Jonginn Yun

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Research Interests

Experimental Quantum Information

- Physical Qubit Implementation
- Quantum Simulation

Education

Stanford University — CA, The United States of America
Ph.D. Student in Applied Physics — *Sep. 2025 – Present*

Seoul National University — Seoul, Republic of Korea
Master of Science in Physics — *Mar. 2020 – Feb. 2022*

- Cumulative GPA: 4.21/4.3
- Thesis: Computational Analysis on the Excited Level Spin Mixing on the Semiconducting Quantum Dot Array
- Advisor: Prof. Dohun Kim

Seoul National University — Seoul, Republic of Korea
Bachelor of Science, *summa cum laude*, in Chemistry Education and Physics — *Mar. 2014 – Feb. 2020*

- Cumulative GPA: 4.14/4.3
- Major GPA: 4.2/4.3 (Chemistry Education); 4.1/4.3 (Physics)
- Ranked first in the Department of Chemistry Education
- Thesis Advisors: Prof. Junhua Yu (Chemistry Education), Prof. Dohun Kim (Physics)

Research Experience

Research Scientist — *Mar. 2022 – Jun. 2025*
Seoul National University — Seoul, Republic of Korea

- Qubit implementation using a semiconductor quantum dot
- Semiconductor quantum dot device fabrication

Graduate Research Assistant — *July. 2020 – Feb.2022*
Seoul National University — Seoul, Republic of Korea

- Electronic transport measurement of van der Waals materials and semiconductor quantum dot devices
- Experimental set-up of a dilution refrigerator
- Simulation of a semiconductor quantum dot system

Publications

(*: equal contribution)

- J. Park*, H. Jang*, H. Sohn, **J. Yun**, Y. Song, B. Kang, L. Stehouwer, D. Esposti, G. Scappucci, and D. Kim, *Passive and active suppression of transduced noise in silicon spin qubits*, **Nat. Commun. 16**, 78 (2025)
- Y. Song*, **J. Yun***, J. Kim, W. Jang, H. Jang, J. Park, M.-K. Cho, H. Sohn, S. Miyamoto, K. Itoh, and D. Kim, *Coherence of a field-gradient-driven singlet-triplet qubit coupled to many-electron spin states in ^{28}Si/SiGe*, **npj Quantum Inform. 10**, 77 (2024)
- **J. Yun***, S. Son*, J. Shin*, G. Park, K. Zhang, Y. Shin, J.-G. Park, and D. Kim, *Magnetic proximity-induced superconducting diode effect and infinite magnetoresistance in a van der Waals heterostructure*, **Phys. Rev. Res. 5**, L022064 (2023)
- **J. Yun***, J. Park*, H. Jang, J. Kim, W. Jang, Y. Song, M.-K. Cho, H. Sohn, H. Jung, V. Umansky, and D. Kim, *Probing two-qubit capacitive interactions beyond bilinear regime using dual Hamiltonian parameter estimations*, **npj Quantum Inform. 9**, 30 (2023)
- J. Kim*, **J. Yun***, W. Jang*, H. Jang, J. Park, Y. Song, M.-K. Cho, S. Sim, H. Sohn, H. Jung, V. Umansky, and D. Kim, *Approaching Ideal Visibility in Singlet-Triplet Qubit Operations Using Energy-Selective Tunneling-Based Hamiltonian Estimation*, **Phys. Rev. Lett. 129**, 040501 (2022)

Research Projects

Semiconductor Quantum Dot Micromagnet Shape Optimization Dec. 2024 – Present
- Computational reproduction of an anomalously long coherence time observed in a ^{28}Si device
- Optimization of a magnet morphology using a genetic algorithm and steepest descent algorithm

Semiconductor Quantum Dot Device Fabrication Jun. 2023 – Present
- Fabrication of Hall bar and silicon quantum dot devices with stacked nano-gates

