Joohyun Lee

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RESEARCH INTEREST

Theoritical & Computational Astrophysics
galaxy formation & evolution; cosmological structure formation
interstellar medium; magnetic field; star formation
numerical simulation; large observational survey

EDUCATION

Ph.D. in Astronomy, University of Texas at Austin 09/2021 -
B.Sc. in Physics & B.Eng. in Electrical and Computer, Seoul National University 03/2014 - 08/2021

RESEARCH EXPERIENCE

Research Intern, Computational Cosmology Group, Seoul National University 2019 - 2020
(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 Intern, 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

- **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*

*N*TH-AUTHOR 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*

COMPUTING SKILLS & EXPERIENCES

Languages: Python, LaTex, C, C++ (skilled); MATLAB, Mathematica, html, Markdown (familiar);
Fortran, IDL, RISC-V assembly language (basic)
Astrophysical Simulation Codes: Enzo, Gadget, DICE, yt
Machine Learning: PyTorch, TensorFlow (familiar)
Computing experience:
• Local cluster of Computational Cosmology Group, Seoul National University (CentOS)
• Nurion, Korea Institute of Science and Technology Information (CentOS),

OUTREACH & TEACHING EXPERIENCES

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

OTHER SKILLS and INTERESTS

Languages: Korean (native), English, Japanese (fluent)
Sports: soccer (football), basketball, table tennis
Interests: photography