Hyeonjae Kim

Researcher at Agency for Defense Development

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Education

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

Research Experiences

Agency for Defense Development (ADD) — Daejeon, South Korea
Researcher (PIs: Dr. Sin Hyuk Yim, Dr. Sangkyung Lee) — Jun. 2024 – Present
Research on quantum sensing based on atomic systems

- Designed and implemented an automated absorption spectroscopy system for rubidium vapor cells based on atom–light interaction modeling
- Built and optimized a zero-field (SERF) optically pumped atomic magnetometer

Novel Applied Nano Optics Lab — Daegu, South Korea
Research Intern (Advisor: Prof. Junyeob Yeo) — Jun. 2021 – Jun. 2022
Project: Fabrication of a flexible photo-electrochemical cell using laser

High Energy Physics Lab (Moon Lab) — Daegu, South Korea
Research Intern (Advisor: Prof. Chang-Sung Moon) — Jun. 2020 – Feb. 2021
Developed momentum reconstruction algorithms for electrons and muons in silicon detector simulations using C++ with ROOT and GEANT4

Publications

Aging test of an atomic vapor cell with Al_2O_3 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

Conference Presentations

Towards the development of a SERF magnetometer
Korean Physical Society (KPS) Fall Meeting (2025)
H. Kim, Y. Lim, S. Lee, S. H. Hong, S. H. Yim, T. Jeong, and J. B. Nam

Lifetime extension of rubidium vapor cells by Al_2O_3 coating
APS Division of Atomic, Molecular, and Optical Physics (DAMOP) Meeting (2025)
H. Kim, 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
Department of Physics Alumni Association, Kyungpook National University

2nd Prize, 2023 MiliTECH Challenge Dec. 2023
Hosted by KAIST; Awarded by the Agency for Defense Development

2nd Prize, 2022 MiliTECH Challenge Dec. 2022
Hosted by KAIST; Awarded by the Korea Military Academy (KMA)

3rd Prize of Academic Conference Dec. 2021
College of Natural Sciences, Kyungpook National University

Dean's List: 3 semesters (2021-1, 2021-2, 2022-2) Nov. 2021, Apr. 2022, Apr. 2023
College of Natural Sciences, Kyungpook National University

Grants and Scholarships

National Science and Technology Scholarship Mar. 2022 – Feb. 2024
Korea Student Aid Foundation (KOSAF)

Academic Merit Scholarship (Hyoseok Scholarship) Apr. 2022
Kyungpook National University Alumni Association

Academic Excellence Scholarship Aug. 2020, Feb. 2021, Aug. 2021
Kyungpook National University

Other Research Outputs

Buffer Gas Pressure Estimation for OPAMs Dec. 2024
Registered software (Korea Copyright Commission, C-2024-047156)

Rubidium Vapor Cell Lifetime Monitoring and Analysis Tool Dec. 2024
Registered software (Korea Copyright Commission, C-2024-054414)

Additional Experiences

Research Officer for National Defense (ROND) Jun. 2024 – May. 2027
First Lieutenant in the Republic of Korea Air Force
Selected as one of 20 research officers nationwide for STEM-based national defense research

Teaching Assistant, Classical Mechanics II (PHYS212) Sep. 2023 – Dec. 2023

Teaching Assistant, Electromagnetism II (PHYS312) Mar. 2023 – Jun. 2023

Skills

Programming: Python, Wolfram Language (Mathematica)

Software: LabVIEW, SolidWorks