Electronic Measurement of Semiconductor Quantum Dot Devices Jan. 2022 – Mar. 2023
- Electronic characterization of silicon-based quantum dots, including a coulomb diamond and a charge stability diagram measurements
- Single-shot measurement and gate fidelity optimization (using Bayesian-based active denoising) of a singlet-triplet qubit
- Analysis of the interqubit coupling between two singlet-triplet qubits

Nonreciprocal Transport in a van der Waals Heterostructure Nov. 2020 – Nov. 2021
- Electronic measurement of the superconducting diode effect in a $NbSe_2/CrPS_4$ van der Waals heterostructure

Dilution Refrigerator Set-up Nov. 2020 – Oct. 2021
- Customization of RF lines for fast dual RF-reflectometry by multiplexing RF lines
- Design and construction of electronic components including hot-swap boxes, breakout boxes, RC filters, and more

Simulation of Nuclear Polarization by Singlet-Triplet Qubit Jun. 2020 – Oct. 2020
- Python-based simulation for calculating the dynamic nuclear polarization rate of a singlet-triplet qubit in a lateral GaAs quantum dot

Teaching Experience

Quantum Physics 2 **Seoul National Univeristy**
Teaching Assistant Sep. 2021 – Dec. 2021
- Assisted Prof. Hongki Min in the 'Quantum Physics 2' course.

Physics 1 **Seoul National Univeristy**
Teaching Assistant Mar. 2021 – Jun. 2021
- Assisted Prof. Songky Moon in the 'Physics 1' course.

Rudimentary Mathematical Methods of Physics **Seoul National Univeristy**
Teaching Assistant Sep. 2020 – Dec. 2020
- Assisted Prof. Dohun Kim in the 'Rudimentary Mathematical Methods of Physics' course.

Physics Lab. 1 **Seoul National Univeristy**
Teaching Assistant Mar. 2020 – Jun. 2020
- Taught and conducted basic physics experiments.
- Taught how to write an academic report with the formats provided by journals.

Chemistry **Seoul National Univeristy Middle School**
Trainee Teacher Apr. 2019 – May. 2019
- Taught middle school chemistry with the use of some recent theories in education.

Technical Skills

Experimental Skills: Extensive experience with ^{3}He-^{4}He dilution refrigerators (Triton, Oxford Instruments) and ^{4}He dry refrigerators (Teslatron, Oxford Instruments). Electronic set-up of RF lines and filters for a low noise RF measurement. Formation and fine-tuning of quantum dots. Low-noise AC and DC characterization of semiconductor quantum dot devices. Qubit manipulation of double electron and triple electron qubits using AWG hardware for spin qubit application.
Computer Skills: Extensive use of Python/C++ for analyzing experimental data. Extensive use of QUA language for an OPX device (Quantum Machines). Experienced user of Matlab, Mathematica, Origin, AutoCAD, C/C++, Pybind11, and LaTeX.
Device Fabrication: Experienced user of e-beam lithography system (JEOL), maskless photolithography system (Nanosystem Solutions), e-beam evaporator, dicing saw, thermal annealing system, reactive ion etcher, and atomic layer deposition system. Knowledge in lift-off and etching techniques, semiconductor quantum dot device fabrication techniques, and device characterization tools including scanning electron microscope and atomic force microscope.
Language: Korean(native), English (fluent; TOEFL: 109, GRE: V166/Q170/W4.5)

Conferences

- **J. Yun**, S. Son, J. Shin, G. Park, K. Zhang, Y. Shin, J.-G. Park, and D. Kim, *Magnetic proximity-induced superconducting diode effect and infinite magnetoresistance in a van der Waals heterostructure*, Oral Presentation in *KPS 2023*, Changwon, Korea 2023
- **J. Yun**, J. Park, H. Jang, J. Kim, W. Jang, Y. Song, M.-K. Cho, H. Sohn, H. Jung, V. Umansky, and D. Kim, *Probing two-qubit capacitive interactions beyond bilinear regime using dual Hamiltonian parameter estimations*, Poster Presentation in *ISPSA 2022*, Jeju, Korea 2022