

# YOO JUNG KIM

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## Graduate student

Division of Astronomy & Astrophysics, Department of Physics and Astronomy, University of California Los Angeles, USA

E-mail: yjkim134340@gmail.com, yjkim@astro.ucla.edu

orcid.org/0000-0003-1392-0845

## EDUCATION

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### PhD Program in Astronomy

University of California, Los Angeles

September 2021 - present

### Master of Science in Astronomy

Seoul National University

September 2018 - August 2021

### Bachelor of Science in Astronomy

Seoul National University (*summa cum laude*)

March 2014 - August 2018

Major: Astronomy Program / Minor: Physics Program / Combined Minor: Science and Technology Studies (STS)

## RESEARCH INTERESTS

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I have a broad range of interests including:

- Potential science with photonic lanterns, astrophotonics
- Novel techniques for detecting and characterizing exoplanets
- Dwarf galaxies and low surface brightness galaxies, near field cosmology

## RESEARCH EXPERIENCES

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- **Graduate Research Student** (University of California, Los Angeles, *Supervisor: Prof. Michael Fitzgerald*) 2021 - present
  - Imaging and Spectroastrometry with Photonic Lanterns
  - KTL layer development for the Near-IR Laser Frequency Comb for the Keck Observatory
- **Graduate Research Student** (Seoul National University, *Supervisor: Prof. Myung Gyoon Lee*) 2019 - 2021
  - Applied the Surface Brightness Fluctuation (SBF) distance method to nearby dwarf galaxies using *HSC* data and derived the color-fluctuation relations in a blue color regime ( $0.2 < g - i < 0.8$ ).
  - Surveyed a wide field ( $5 \text{ deg} \times 4 \text{ deg}$ ) around NGC 4437 and newly confirmed five dwarf galaxies to be members of the NGC 4437 group.
  - Obtained an independent value of  $H_0$  using the Bayesian approach and models of the Virgo infall. Studied and compared recent methods of the Tip of the Red Giant Branch (TRGB) edge detection.
  - Studied spatial distributions, color distributions, and luminosity functions of globular clusters in several galaxies (M64, NGC 474, etc.) using *HST*, *HSC*, and *CFHT* images.
- **Undergraduate Research Intern** (Seoul National University, *Supervisor: Prof. Jongchul Chae*) 2017 - 2018
  - Analyzed EUV images and magnetograms taken by the Solar Dynamics Observatory (SDO) to examine the spatial configuration and the eruption processes of the recurrent flares, which were associated with plasma blobs that outflow along post-CME rays. Found a quadrupolar magnetic configuration related to the main CME and flares, implying that the blobs are magnetically detached systems similar to the CME.
- **Undergraduate Research Intern** (Seoul National University, *Supervisor: Prof. Jong-hak Woo*) 2016
  - Performed multi-component AGN emission line spectra fitting on SuperNova Integral Field Spectrograph (SNIFS) data and obtained BPT diagrams.

## PUBLICATIONS (8 TOTAL; 5 FIRST-AUTHOR, 1 SECOND AUTHOR)

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[1] *Coherent Imaging with Photonic Lanterns*

Yoo Jung Kim, Michael P. Fitzgerald, Jonathan Lin, Steph Sallum, Yinzi Xin, Nemanja Jovanovic, Sergio Leon-Saval, 2023, submitted

