

Hyeonjae Kim

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Researcher at Agency for Defense Development

Research Interests

AMO Physics, Atom-light interaction, Quantum sensing, Quantum simulation, Quantum computing

Education

Kyungpook National University (KNU) Bachelor of Science in Physics Overall GPA: 4.11/4.3 (130 credits) Major GPA: 4.19/4.3 (71 credits)	Daegu, South Korea Mar. 2020 – Feb. 2024
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Research Experiences

Agency for Defense Development (ADD) Researcher (PIs: Dr. Sin Hyuk Yim, Dr. Sangkyung Lee) Research on Optically Pumped Atomic Magnetometers (OPAMs) <ul style="list-style-type: none">Designed and implemented an absorption spectroscopy system for rubidium vapor cells with automated measurements.Developed theoretical models of absorption spectra and applied them to characterize the properties of rubidium vapor cells.Built and optimized a zero-field (SERF) optically pumped atomic magnetometer, supported by theoretical analysis of spin dynamics.	Daejeon, South Korea Jun. 2024 – Present
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Novel Applied Nano Optics Lab Research Intern (Advisor: Prof. Junyeob Yeo) Research on photo-electrochemical cells using lasers	Daegu, South Korea Jun. 2021 – Jun. 2022
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High Energy Physics Lab (Moon Lab) Research Intern (Advisor: Prof. Chang-Sung Moon) Research on the development of algorithms for silicon detectors	Daegu, South Korea Jun. 2020 – Feb. 2021
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Publications

Aging test of atomic vapor cell with Al₂O₃ wall coating on cubic glass
Applied Optics **64**, 7932-7937 (2025)
H. Kim, T. Jeong, S. H. Hong, J. B. Nam, S. Lee, Y. Lim, and S. H. Yim

Conferences

Towards the SERF regime in an atomic magnetometer Korean Physical Society (KPS) Fall Meeting (2025) <u>H. Kim</u> , Y. Lim, S. Lee, S. H. Hong, S. H. Yim, T. Jeong, and J. B. Nam	
Lifetime extension of rubidium vapor cells by Al₂O₃ coating APS Division of Atomic, Molecular, and Optical Physics (DAMOP) Meeting (2025) <u>H. Kim</u> , T. Jeong, S. Lee, and S. H. Yim	
Linear absorption spectroscopy in rubidium vapor cells: Applications in buffer gas measurement and	

lifetime estimation

Korean Physical Society (KPS) Spring Meeting (2025)

H. Kim, T. Jeong, S. Lee, J. B. Nam, S. H. Hong, and S. H. Yim

Honors and Awards

Physics Alumni Association Award and Scholarship (Outstanding Graduate)	Feb. 2024
Awarded by the chair of the Physics Alumni Association, Kyungpook National University	
Agency for Defense Development Director General's Award	Dec. 2023
2nd prize at the MiliTECH Challenge hosted by KAIST	
Korea Military Academy President's Award	Dec. 2022
2nd prize at the MiliTECH Challenge hosted by KAIST	
3rd prize of Academic Conference	Dec. 2021
Awarded by the College of Natural Sciences, Kyungpook National University	
Dean's list: 3 semesters (2021-1, 2021-2, 2022-2)	Nov. 2021, Apr. 2022, Apr. 2023
Awarded by the College of Natural Sciences, Kyungpook National University	

Grants and Scholarships

National Science and Technology Scholarship	Mar. 2022 – Feb. 2024
Awarded by the Korea Student Aid Foundation (KOSAF)	
Academic Encouragement Scholarship (Hyoseok Scholarship)	Apr. 2022
Awarded by the Kyungpook National University Alumni Association	
Outstanding students selected from each college (Representative of the College of the Natural Sciences)	
Academic Achievement Scholarship	Aug. 2020, Feb. 2021, Aug. 2021
Awarded by Kyungpook National University	
A partial tuition reduction granted for academic excellence	

Teaching Experiences

Undergraduate Tutoring in Classical Mechanics2 (PHYS212) Courses	Sep. 2023 – Dec. 2023
Teaching Assistant	
Undergraduate Tutoring in Electromagnetism2 (PHYS312) Courses	Mar. 2023 – Jun. 2023
Teaching Assistant	

Patents and Software

Buffer Gas Pressure Estimation for OPAMs	Dec. 2024
Registered in Korea Copyright Commission (C-2024-047156)	
Rubidium Vapor Cell Lifetime Monitoring and Analysis Tool	Dec. 2024
Registered in Korea Copyright Commission (C-2024-054414)	

Other Experiences

Research Officer for National Defense (ROND)	Jun. 2024 – May. 2027
Selected top students (2 per year in Physics) for a program modeled after Israel's Talpiot, completing mandatory military service through research at the Agency for Defense Development, Korea's DARPA	

counterpart.

Concurrently serving as a First Lieutenant in the Republic of Korea Air Force.

Tutoring for International Undergraduate Freshmen

Feb. 2022 – May. 2022

Mentored for 2 hours per week on general academic life and basic calculus

Selected as an excellent tutor

Skills

- Programming: Python (NumPy, SciPy, SymPy, pandas, matplotlib), Wolfram Language (Mathematica)
- Software: LabVIEW, Solidworks