Yong Kwon

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PhD student
FBK, Trento, Italy

Research interests

Integrated Quantum Photonics
Quantum computing (Linear optical quantum computing, Quantum verification and validation)
Quantum information (entanglement entropy, concurrence)

Education

Nov. 2024 –	**Ph.D. in Physics** Università degli Studi di Trento – Trento, Italy Advisor: Dr. Mher Ghulinyan and Prof. Iacopo Carusotto as a second advisor (2024.11 –)
Feb. 2024	**M.S. in Physics** Pukyong National University – Busan, ROK Advisor: Prof. Byung-Soo Choi (2022.06 –) and Prof. Seung Ki Baek (– 2022.05) (2022.09 – and – 2022.08 as an official document) Thesis title: "Two Approaches of Quantum Information and Quantum Computing : Information Entropy and Computer Systems" link
Feb. 2022	**B.S. in Physics** Pukyong National University – Busan, ROK Advisor: Prof. Seung Ki Baek and Prof. Jaegon Um as a co-advisor (2020.07 –)

Publications

Oct. 2024	**"Full Software Control on MZI-Based Photonic Integrated Circuit"** Y. Kwon, M. Bernard, L. Limongi, G. Piccoli, M. Ghulinyan, and B.-S. Choi *IEEE Access* doi:10.1109/ACCESS.2024.3474014
Mar. 2024	**"Quantum circuit mapping for universal and scalable computing in MZI-based integrated photonics"** Y. Kwon, A. Baldazzi, L. Pavesi, and B.-S. Choi *Optics Express* doi:10.1364/OE.520492
Oct. 2023	**"A Software Platform for Programmable Linear Optical Quantum Computer"** Y. Kwon and B.-S. Choi *IEEE Access* doi:10.1109/ACCESS.2023.3324048
Sep. 2022	**"Correlation between concurrence and mutual information"** Y. Kwon, S. K. Baek, and J. Um *Journal of Statistical Mechanics: Theory and Experiment* doi:10.1088/1742-5468/ac8e5b

Research and Work experience

Nov. 2024 –	**Integrate and Quantum Optics (I&QO) Unit** – I&QO lab website **Photonic Quantum-gate based planar lightwave circuits** Mentor: Dr. Mher Ghulinyan (FBK) and Prof. Iacopo Carusotto (UniTN) • Position: PhD student

Jun. 2022 – Sep. 2024	**Quantum Computational Science Lab** – QCS lab website **EPIQUS Project** Mentor: Prof. Byung-Soo Choi (PKNU) • Position: MSc student and master researcher • Project Overview: main page / CORDIS information • Build up the optimized software for epiqus project
Jun. 2020 – May 2022	**Statistical Physics Laboratory** – Statphys lab website **Entanglement vs mutual information on two qubit system** Mentors: Prof. Jaegon Um (POSTECH), Prof. Seung Ki Baek (PKNU) • Position: Undergraduate student and MSc student • Investigate on two spin-1/2 particles • Find correlated information entropy on classical definition and quantum definition • Compare two entropy values using 'Concurrence'
Fall 2020	**Others** **Quantum-like game development** Mentor: Prof. Jae-yeol Hwang (PKNU) (only for class guidance) • The word 'Quantum-like game' means a game made by applying the phenomenon to introduce to those who are not familiar with quantum physics. • This project worked during the one of undergraduate classes, 'Capstone Design I' • My contributions: project idea suggestion, introducing concept of quantum-like games, GUI development • Find more detailed information following Github team repository.
Apr. 2018 – Dec. 2019	**Military service** • Combat engineer, 2nd Armored Brigade, Republic of Korea Army

Teaching experience

Fall 2022	**TA, Physical Experiment II (PKNU)** A physical experiment class in general physics topics for freshyear students.
Spring 2022	**TA, Physical Experiment I (PKNU)** A physical experiment class in general physics topics for freshyear students.

Talks and posters

May. 2025	**[P]** Quantum Process Tomography on Integrated Photonic Quantum Computing System *Quantum Science Generation Trento 2025* link
Dec. 2024	**[P]** Quantum Computing Software Platform for Integrated Photonic Circuits *Winter School on Quantum Machine Learning 2024* link
Apr. 2024	**[T]** A software platform for MZI-based quantum hardware *QisK Annual Meeting 2024*
Jul. 2023	**[T]** A Universal and programmable software platform for linear optical quantum computing *International Workshop on Quantum Compilation 2023* link
Apr. 2022	**[T]** Correlation between mutual information and concurrence *KPS Spring Meeting 2022* link
Oct. 2021	**[P]** Correlation between mutual information and concurrence *KPS Fall Meeting 2021*

| Aug. 2021 | **[P]** Entanglement vs. mutual information |
| | *Roles of heterogeneity in non-equilibrium collective dynamics (RHINO) 2021* *link* |

Technical skills

Programming languages
Python, C (a little bit), LaTeX, Markdown

Software
Linux (usually Fedora), Git, Mathematica (a little bit)

Languages
Korean (mother language), English (intermediate level)