Joohyun Lee

The University of Texas at Austin,   https://joohyun-lee.github.io/

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RESEARCH INTEREST

Theoritical & Computational Astrophysics

numerical cosmological simulation of epoch of reionization;

role of dark matter models in the growth of structures;

general galaxy formation & evolution; usage of machine learning in simulation analysis

EDUCATION

Ph.D. in Astronomy, University of Texas at Austin   09/2021 - present

   Supervisor: Paul Shapiro

B.Sc. in Physics & B.Eng. in Electrical and Computer, Seoul National University   03/2014 - 08/2021

RESEARCH EXPERIENCE

Research Associate, Computational Cosmology Group, Seoul National University   09/2019 - 08/2021

(Supervisor: Prof. Ji-hoon Kim)

- Estimating Galactic Baryonic Properties from Their Dark Matter Using Machine Learning
  - Applied trained machine to the cosmological simulation halo catalog (IllustrisTNG simulation)
  - Computed and compared two-point correlation function in IllustrisTNG halo catalog and machine-predicted halo catalog
- Dark Matter Deficient Galaxies Produced Via High-velocity Galaxy Collision in Cosmological Simulation
  - Studied IllustrisTNG catalog to find high-speed collision event of dwarf galaxies to compare with idealized simulation
- pc-scale Simulation of Simultaneous Formation of Dark Matter Deficient Galaxies and Star Clusters
  - Runned a suite of 1.25 pc-resolution galaxy collision simulations with different merger configuration and feedback schemes
  - Resolved and tracked the formation process of dark matter deficient galaxies and massive star clusters

Research Associate, AGN Research Group, Seoul National University   09/2020 - 02/2021

(Supervisor: Prof. Jong-Hak Woo)

- Calibrated and Applied Novel Method of Measuring SFR in AGNs
  - Tested Oxygen emission line flux as SFR indicator by statistically analyzing SDSS spectroscopty data and IR surveys
  - Investigated correlation between gas outflow strength from AGNs and star formation of host galaxies

AWARDED FELLOWSHIPS & SCHOLARSHIPS

Dean's Excellence Fellowship, University of Texas at Austin   09/2021 - 08/2022

Presidential Science Scholarship, Korea Student Aid Foundation   03/2014 - 08/2020

PUBLICATIONS

- Shin, E. -j., Jung, M., Kwon, G., Kim, J. -h, **Lee, J.**, Jo, Y., & Oh, B. K., "Dark Matter Deficient Galaxies Produced Via High-velocity Galaxy Collisions In High-resolution Numerical Simulations", *ApJ 899 (2020) 25*, *astro-ph:2007.09889*
- **Lee, J.**, Shin, E. -j., & Kim, J. -h., "Dark Matter Deficient Galaxies And Their Member Star Clusters Form Simultaneously During High-velocity Galaxy Collisions In 1.25 pc Resolution Simulations", *ApJL 917 (2021) L15*, *astro-ph:2108.01102*

TALKS & PRESENTATIONS

- Galaxy Evolution Workshop 2021, ASIAA   02/2022
- Numerical Galaxy Formation Mini-Workshop, SNU   01/2022
- SAZERAC-SIPS Early Galaxy Formation Near and Far — Preparing for a Long Journey with JWST   12/2021
- The 1st KIAA Forum on Gas in Galaxies for Early Career Scientists (KooGiG-Junior workshop)   10/2021
- UT Austin Extragalactic/Cosmology Seminar   09/2021
- AGORA WORKSHOP 2021   08/2021

COMPUTING SKILLS & EXPERIENCES

Languages: Python, LaTex, C, C++ (skilled); Fortran, MATLAB, Mathematica, html, Markdown (familiar); IDL, RISC-V assembly language (basic)

Astrophysical Simulation Codes: Enzo, Gadget, DICE, yt

Machine Learning: PyTorch, TensorFlow (familiar)

High performance computing experience:
- Local cluster of Computational Cosmology Group, Seoul National University (CentOS)
- Nurion, Korea Institute of Science and Technology Information (CentOS)
- Frontera, Texas Advanced Computing Center (CentOS),
- Stampede2, Texas Advanced Computing Center (Red Hat)

OUTREACH & TEACHING EXPERIENCES

Korea Student Aid Foundation Science Teaching Service Organization	01/2015 - 02/2015
Habitat for Humanity in Cebu, Phillippines	02/2016
Military Service at Korean Air Force 5th Air Mobility Wing	05/2017 - 04/2019

OTHER SKILLS

Languages: Korean (native), English, Japanese (fluent)