 The 6th Joint Meeting of Chinese Physicists Worldwide International Conference on Physics Education and Frontier Physics*, Lanzhou, China, August, 3–7, 2009.

(8-60) **M. Hayashi**, "Quantum capacity and degraded channel," *Multicritical Behaviour of Spin Glasses and Quantum Error Correcting Codes (MBQEC)*, Centennial Hall, Ookayama campus, Tokyo Institute of Technology, Tokyo, Japan, November, 17–19, 2008.

(8-61) **M. Hayashi**, "Universal information protocols in quantum information theory," *Information and Communication*, Alfred Rényi Institute of Mathematics, Hungary, August, 25–28, 2008. (This is the conference to celebrate the 70th birthday of Professor Imré Csiszár, who is a leading researcher in Information Theory.)

(8-62) **M. Hayashi**, "Theoretical analysis and implementation on QKD with the decoy-state method," *KIAS-KAIST 2007 Workshop on Quantum Information Science*, KIAS, Seoul, Korea, June, 26–27 (2007).

(8-63) **M. Hayashi**, "Theoretical analysis and implementation on QKD with the decoy-state method," *Third Asia Pacific Conference on Quantum Information Science*, Nanyang Executive Center, Singapore, 30 July – 2 August, 2007.

(8-64) **M. Hayashi**, "State Discrimination of Entangled State by Local Operations," *Noise Information & Complexity Quantum Scale*, Ettore Majorana Centre, Erice (Sicily), Italy, November, 4 – 10, 2007.

(8-65) **M. Hayashi**, K. Matsumto, A. Tomita, B.-S. Shi, Y. Tsuda, and Y.K. Jiang: "Testing for Maximally Entangled State (Theory and Experiment)," *15th International Laser Physiscs workshop (LPHYS'06)*, EPFL, Lausanne,

Switzerland, July, 24 – 28, 2006.

(8-66) **M. Hayashi**: "Practical Evaluation of Security for Quantum Key Distribution," *A conference on Quantum Statistics, Information and Control*, Nottingham, UK, July, 15 – 22, 2006.

(8-67) **M. Hayashi**, "Statistical analysis on testing of an entangled state based on Poisson distribution framework," *FOCUS MEETING: QUANTUM PROCESS ESTIMATION*, Budmerice, Slovakia, September 27–30, 2006.

(8-68) **M. Hayashi**: "Estimation of squeezed state," *9th International Conference on Squeezed States and Uncertainty Relations (ICSSUR 2005)*, Besancon, France, May 2 – 6, 2005.

(8-69) **M. Hayashi**: "Characterization of several kinds of quantum analogues of relative entropy," *2nd International Symposium on Information Geometry and its Applications*, University of Tokyo, Tokyo, December 12 – 16, 2005.

(8-70) **M. Hayashi**: "Quantum statistical inference and entanglement," *Special Week on Quantum Statistics*, Isaac Newton Institute for Mathematical Sciences, Cambridge, UK, October, 2004.

(8-71) **M. Hayashi**: "Hypothesis Testing Approach to Quantum Information Theory," *1st Asia-Pacific Conference on Quantum Information Science*, National Cheng Kung University, Tainan, Taiwan, December 10–13, 2004.

(8-72) **M. Hayashi**: "Quantum central limit theorem and quantum estimation," *Joint MaPhySto and QUANTOP Workshop on Quantum Measurements and Quantum Stochastics*, Department of Mathematical Sciences, University of Aarhus, Denmark, August 7 – 12, 2003.

(8-73) **M. Hayashi**: "Can quantum non-locality improve quantum estimation?" *Non-locality of Quantum Mechanics and Statistical Inference*, Kyoto, Japan, September, 8 – 9, 2003.

(8-74) **M. Hayashi**: "Hypothesis testing approach to quantum information theory," *COE Symposium on Quantum Information Theory*, Kyoto, Japan, September 2–3, 2003.