Sangjun Cha — CV

Department of Astronomy, Yonsei University
637B Science Hall, 50 Yonsei-ro, Seodaemun-gu, Seoul, 03722, South Korea
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Education

Yonsei University
Integrated course in Astronomy *2021/03 – present*
Supervisor: Prof. Myungkook. James Jee

Yonsei University
B.S. in Astronomy & Physics (Double majors) *2015/03 – 2021/02*

Research Interests

Strong gravitational lensing in the galaxy cluster scale

Merging galaxy clusters and dark matter

Weak gravitational lensing analysis using deep learning

Publications

First Author

[5]: A High-Caliber View of the Bullet Cluster Through JWST Strong and Weak Lensing Analyses, **Cha, S.**, Cho, B. Y., Joo, H., Lee, W., HyeongHan, K., Scofield, Z. P., Finner, K., Jee, M. J., 2025, ApJL, 987, L15

[4]: Weak-lensing Mass Reconstruction of Galaxy Clusters with a Convolutional Neural Network. II. Application to Next-Generation Wide-Field Surveys, **Cha, S.**, Jee, M. J., Hong, S. E., Park, S., Bak, D., Kim, T., 2025, ApJ, 981, 52

[3]: Precision MARS Mass Reconstruction of A2744: Synergizing the Largest Strong-lensing and Densest Weak-lensing Data Sets from JWST, **Cha, S.**, HyeongHan, K., Scofield, Z. P., Joo, H., Jee, M. J., 2024, ApJ, 961, 186

[2]: Model-independent Mass Reconstruction of the Hubble Frontier Field Clusters with MARS Based on Self-consistent Strong-lensing data, **Cha, S.**, Jee, M. J., 2023, ApJ, 951, 140

[1]: MARS: A New Maximum-entropy-regularized Strong Lensing Mass Reconstruction Method, **Cha, S.**, Jee, M. J., 2022, ApJ, 931, 127

Co-Author

[9]: JWST Discovery of Strong Lensing from a Galaxy Cluster at Cosmic Noon: Giant Arcs and a Highly Concentrated Core of XLSSC 122, Finner, K., **Cha, S.**, Scofield, Z. P., Jee, M. J., Lin, Y.-H., Joo, H., Park, H., Morishita, T., Faisst, A. L., Lee, B., Wang, W., Chary, R., 2025, arXiv:2508.08356, submitted to ApJL

[8]: Is Earendel a Star?: Investigating the Sunrise Arc Using JWST Strong and Weak Gravitational Lensing Analyses, Scofield, Z. P., Jee, M. J., **Cha, S.**, Park, H., 2025, arXiv:2504.08879, submitted to ApJ

[7]: A dynamical mass measure of an inactive black hole in the distant universe, Newman, A. B., Gu, M., Belli, S., Ellis, R. S., Gangula, S., Greene, J. E., Walsh, J., Suyu, S. H., Ertl, S., Caminha, G. B., Granata, G., Grillo, C., Schuldt, S., Barone, T., Bird, S., Glazebrook, K., Jafariyazani, M., Kriek, M., Matthews, A., Morishita, T., Nanayakkara, T., Pierel, J. D. R., Acebron, A., Bergamini, P., **Cha, S.**, Diego, J. M., Foo, N., Frye, B. L., Fudamoto, Y., Jee, M. J., Kamieneski, P. S., Koekemoer, A. M., Meena, A. K., Nishida, S., Oguri, M., Rosati, P., Zitrin, A., 2025, arXiv:2503.17478, submitted

[6]: Cosmology with Supernova Encore in the strong lensing cluster MACS J0138-2155: photometry, cluster members, and lens mass model, Etrl, S., Suyu, S. H., Schuldt, S., Granata, G., Grillo, C., Caminha, G. B.,

Acebron, A., Bergamini, P., Cañameras, R., **Cha, S.**, Diego, J. M., Foo, N., Frye, B. L., Fudamoto, Y., Halkola, A., Jee, M. J., Kamieneski, P. S., Koekemoer, A. M., Meena, A. K., Nishida, S., Oguri, M., Pierel, J. D. R., Rosati, P., Tortorelli, L., Wang, H., Zitrin, A., 2025, arXiv:2503.09718, submitted to A&A

[5]: SN H0pe: The First Measurement of H_0 from a Multiply Imaged Type Ia Supernova, Discovered by JWST, Pascale, M., Frye, B. L., Pierel, J. D. R., Chen, W., Kelly, P. L., Cohen, S. H., Windhorst, R. A., Riess, A. G., Kamieneski, P. S., Diego, J. M., Meena, A. K., **Cha, S.**, Oguri, M., Zitrin, A., Jee, M. J., Foo, N., Leimbach, R., Koekemoer, A. M., Conselice, C. J., Dai, L., Goobar, A., Siebert, M. R., Strolger, L., Willer, S. P., 2025, ApJ, 979, 13

