

Min Namkung (Ph.D)

Department of Applied Mathematics, National Research University Higher School of Economics (HSE)
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Personal Data	Birth: 26th June, 1989, in Republic of Korea (South Korea) Nationality: Korean Gender: Male
Language	First language Korean, Fluent in English
Research Interests	Quantum state discrimination (Main) Sequential state discrimination (Main) Quantum communication Quantum correlations and coherence Implementation of quantum information using quantum optics Implementation of quantum computer using superconductor Quantum artificial intelligence Open Quantum Systems
Skills	Software skills MATLAB and Python programming Mathematical skills Numerical analysis and optimization Designing quantum optics experiments and related applications Theoretical analysis of various quantum state discrimination strategies Theoretical analysis of open quantum system dynamics based on master equation
Work experience	Postdoctoral Fellow in Higher School of Economics Sep. 2020 - Present Tikhonov Moscow Institute of Electronics and Mathematics Department of Applied Mathematics Supervisor: Prof. Elena R. Loubenets Technical Research Personnel in Hanyang University Sep. 2016 - Sep. 2019 ("Alternative military service" in South Korea) Department of Applied Physics Supervisor: Prof. Younghun Kwon
Educations	Doctor of Philosophy in Hanyang University Mar. 2013 - Feb. 2020 Major: Applied Physics (Quantum Information Theory) Graduation Thesis: Structure of nondestructive measurement for discriminating quantum states (Outstanding Doctoral Degree Thesis Award, 2020) Supervisor: Prof. Younghun Kwon Bachelor of Engineerings in Hanyang University Mar. 2009 - Feb. 2013 Primary Major: Electronic System Engineerings Secondary Major: Applied Physics Graduation Portfolio: Robot control using mobile platform Supervisor: Prof. Joon-hong Lim

**Teaching
Experience**

Assistance of undergraduate students research project
Teaching assistant (General Physics - Experiment and Theory)

Publications

M. Namkung and Y. Kwon, “Understanding of Various Type of Unambiguous Discrimination in View of Coherence Distribution”, *Entropy* **22**, 1422 (2020).

M. Namkung and Y. Kwon, “Coherence and Entanglement Dynamics in Training Variational Quantum Perceptron”, *Entropy* **22**, 1277 (2020).

M. Namkung and Y. Kwon, “Generalized sequential state discrimination for multiparty QKD and its optical implementation”, *Scientific Reports* **10**, 8247 (2020).

M. Namkung and Y. Kwon, “Almost minimum error discrimination of N -ary weak coherent states by Jaynes-Cummings Hamiltonian dynamics”, *Scientific Report* **9**, 19664 (2019).

M. Namkung and Y. Kwon, “Sequential state discrimination of coherent states”, *Scientific Reports*, **8**, 16915 (2018).

M. Namkung and Y. Kwon, “Understanding non-classical correlation using optical hybrid states in noisy quantum channels”, *Journal of Physics A: Mathematical and Theoretical* **51**, 455302 (2018).

M. Namkung and Y. Kwon, “Analysis of Optimal Sequential State Discrimination for Linearly Independent Pure Quantum States”, *Scientific Reports*, **8**, 6515 (2018).

M. Namkung and Y. Kwon, “Optimal sequential state discrimination between two mixed quantum states”, *Physical Review A* **96**, 022318 (2017).

M. Namkung, J. Chang, J. Shin, and Y. Kwon, “Revisiting Quantum Discord for Two-Qubit X -states: The Error Bound to an Analytical Formula”, *International Journal of Theoretical Physics*, **54**, 3340 (2015).

**International
Conferences**

M. Namkung and Y. Kwon, “Understanding coherent distribution in generalized measurement for unambiguous discrimination”, *Quantum Information Processing*, Hilton Hotel Shenzhen, Shenzhen, China (2020).

M. Namkung and Y. Kwon, “Coherence distribution and depletion in training quantum classifier”, *Asian Quantum Information Science*, Korean Institute for Advanced Study(KIAS), Seoul, Korea (2019).

J.-S. Kang, M. Namkung, and Y. Kwon, “Understanding Entanglement Survival in Hybrid Quantum System Composed of Two-level Atom and Superconducting Circuit in Noisy Environment”, *Asian Quantum Information Science*, Korean Institute for Advanced Study(KIAS), Seoul, Korea (2019).

M. Namkung and Y. Kwon, “Structure of Sequential State Discrimination”, *Mathematical Aspects in Current Quantum Information Theory*, Seoul National University, Seoul, Korea (invited talk, 2019).

M. Namkung and Y. Kwon, “Almost minimum error discrimination of N -ary weak coherent states by Jaynes-Cummings Hamiltonian dynamics”, *Quantum Information Processing*, Colorado University, Boulder, United States of America (2019).

M. Namkung and Y. Kwon, “Sequential state discrimination of various states which can be used for multi-party quantum key distribution”, Asian Quantum Information Science, Nagoya University, Nagoya, Japan (2018).

M. Namkung, D. Ha, and Y. Kwon, “Construction of sequential state discrimination for three linearly independent qutrits”, Asian Quantum Information Science, National University of Singapore(NUS), Singapore (2017).

M. Namkung and Y. Kwon, “Revisiting quantum discord for two qubit X-states”, Asian Quantum Information Science, Korea Institute for Advanced Study(KIAS), Seoul, Korea (2015).

M. Namkung, D. Ha, and Y. Kwon, “Non-Classicality of Optical Hybrid States in Noisy Quantum Channel”, Quantum Information Processing, University of Technology Sydney(UTS), Sydney, Australia (2015).

D. Ha, M. Namkung, and Y. Kwon, “Discriminating N -qudit states using geometric structure”, Quantum Information Processing, University of Technology Sydney(UTS), Sydney, Australia (2015).

Domestic Conferences

M. Namkung and Y. Kwon, “Sequential state discrimination of coherent states”, The Korean Physics Society: Spring Meeting, Daejeon, Korea (2019).

M. Namkung and Y. Kwon, “Quantum Key Distribution by Optimal Sequential State Discrimination”, The Korean Physics Society: Fall Meeting, Kyungju, Korea (invited talk, 2017).

Y. Kwon and M. Namkung, “Sequential State Discrimination of Two Mixed Qubit”, The Korean Physics Society: Spring Meeting, Daejeon, Korea (2014).

M. Namkung, J. Chang, J. Shin, and Y. Kwon, “Quantum Discord of X states”, The Korean Physics Society: Fall Meeting, Changwon, Korea (2013).

Patents

Y. Kwon and M. Namkung, “Minimum error discrimination of weak coherent states using atoms” Korea - Application No. 10-2020-0099364, 2020.

Y. Kwon and M. Namkung, “Sequential state discrimination using coherent states” Korea - Registration No. 10-2074890, 2019.

Y. Kwon and M. Namkung, “Quantum key distribution through sequential state discrimination” Korea - Application No. 10-2017-0102326, 2017.