Bo-Eun Choi

she/her

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Department of Astronomy, University of Washington Box 351580 Seattle, WA 98195-1580

Education

PhD Candidate, Astronomy — expected in 2026
University of Washington, Seattle, USA

MSc, Astronomy and Space Science — Feb 2021
Sejong University, Seoul, Korea

BSc, Astronomy and Space Science | Physics, *Cum Laude* — Feb 2019
Sejong University, Seoul, Korea

Research Interest

Cosmic Baryon Cycle & Chemical Evolution
I am interested in detailed physical processes within the cosmic baryon cycle, how pristine gas is accreted into galaxies and fuel star formation, and how feedback processes efficiently redistribute baryons and enrich metals in gas. I use spectroscopy to trace metals and gas flows along the cycle.

Massive Stars: Powerful Feedback Drivers
Massive stars drive strong radiative, kinematic, and chemical feedback, having a huge impact on the host galaxy, but our understanding of their evolution is limited. I am interested in deciphering their evolutionary history from their observable properties.

Keywords: **CGM, Stellar Feedback, Stellar Evolution, Spectroscopy, Radiative Transfer**

Publications

ADS/ **arXiv**

- Lim, J., Chang, S.-J., ..., **Choi, B.-E.**, et al. 2025, ApJ, 979, 124
  High-resolution BOES Spectroscopy of Raman-scattered He IIλ6545 in Young Planetary Nebulae
- **Choi, B.-E.**, Werk, J. K., Tchernyshyov, K., et al. 2024, ApJ, 976, 222
  Metallicity Mapping of the Ionized Diffuse Gas at the Milky Way Disk–Halo Interface
- **Choi, B.-E.** & Lee, H.-W. 2020, ApJL, 903, L39
  Discovery of Raman-scattered He II λ6545 in the Planetary Nebulae NGC 6886 and NGC 6881
- **Choi, B.-E.**, Chang, S.-J., Lee, H.-G. & Lee, H.-W. 2020, ApJ, 889, 2
  Line Formation of Raman-scattered He II λ4851 in an Expanding Spherical H I Shell in Young Planetary Nebulae
- Angeloni, R., Gonçalves, D. R., ..., **Choi, B.-E.**, et al. 2019, AJ, 157, 156
  RAMSES II - RAMan Search for Extragalactic Symbiotic Stars: Project Concept, Commissioning, and Early Results from the Science Verification Phase

Research Experience

Graduate Research Assistant, University of Washington, USA Sep 2021 - present

- **Probing the Milky Way's Gaseous Halo** (Advisor: Prof. Jessica K. Werk)
  Metallicity study of the ionized diffuse gas at the Milky Way disk-halo interface using HST UV archival data with a precise ionization correction using CLOUDY.
- **Red and Luminous Massive Stars** (Advisor: Emily M. Levesque)
  Using high-resolution spectral data, chemical abundance, variability, and stellar atmosphere modeling study of evolved massive stars to search for Thorne-Żytkow object candidates.

Post-master Researcher, UNIST, South Korea Mar - Jul 2021
(Advisor: Prof. Maurice van Putten)

- **Orbital Stability of Circumbinary Planets**
  Developing a 3-body simulation code for testing orbital stability of prograding and retrograding circumbinary planets.

Graduate Research Assistant, Sejong University, South Korea Mar 2019 - Feb 2021
(Advisor: Prof. Hee-Won Lee)

- **Decoding Mass-loss in Evolved Stars using Raman He II**
  - Line formation study of Raman-scattered He II, applying radiative transfer simulation for Rayleigh and Raman scattering in neutral hydrogen region.
  - Spectroscopic survey of Raman He II features in young planetary nebulae.

Undergraduate Research Assistant, Sejong University, South Korea Sep 2018 - Feb 2019
(Advisor: Prof. Hee-Won Lee)

- Evaluating quantum mechanical effect on the line profile of DLAs.
- Monte Carlo simulation of the emission line formation in an accretion disk around Schwarzschild black hole

Successful Observing Proposals

- **Building a Spectroscopic Tool for TŻO Search (P.I.)**
  - 3.75 hours with **GHOST - 8.1 m Gemini-South** Telescope (2023B FT)
  - 8 half-nights with **ARCES - 3.5 m ARC** Telescope (2022Q3, 2023Q2)
- *__Spectroscopic Survey for Raman He II Features in Young Planetary Nebulae__
  - 4.8 hours with **GRACES - 8.1 m Gemini-North** Telescope (2019A, 2020B)
  - 19 nights with **BOES - 1.8 m BOAO** Telescope (2019A, 2020A&B)
  - 8.5 nights with **MRES - 2.4 m Thai National Telescope** (Cycle7, 8)
- *__Spectropolarimetry Monitoring of Raman-Scattered O VI Features in S-type Symbiotic Stars__
  - 3 nights with **BOES - 1.8 m BOAO** Telescope (2019B)