- [2] *Efficient Detection and Characterization of Exoplanets within the Diffraction Limit: Nulling with a Mode-selective Photonic Lantern*  
Yinzi Xin, Nemanja Jovanovic, Garreth Ruane, Dimitri Mawet, Michael P. Fitzgerald, Daniel Echeverri, Jonathan Lin, Sergio Leon-Saval, Pradip Gatkine, **Yoo Jung Kim**, Barnaby Norris, Steph Sallum, 2022, ApJ, 938, 140
- [3] *A Rich Satellite Population of the NGC 4437 Group and Implications of a Magnitude Gap for Galaxy Group Assembly History*  
**Yoo Jung Kim**, Jisu Kang, Myung Gyoon Lee, and In Sung Jang, 2022, ApJ, 929, 36
- [4] *Calibration of Surface Brightness Fluctuations for Dwarf Galaxies in the Hyper Suprime-Cam *gi* Filter System*  
**Yoo Jung Kim**, Myung Gyoon Lee, 2021, ApJ, 923, 152
- [5] *Unraveling the Complex Structure of AGN-driven Outflows: V. Integral-field Spectroscopy of 40 Local Type-2 AGNs*  
Rongxin Luo, Jong-Hak Woo, Hyun-Jin Bae, Marios Karouzos, Jaejin Shin, Songyoun Park, Hsin-Yi Shih, Nicholas McConnell, and **Yoo Jung Kim**, 2021, ApJ, 908, 221
- [6] *Determination of the Local Hubble Constant from Virgo Infall Using TRGB Distances*  
**Yoo Jung Kim**, Jisu Kang, Myung Gyoon Lee, and In Sung Jang, 2020, ApJ, 905, 104
- [7] *A New Metal-poor Globular Cluster and Resolved Stars in the Outer Disk of the Black Eye Galaxy M64: Implication for the Origin of the Type III Disk Break*  
Jisu Kang, **Yoo Jung Kim**, Myung Gyoon Lee, and In Sung Jang, 2020, ApJ, 897, 106
- [8] *A Study of Small Flares Associated with Plasma Blobs Outflowing along Post-CME Rays*  
**Yoo Jung Kim**, Ryun-Young Kwon, and Jongchul Chae, 2020, Journal of Korean Astronomical Society, 53, 1

## SELECTED PRESENTATIONS

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- "Coherent Imaging with Photonic Lanterns" June 2023  
Coherent Differential Imaging Workshop @ Meudon, France, Oral Presentation
- "Spectroastrometry and Imaging Science with Photonic Lanterns on Extremely Large Telescopes" June 2023  
AO4ELT, Poster Session
- "Spectroastrometry with Photonic Lanterns" July 2022  
SPIE, Poster Session
- "A Complete Survey of the Satellites in the NGC 4437 Group and Implications of a Magnitude Gap for Galaxy Group Assembly History" June 2022  
AAS 240th Meeting, Poster Session
- " $H_0$  Determination Using TRGB Distances to the Virgo Infalling Galaxies" October 2020  
Korean Astronomical Society Fall Meeting, Oral Presentation
- "The NGC 4437 Group: A Galaxy Group Infalling Toward the Virgo Cluster" October 2019  
Korean Astronomical Society Fall Meeting, Poster Session
- "Intermediate-color and Blue Globular Clusters in the center of the Shell Galaxy NGC 474" February 2019  
2019 Korea Young Astronomers Meeting Workshop, Poster Session
- "Connection of Blobs along Post-CME Ray and EUV Flares" October 2017  
2017 Korean Astronomical Society Fall Meeting, Poster Session

## HONORS AND SCHOLARSHIPS

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- Brain Korea 21 Plus Scholarship (as a research and teaching assistant) 2018 - present
- College of Natural Science's Dean's List 2014-Fall, 2015-Spring, 2018-Spring
- Kwanjeong Educational Foundation Scholarship 2016 - 2017
- Eminence Scholarship 2014 - 2015

## TEACHING EXPERIENCES

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*Teaching Assistant @ University of California, Los Angeles*

- Astro 180 - Astrophysics Lab 2022-Fall
- Astro 127 - Stellar Atmospheres, Interiors, and Evolution 2022-Winter

*Teaching Assistant @ Seoul National University*

- Extragalactic Astronomy and Cosmology (Graduate course) 2019-Fall, 2020-Fall
- Astronomy (Undergraduate elective course for science majors) 2019-Spring
- Extraterrestrial Planets and Life (Undergraduate general elective course) 2018-Fall

## PUBLIC OUTREACH

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- Member of Graduate Students' Public Outreach Committee in Astronomy program, April 2019 - present  
Seoul National University
  - Participated in planning regular public outreach events
  - Delivered a special lecture on July 2019, "Milky Way Zoom-in"
- Delivered lectures in Korea Astronomy Olympiad Online Course September 2020