

# SAN HAN

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 <https://github.com/sanhancluster> ◊  <https://bitbucket.org/sanhancluster>

## EDUCATION

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Yonsei University

- Ph.D. (Joint Program), Astronomy
- B.S., Astronomy

**Mar 2017–Aug 2024**

**Mar 2013–Feb 2017**

Korea Science Academy (high school)

**Mar 2010–Feb 2013**

## RESEARCH EXPERIENCE

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**Implementation of Cosmic ray physics in Dyablo**

**2024–**

- Post-doctoral project in IAP. Implementing the cosmic ray physics in the new hydrodynamic simulation code Dyablo.

**Large Zoom-in Simulation of a Galaxy Cluster**

**2019–now**

- Supervised by Prof. Suhyoung K. Yi. Playing a primary role in the design and execution of the NewCluster project, a high-resolution cosmological zoom-in simulation of a galaxy cluster.

**Code Development for Simulations**

**2019–2024**

- Developed RAMSES-yOMP, a modified version of the hydrodynamic simulation code RAMSES that features performance enhancement and chemical/dust evolution.
- Developed an efficient reading and imaging package for RAMSES output based on NumPy.

**Velocity Dispersion Profiles of Galaxies**

**2021–2024**

- Supervised by Prof. Suhyoung K. Yi. Compared simulations and IFU observations to reconcile the origin of the various velocity dispersion profiles of galaxies.

**Preprocessing of dark halos in clusters**

**2017–2018**

- Supervised by Dr. Rory Smith and Prof. Suhyoung K. Yi. Used a cosmological simulation of galaxy clusters to quantify the impact of preprocessing on the population of dark halos in galaxy clusters.

## SKILLS

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**Languages**

Korean (Native), English

**Programming & Data analysis**

Python, Fortran, Java, Linux

**High Performance Computing**

RAMSES, MPI, OpenMP

## PUBLICATIONS

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**ADS Publication List** <https://ui.adsabs.harvard.edu/public-libraries/8GkonQ6JQfWG3Vhc-mDIkg>  
**ORCID** 0000-0001-9939-713X

*On the Origin of the Variety of Velocity Dispersion Profiles of Galaxies* (Submitted) **Aug 2023**  
**S. Han**, S. K. Yi, S. Oh, M. Pak, S. M. Croom, J. Devriendt, Y. Dubois, T. Kimm, K. Kraljic, C. Pichon, M. Volonteri; submitted to **ApJ**, arXiv:2310.15534

*Galaxies with grains: unraveling dust evolution and extinction curves with hydrodynamical simulations* (Submitted) **Feb 2024**  
Y. Dubois, F. R. Montero, C. Guerra, M. Trebitsch, **S. Han**, R. Beckmann, S. K. Yi, J. Lewis, J. Jang; submitted to **A&A**, arXiv:2402.18515

*Cosmic evolution of black hole-spin and galaxy orientations: clues from the NewHorizon and Galactic simulations* **2024**  
S. Peirani, Y. Suto, R. S. Beckmann, M. Volonteri, Y. Lin, Y. Dubois, S. K. Yi, C. Pichon, K. Kraljic, M. Park, J. Devriendt, **S. Han**, W. Chen; accepted to **A&A**, arXiv:2401.03712

*Diffuse Light in Milky-Way like Haloes* **2024**  
E. Contini, **S. Han**, S. Jeon, J. Rhee, S. K. Yi; **ApJL**, 962, 7

*On the Significance of the Thick Disks of Disk Galaxies* **2024**  
S. K. Yi, J. K. Jang, J. Devriendt, Y. Dubois, **S. Han**, T. Kimm, K. Kraljic, M. Park, S. Peirani, C. Pichon, J. Rhee; **ApJS**, 271, 25

*The Connection between the Intracluster Light and its Host Halo: Formation Time and Contribution from Different Channels* **2024**  
E. Contini, S. Jeon, J. Rhee, **S. Han**, S. K. Yi; **ApJ**, 167, 12

*The Intracluster Light and its Link with the Dynamical State of the Host Group/Cluster: the Role of the Halo Concentration* **2023**  
E. Contini, S. Jeon, J. Rhee, **S. Han**, S. K. Yi; **ApJ**, 958, 12

