Jaemyoung (Jason) Lee

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Research Interests

SN Ia Cosmology: Wavelength-dependent atmospheric effects, astrometric/photometric redshifts
- Part of the Dark Energy Survey Supernova Working Group (DES-SNWG)
- Part of the Vera C. Rubin Observatory Legacy Survey of Space and Time - Dark Energy Science Collaboration Time Domain Working Group (LSST-DESC-TDWG)

Large Scale Structure: Baryon Acoustic Oscillations (BAO), Modified Gravity, Cosmic Infrared Background (CIB), weak gravitational lensing, higher-order statistics

Education and Employment

Ph.D. Candidate in Physics and Astronomy — *University of Pennsylvania*
Advisor: Masao Sako, M.S. in August 2022 — *Aug. 2020 - May 2025 (expected)*

B.S. in Physics and B.A. in English Language and Literature — *Korea University*
Dual major — *Mar. 2013 - Feb. 2020*

Study Abroad — *University of Toronto*
Engaged in undergraduate research with J. Richard Bond's group — *Sept. 2018 - Apr. 2019*

Military Service as an English Interpreter — *Army Signal School, South Korea*
Discharged as a sergeant on March 1st, 2016 — *June 2014 - Mar. 2016*

Awards and Honors

Dissertation Completion Fellowship — *July 2024 - Apr. 2025*
Department of Physics and Astronomy (University of Pennsylvania) — *Philadelphia, Pennsylvania*

Mitacs Globalink Research Award — *May 2019 - Aug. 2019*
Canadian Institute for Theoretical Astrophysics — *Toronto, Ontario, Canada*

- Funding for summer research

National Excellence Scholarship for Science and Technology Majors *Mar. 2017 - Feb. 2019*
Department of Physics (Korea University) — *Seoul, South Korea*

- Full funding for university tuition (4 semesters) by the Korea Student Aid Foundation

Publications

Lead author publications

[1] **Lee J.**, Bernardinelli, P., Sako, M., and the DES Collaboration (2024)
Astrometric Redshifts of Supernovae: Validation on Real Data from the Dark Energy Survey
in preparation

[2] **Lee J.**, Nikakhtar, F., Paranjape A., and Sheth, R.K. (2024)
Eigen-decomposition of Covariance matrices: An application to the BAO Linear Point
arXiv: 2407.04692, submitted to Physical Review D

[3] **Lee J.**, Fiorini, B., Nikakhtar, F., and Sheth, R.K. (2024)
The Stability of the BAO Linear Point under Modified Gravity
arXiv: 2406.09379, submitted to Physical Review D

[4] **Lee J.**, Sako, M., Kessler, R., Malz, A.I., and the LSST DESC Collaboration (2024)
Astrometric Redshifts of Supernovae
arXiv: 2405.04522, submitted to The Astrophysical Journal

[5] **Lee J.**, Bond J.R., Motloch P., van Engelen A. and Stein G. (2024)
Exploring the Non-Gaussianity of the Cosmic Infrared Background and Its Weak Gravitational Lensing
Monthly Notices of the Royal Astronomical Society, 529, 2543

[6] **Lee J.** and Acevedo M., Sako M., Vincenzi M., Brout D., Sanchez B., et al. (2023)
The Dark Energy Survey Supernova Program: Corrections on photometry due to wavelength-dependent atmospheric effects
The Astronomical Journal, 165, 222

Publications with major contributions

[1] Doux C., Jain B., Zeurcher D., **Lee J.**, Fang, X., Rosenfeld, R., et al. (2022)
Dark energy survey year 3 results: cosmological constraints from the analysis of cosmic shear in harmonic space
Monthly Notices of the Royal Astronomical Society, 515, 1942

Publications as part of the DES-SNWG (major contributions)

[1] Sánchez B.O., Brout D., Vincenzi M., et al. (2024)
The Dark Energy Survey Supernova Program: Light curves and 5-Year data release
arXiv: 2406.05046, submitted to The Astronomical Journal

[2] DES Collaboration: Abbott T.M.C., Acevedo, M., et al. (2024)
The Dark Energy Survey: Cosmology Results With 1500 New High-redshift Type Ia Supernovae Using The Full 5-year Dataset
arXiv: 2401.02929, accepted by The Astrophysical Journal