[4]: Weak-lensing detection of intracluster filaments in the Coma cluster, HyeongHan, K., Jee, M. J., **Cha, S.**, Cho, H., 2024, NatAs, 8, 377

[3]: Weak-lensing Analysis of the Complex Cluster Merger A746 with Subaru/Hyper Suprime-Cam, HyeongHan, K., Cho, H., Jee, M. J., Wittman, D., **Cha, S.**, Lee, W., Finner, K., Rajpurohit, K., Brüggen, M., Forman, W., Jones, C., van Weeren, R., Botteon, A., Lovisari, L., Stroe, A., Domínguez-Fernández, P., O'Sullivan, E., Vrtilek, J., 2024, ApJ, 962, 100

[2]: Weak-lensing Mass Bias in Merging Galaxy Clusters, Lee, W., **Cha, S.**, Jee, M. J., Nagai, D., King, L., ZuHone, J., Chadayammuri, U., Felix, S., Finner, K., 2023, ApJ, 945, 71

[1]: Weak-lensing Mass Reconstruction of Galaxy Clusters with a Convolutional Neural Network, Hong, S. E., Park, S., Jee, M. J., Bak, D., **Cha, S.**, 2021, ApJ, 923, 266

Presentations

Talk

2025: JWST Lensing Analysis of Merging Galaxy Clusters: The Bullet Cluster and Abell 2744 / CL2025: Entering a Golden Age of Galaxy Cluster Studies / Taiwan / Contributed

2025: Probing Galaxy Cluster Mergers by Combining Strong and Weak Gravitational Lensing in the JWST Era / MPA / Germany

2024: Probing Galaxy Clusters by Combining Strong and Weak Gravitational Lensing in the JWST Era / NOIRLab, University of Arizona / USA

2024: Probing Galaxy Clusters by Combining Strong and Weak Lensing in the JWST Era: Mass Reconstruction of Abell 2744 / The 11th KIAS Workshop on Cosmology and Structure Formation / South Korea / Contributed

2024: Do Globular Cluster Trace Dark Matter? / 2024 KAS Fall Meeting / South Korea / Contributed

2024: Constraining Cosmological Parameters through Strong Lensing / 2024 KAS Spring Meeting / South Korea / Contributed

2023: Precision MARS Mass Reconstruction of Abell 2744: Combining Large Strong and Weak Lensing Datasets from JWST / 2023 KAS Fall Meeting / South Korea / Contributed

2022: Wide-field Weak-lensing Mass Reconstruction with Improved Convolutional Neural Network / 2022 KAS Fall Meeting / South Korea / Contributed

2022: MARS Probe of Hubble Frontier Fields Clusters / IAUGA 2022 / South Korea / Contributed

Poster

2025: Probing Galaxy Clusters from Cores to the Outskirts in the JWST Era: Mass Reconstruction of the Galaxy Cluster Abell 2744 by Combining Strong and Weak Lensing / Tracing Cosmic Evolution with Galaxy Clusters V / Italy

2025: Lensing through JWST: Greater Detail Nearby, New Perspectives High Redshift / EAS 2025 / Ireland

2025: Lensing Analysis of the Bullet Cluster with JWST / 2025 KAS Spring Meeting / South Korea

2024: Multi-resolution MAximum-entropy Reconstruction Technique Integrating Analytic Node (Mr.MARTIAN): A New Hybrid Lensing Reconstruction Method for the JWST Era / The 11th KIAS Workshop on Cosmology and Structure Formation / South Korea

2024: Precision MARS Mass Reconstruction of A2744: Synergizing the Largest Strong-lensing and Densest Weak-lensing Data Sets from JWST / EAS 2024 / Italy

2024: Constraining Cosmological Parameters through Strong Lensing / EAS 2024 / Italy

2023: MAximum-entropy ReconStruction (MARS): A New Strong-lensing Reconstruction Algorithm for the JWST Era / IAUS 381: Strong gravitational lensing in the era of Big Data / Italy

2022: A New Maximum-entropy-regularized Strong Lensing Mass Reconstruction Method / 240th AAS Meeting / USA

Fellowship & Awards

2021 – 2023: Integrated Undergraduate-and-Graduate Program Scholarship (Yonsei University; Three-year full-tuition)

2021 – 2023: Brain Korea 21 Plus Fellowship (Yonsei University)

2023: Yonsei Merit Academic Paper Award (Yonsei University)

2024 – 2026: Doctoral Student Research Fellowship (National Research Foundation of Korea), ∼$40k

2024: Excellent Academic Paper Award (Yonsei University)

Teaching Assistant

2021: UNDERSTANDING OF SPACE (Yonsei University)

2021: ASTROPHYSICS (Yonsei University)

2022: INTRODUCTION TO ASTROPHYSICS (Yonsei University)

2022: SCIENTIFIC IMAGE DATA PROCESSING (Yonsei University)

Outreach

2023: Merging Cluster Workshop at Yonsei – Served as a LOC

Military Service

2016 – 2017: Korea National Police Agency Auxiliary Police
Served as part of the mandatory military service in South Korea