Hyeonjae Kim

Agency for Defense Development
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Education

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

Publications

[4] **A zero-field optically pumped magnetometry platform for magnetic characterization of electronic components used in portable atomic sensors**
Manuscript in preparation
H. Kim, S. Lee, S. H. Yim, T. Jeong, and Y. Lim

[3] **Novel sealing of glass-blown atomic gas cells using resistive heating wires**
Manuscript under review
S. H. Hong, Y. Lim, S. H. Yim, J. B. Nam, S. Lee, T. Jeong, and **H. Kim**

[2] **Magnetic Anomaly Detection of an Undersea Tunnel Using a Drone-Mounted All-Optical Pulsed Atomic Magnetometer**
IEEE Sensors Journal, accepted for publication. DOI: 10.1109/JSEN.2026.3729190
H. Kim, S. H. Yim, S. Lee, E.-S. Bang, S. R. Yeo, Y. J. Kim, T. Jeong, and Y. Lim

[1] **Aging test of atomic vapor cell with Al_2O_3 wall coating on cubic glass**
Applied Optics **64**, 7932–7937 (2025). DOI: 10.1364/AO.572036
H. Kim, T. Jeong, S. H. Hong, J. B. Nam, S. Lee, Y. Lim, and S. H. Yim

Selected Presentations

[3] **Probing magnetic noise from portable sensor components using a zero-field optically pumped magnetometer**
Poster presentation; APS Division of Atomic, Molecular, and Optical Physics (DAMOP) Meeting (2026)

[2] **Experimental systems for spectroscopy and zero-field OPM with atomic vapor cells**
Invited oral presentation; KISTI-SNU Joint Workshop (2026)

[1] **Lifetime extension of rubidium vapor cells by Al_2O_3 coating**
Poster presentation; APS Division of Atomic, Molecular, and Optical Physics (DAMOP) Meeting (2025)

Research Experience

Agency for Defense Development (ADD) — Daejeon, Republic of Korea
Research Officer for National Defense (Military service) — Jun. 2024 – Present
Supervisors: Dr. Sin Hyuk Yim and Dr. Sangkyung Lee
Research in experimental atomic physics and quantum sensing

- Developed an automated absorption spectroscopy system with spectral modeling to characterize atomic vapor cells and contributed to their fabrication
- Built a zero-field optically pumped magnetometry platform to evaluate component-induced magnetic interference and provide design guidance for portable atomic sensors
- Deployed a drone-mounted atomic magnetometer for magnetic anomaly detection and established a quantitative framework for interpreting the acquired data

Kyungpook National University (KNU) Daegu, Republic of Korea
Undergraduate Researcher

- **Novel Applied Nano Optics Lab** (Advisor: Prof. Junyeob Yeo) Jun. 2021 – Jun. 2022
  Fabricated a flexible photoelectrochemical cell using laser processing
- **High Energy Physics Lab (Moon Lab)** (Advisor: Prof. Chang-Sung Moon) Jun. 2020 – Feb. 2021
  Developed momentum reconstruction algorithms for silicon detector simulations

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

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

Dean's List 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 OPMs 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 Experience

Selected Participant, KFAS Study Abroad Workshop Jul. 2026 – Jul. 2027
Natural Sciences; Korea Foundation for Advanced Studies (KFAS)

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

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

International Student Tutor, KNU Feb. 2022 – May 2022

Skills

Programming: Python, Wolfram Language | **Software:** LabVIEW, SolidWorks, COMSOL Multiphysics