[3] Vincenzi M., Brout D., et al. (2024)
The Dark Energy Survey Supernova Program: Cosmological Analysis and Systematic Uncertainties
arXiv: 2401.02945, accepted by The Astrophysical Journal Letters

Publications as part of the DES-SNWG (minor contributions)

[1] Toy M., Wiseman P., Sullivan M., et al. (2024)
Suppression of the type Ia supernova host galaxy step in the outer regions of galaxies
arXiv: 2408.03749, submitted to MNRAS

[2] Dixon M., Mould J., Lidman C., et al. (2024)
Calibrating the Absolute Magnitude of Type Ia Supernovae in Nearby Galaxies using [OII] and Implications for H_0
arXiv: 2408.01001, submitted to MNRAS

[3] Chen R., Scolnic D., Vincenzi M., et al. (2024)
Evaluating Cosmological Biases using Photometric Redshifts for Type Ia Supernova Cosmology

with the Dark Energy Survey Supernova Program
arXiv: 2407.16744, submitted to MNRAS

[4] Popovic B., Wiseman P., Sullivan M., et al. (2024)
Modelling the impact of host galaxy dust on type Ia supernova distance measurements
arXiv: 2406.05051, submitted to MNRAS

[5] White R.M.T., Davis T.M., Lewis G.F., et al. (2024)
The Dark Energy Survey Supernova Program: Slow supernovae show cosmological time dilation out to $z \sim 1$
arXiv: 2406.05050, submitted to MNRAS

[6] Camilleri R., Davis T.M, et al. (2024)
The Dark Energy Survey Supernova Program: An updated measurement of the Hubble constant using the Inverse Distance Ladder
arXiv: 2406.05049, submitted to MNRAS

[7] Camilleri R., Davis T.M, et al. (2024)
The Dark Energy Survey Supernova Program: Investigating Beyond-ΛCDM
Monthly Notices of the Royal Astronomical Society, 533, 2615

[8] Möller A., Wiseman P., et al. (2024)
The Dark Energy Survey 5-year photometrically classified type Ia supernovae without host-galaxy redshifts
Monthly Notices of the Royal Astronomical Society, 533, 2073

[9] Shah P., Davis T.M., et al. (2024)
The Dark Energy Survey : Detection of weak lensing magnification of supernovae and constraints on dark matter haloes
Monthly Notices of the Royal Astronomical Society, 532, 932

[10] Qu H., Sako M., Vincenzi M., et al. (2024)
The Dark Energy Survey Supernova Program: Cosmological Biases from Host Galaxy Mismatch of Type Ia Supernovae
The Astrophysical Journal, 964, 134

Talks

Cosmology from Home 2024 — *June 2024*
"Astrometric Redshifts of Supernovae" — *virtual*

- https://www.youtube.com/watch?v=_hF7QZ_gbSE

Dark Energy Survey Collaboration Meeting — *May 2024*
"DES-LSST Synergies: Wavelength-dependent Atmospheric Effects" — *S'Agaró, Spain*

Fink-Brazil Workshop — *May 2024*
"Astrometric Redshifts of Supernovae in the Rubin LSST era" — *Rio de Janeiro, Brazil*

LSST-DESC JuDO (Junior Members) short colloquia — *March 2024*
"The Stability of the BAO Linear Point under Modified Gravity" — *virtual*

Invited Talk at Yonsei University — *Dec. 2023*
"Exploring the non-Gaussianity of the CIB and Its Gravitational Lensing" — *Seoul, South Korea*

IPMU Time Domain Workshop — *Dec. 2023*
"Astrometric Redshifts of Supernovae" — *Kashiwa, Japan*

Cosmology from Home 2023 *July 2023*
"Exploring the non-Gaussianity of the CIB and Its Gravitational Lensing" *virtual*

- https://www.youtube.com/watch?v=CEkQ_mHEBO0

Particle Physics and Cosmology 2023 *June 2023*
"Exploring the non-Gaussianity of the CIB and Its Gravitational Lensing" *Daejeon, South Korea*

Dark Energy Survey Collaboration Meeting *Jan. 2023*
"The Dark Energy Survey Supernova Program: Corrections on photometry due to wavelength-dependent atmospheric effects" *Portsmouth, UK*