*Star Formation History and Transition Epoch of Cluster Galaxies Based on the Horizon-AGN Simulation* **2022**  
S. Jeon, S. K. Yi, Y. Dubois, A. Chung, J. Devriendt, **S. Han**, R. A. Jackson, T. Kimm, C. Pichon, J. Rhee; **ApJ**, 941, 13

*YZiCS: On the Mass Segregation of Galaxies in Clusters* **2020**  
S. Kim, E. Contini, H. Choi, **S. Han**, J. Lee, S. Oh, X. Kang, S. K. Yi; **ApJ**, 905, 8

*YZiCS: Unveiling the Quenching History of Cluster Galaxies Using Phase-space Analysis* **2020**  
J. Rhee, R. Smith, H. Choi, E. Contini, S. L. Jung, **S. Han**, S. K. Yi; **ApJ**, 247, 18

*YZiCS: Preprocessing of Dark Halos in the Hydrodynamic Zoom-in Simulation of Clusters* **2018**  
**S. Han**, R. Smith, H. Choi, L. Cortese, B. Catinella, E. Contini, S. K. Yi; **ApJ**, 866, 78

## SELECTED CONFERENCE TALKS / POSTERS

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|   |                 |
|---|-----------------|
| IAP colloquium: New simulations for new problems in galaxy formation (Talk) | <b>Dec 2023</b> |
| Korea Astronomy Society Fall Meeting (Talk)                                 | <b>Oct 2023</b> |
| Ramses User Meeting (Talk)  | <b>Apr 2023</b> |
| Korea Astronomy Society Spring Meeting (Talk)                               | <b>Apr 2023</b> |
| European Astronomical Society Annual Meeting (Poster)                       | <b>Jun 2022</b> |
| Ramses User Meeting (Talk)  | <b>Sep 2021</b> |
| Ramses User Meeting (Talk)  | <b>Oct 2021</b> |
| American Astronomical Society 233 <sup>rd</sup> Meeting (Talk)              | <b>Jan 2019</b> |
| Ramses User Meeting (Talk)  | <b>Sep 2018</b> |

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|---|----------|
| Korea Astronomy Society Fall Meeting (Talk)     | May 2018 |
| Korea Astronomy Society Spring Meeting (Poster) | May 2018 |

## SELECTED SUPERCOMPUTER TIME

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|---|------------------|
| <b>KISTI HPC R&amp;D Innovation Support Program (Grand Challenge)</b><br>KSC-2019-CHA-0006  | <b>2019</b>      |
| <b>KISTI HPC R&amp;D Innovation Support Program (Creative Research)</b><br>KSC-2023-CRE-0343, KSC-2022-CRE-0409, KSC-2022-CRE-0344, KSC-2022-CRE-0088, KSC-2021-CRE-0486, KSC-2020-CRE-0280, KSC-2020-CRE-0055, KSC-2018-CRE-0114 | <b>2018–2023</b> |

## TEACHING EXPERIENCE

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|  |                   |
|--|-------------------|
| <b>Teaching Assistant</b> , Yonsei University                      |                   |
| – Earth & Universe   | Fall 2018         |
| – Galaxy & Universe 2  | Spring 2018       |
| – Astrophysics 2   | Fall 2017         |
| – Understanding of Space   | Spring 2017       |
| <b>Teaching Assistant</b> , Korea Astronomy Olympiad Winter School | Jan 2016–Jan 2017 |

## AWARDS AND SCHOLARSHIPS

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| <b>Brain Korea 21 Plus</b> , National Research Foundation of Korea              | <b>2017–2023</b> |
| <b>The 6<sup>th</sup> Asian-Pacific Astronomy Olympiad</b> , won the 1-st prize | <b>Dec 2010</b>  |

## OTHER ACTIVITIES

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| <b>WouldYouLike</b> , A student-run astronomy magazine dedicated to public outreach. Contributed as a writer.      | <b>2014–2016</b> |
| <b>Byeol-arum</b> , Astronomical observation and outreach club. Participated as a science educator for the public. | <b>2013–2016</b> |