* *Co-I of the proposals, but the primary observer*

Awards & Grants

Jacobsen Fund ($350), Astronomy Department, UW — Jul 2023
Outstanding TA Award, Astronomy Department, UW — Sep 2022
Jacobsen Fund ($1,700), Astronomy Department, UW — Apr 2022
Outstanding Research Award, Graduate School, Sejong University — Feb 2021
Outstanding Presentation Award, Korean Physical Society — Oct 2019

Conferences & Talks

XXXV Canary Islands Winter School of Astrophysics — Oct 2024
— Baryonic Cycle Across Space and Time

MIAPbP - "Some Like It Hot": A Journey from the Hot IGrM to the Multiphase CGM — Apr 2024

ESO CGM Group Seminar Talk — Apr 2024

New Views on Feedback & the Baryon Cycle in Galaxies — Jul 2023
Talk: The Metallicity Mapping of the Ionized Diffuse Gas at the Milky Way Disk-halo Interface

Seminar Talk at the RSAA of Australian National University — Jul 2023

241st AAS meeting — Jan 2023
Talk: The Metallicity Mapping of the Ionized Diffuse Gas at the Milky Way Disk-halo Interface

2022 XXXI IAUGA — Aug 2022
Poster: Spectral Features and Variability of the Thorne-Zytkow Object Candidates in the SMC

102nd Korean Astronomical Society Meeting — Oct 2020
Talk: Discovery of Raman-scattered He II λ6545 in Planetary Nebulae NGC 6886 and NGC 6881 from BOES Spectroscopy
Poster: Activity of Korean Young Astronomers' Meeting in 2019-2020 Season (co-author)

2019 XVI Latin American Regional IAU Meeting — Nov 2019
Poster: A Study of Line Formation of Raman-Scattered He II λ4851 in Young Planetary Nebulae

96th Korean Physical Society Meeting — Oct 2019
A New Grid-Based Radiative Transfer Simulation for Raman Scattering of He II with Atomic Hydrogen

8th KGMT Summer School: Exoplanet — Jul 2019

2019 APCTP-NIMS-KISTI-UNIST-KASI Summer School — Jul 2019
— Numerical Relativity and Gravitational Waves

100th Korean Astronomical Society Meeting — Apr 2019
Poster: A New Grid-based Monte Carlo Code for Raman Scattered He II : Preliminary Results

2019 Korea Young Astronomers' Meeting Workshop — Feb 2019
Poster: The Emission Line Formation in an Accretion Disk of Schwarzschild Black Hole

7th KGMT Summer School — Jul 2017
SOAO Winter School: Long-slit Spectroscopy — Feb 2017

Teaching Experience

UW Astronomy Pre-MAP Mentor — Fall 2022 & 2024
Jimmy Fowler (2022), Annabelle Lin (2024), Anaïs Martin (2022), Pranathi Ramesh (2022)

UW Graduate Mentor Sep 2022 - Jun 2023
Abbas Jaffery

Teaching Assistant, University of Washington, USA
- Introduction to Astronomical Data Analysis (ASTR 480) Spring 2022
- ASTR 101 Fall 2021, Winter 2022

Teaching Assistant, Sejong University, South Korea
- Introduction to Astronomical Spectroscopy (300 level) Fall 2018 & 2020
- Astrophysics (300 level) Spring 2019 & 2020
- General Physics 2 (100 level) Fall 2019

Outreach

Astronomy on Tap - Seattle, Flyer Designer 2023 - present
2021 Staff IAUGA Session of Busan Science Festival Apr 2019
Volunteer Instructor at the Observatory of Seoul 2014-2016
Sejong University Starry Night Festival Staff 2014-2016

Professional Services

UW TAC of Apache Point Observatory ARC 3.5 m 2023 - present
Organizing committee, Korean Young Astronomers' Meeting 2020
LOC member, the 1st Korean Lyman Alpha Workshop Jan 2019
Student staff, Korean Astronomical Society Meeting Apr 2017

Technical Skills

Programming languages: Python, Fortran, MATLAB
Softwares & codes: IRAF, Cloudy, CASA (Common Astronomy Software Applications)
Operating Systems : Linux, Mac