ZTF-DES Supernova Cosmology Workshop *July 2022*
"The Dark Energy Survey Supernova Program: Corrections on photometry due to wavelength-dependent atmospheric effects" *Stockholm, Sweden*

Dark Energy Survey Collaboration Meeting *May 2022*
"The Dark Energy Survey Supernova Program: Corrections on photometry due to wavelength-dependent atmospheric effects" *Durham, North Carolina*

Posters

LSST Dark Energy Science Collaboration Meeting *July 2024*
"Astrometric Redshifts of Supernovae" *Zürich, Switzerland*

Dark Energy Survey Collaboration Meeting *May 2024*
"Astrometric Redshifts of Supernovae" *S'Agaró, Spain*

Cosmology in Miramare *Sept. 2023*
"Astrometric Redshifts of Supernovae", "Exploring the non-Gaussianity of the CIB and Its Gravitational Lensing" *Trieste, Italy*

CMB-S4 Collaboration Meeting *Aug. 2023*
"Exploring the non-Gaussianity of the CIB and Its Gravitational Lensing" *Stanford, CA*

LSST Dark Energy Science Collaboration Meeting *July 2023*
"Astrometric Redshifts of Supernovae" *Stanford, CA*

American Astronomical Society Winter Meeting *Januaray 2023*
"The Dark Energy Survey Supernova Program: Corrections on photometry due to wavelength-dependent atmospheric effects" *Seattle, Washington*

https://aas241-aas.ipostersessions.com/?s=FB-2D-A1-75-B1-60-73-5B-AC-1F-39-E7-A1-A2-78-9B

Teaching Experience - at the University of Pennsylvania

ASTR001 Survery of the Universe	Teaching Assistant	*Fall 2020*
ASTR006 Solar System and Exoplanets		
PHYS151 Principles of Physics II:		
Electromagnetism and Radiation	Teaching Assistant	*Spring 2021*
PHYS358 Data Analysis for the Natural Sciences I	Teaching Assistant	*Fall 2022*
PHYS351 Analytical Mechanics	Teaching Assistant	*Spring 2023*
PHYS531 Quantum Mechanics (graduate course)	Teaching Assistant	*Fall 2023*
PHYS100 Foundations of Data Science	Teaching Assistant	*Spring 2024*
PHYS531 Quantum Mechanics (graduate course)	Teaching Assistant	*Fall 2024*

Mentorship Experience - at the University of Pennsylvania

Pathways to Ph.D. Mentor *Fall 2023 - Spring 2024*

Full-day workshop and follow-up mentorship on applying to graduate schools and fellowships in the U.S.

Mentored 3 students, including 2 from historically underrepresented backgrounds.

Penn Physics and Astronomy Peer Mentorship Program *Fall 2022 - present*

Monthly meetings with 1st year PhD students to provide guidance in research and professional development.

Mentored 4 students so far.

Penn Undergrad Emma Yao (with Professor Madhavacheril) *June 2024 - present*

Co-supervision on "Prior volume/projection effects on w_0w_aCDM using Pantheon+ data"

Penn Physics and Astronomy GRAD Mentor *Fall 2021 - Spring 2022*

Mentorship program on applying to graduate school organized by Penn Physics and Astronomy students

Mentored 2 students, including 1 from a historically underrepresented background.

Skills

Programming Languages/Tools	Python, C++, LaTeX
Languages	Fully bilingual in Korean and English

Outreach

Speaker *June 2022*
Astronomy on Tap *Philadephia, Pennsylvania*

- Pub talk on "Where We Might Find Aliens, Under the Ice"

Volunteer *February 2019 - August 2019*
AstroTours at the University of Toronto *Toronto, Ontario, Canada*

- A once-a-month public event; demonstrated the WWT (World Wide Telescope) and Oculus Rift (Virtual Reality)

Volunteer *May 2019*
Science Rendezvous at the University of Toronto *Toronto, Ontario, Canada*

- A public event with the Department of Astronomy and Astrophysics; explained 3D printed models of several asteroid missions as well as planetary features

Other Interests

- Violin/Piano (Currently a violinist at the Penn Symphony Orchestra, performed in 10+ concerts)
- Traveling (been to 30+ countries)