Ahreum Lee

Department of Physics
University of Maryland College Park
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Research Interests

Quantum Information Processing; Atomic Physics; Quantum Optics; Collective Radiation; Superradiance; Quantum Many-Body Systems; Atom-Photon Interaction

Education

Ph.D. in Physics, University of Maryland College Park Present
Advisor: Prof. Steven L. Rolston

B.S. in Physics, Pohang University of Science and Technology 2018
Thesis: Anistropic Transport Properties in Black Phosphorus
Advisor: Prof. Seung-Hoon Jhi

Research & Work Experience

Rolston Ultracold Matter Group Sep. 2019 - Present
University of Maryland College Park, USA
Advisor: Prof. Steven L. Rolston

- Developed theory of collective vacuum-induced quantum beats
- Built a MOT(Magneto-Optical Trap) with two ONFs(Optical Nano Fiber) crossing across it
- Made customized experimental control (communicating with DDSs(Direct Digital Synthesizer) and PCI boards) and measurement (communicating with PicoHarp) programs

Quantum Optics & Quantum Information Sep. 2018 - Feb. 2019
Pohang University of Science and Technology, South Korea
Advisor: Prof. Yoon-Ho Kim

- Observed nonlocal two-photon interference of time-energy entangled photons generated in warm Rubidium vapor

Computational Nano Physics Laboratory Mar. 2017 - Jul. 2017
Pohang University of Science and Technology, South Korea
Advisor: Prof. Seung-Hoon Jhi

- Calculated electric properties of monolayer black phosphorus via density functional theory and Boltzmann tansport theory

Ultracold Quantum Matter & Light Jun. 2017 - Jul. 2017
Institute for Quantum Computing & University of Waterloo, Canada
Advisor: Prof. Kyung Soo Choi

- Built two ECDL(External-Cavity Diode Laser) controller boxes
- Built a direct digital synthesizer (DDS) circuit

Quantum Optics & Quantum Information Sep. 2016 - Feb. 2017
Pohang University of Science and Technology, South Korea
Advisor: Prof. Yoon-Ho Kim

- Built Michelson-Morley and Mach-Zehnder interferometers and measured laser coherence length
- Built a MOT of Rubidium atoms

Laboratory for Ultracold Quantum Gases Jun. 2016 - Aug. 2017
Hong Kong University of Science and Technology, Hong Kong
Advisor: Prof. Gyu-Boong Jo

- Designed a SHG(Second Harmonic Generation) cavity
- Calculated single pass efficiency of the SHG cavity

OSSLab - Software Engineer Jan. 2015 - Jul. 2015
Seoul, South Korea
Advisor: Byung-Hyun Ahn

- Developed *Webcess*, an APM(Application Performance Management) service
- Developed back-end module: extended the module for Windows users; extended the type of collected data; implemented connection between the user and the server
- Developed front-end service: visualized data using d3.js; renewed the service page

Publications

See also my google scholar page.

2. H. S. Han*, **A. Lee***, K. Sinha, F. K. Fatemi, and S. L. Rolston, "Observation of Vacuum-Induced Collective Quantum Beats" *Phys. Rev. Lett.* **127**, 073604 (2021). (*coauthors)
1. G. Lee, Y. S. Ihn, **A. Lee**, U. Kim, and Y. Kim, "Nonlocal two-photon interference of energy-time entangled photon pairs generated in Doppler-broadened ladder-type ^{87}Rb atoms" *Phys. Rev. A* **100**, 053817 (2019).

Awards

Dean's Fellowhip	2019, 2020
Excellence Award for Bachelor's Thesis	2017
National Excellence Scholarship	2016-2017
Semester High Grade Honors	2013, 2016, 2017
Summer Session Scholarship	2016

Posters

APS DAMOP 2021
"Vacuum-induced collective dynamics in three-level V-type atomic systems"

KSEA Virginia Washington Metro Regional Conference 2020
"Collective modes of 1d atomic clouds"

Teaching Experience

Intermediate Electricity and Magnetism (PHYS411) 2019
Teaching assistant of Prof. Victor M. Yakovenko

Community Activities

US Korea Conference 2022
Student/Social Chair