

YUE SAMUEL LU

◇ Department of Astronomy and Astrophysics ◇ SERF 431 ◇ UC San Diego ◇ CA 92093
◇ ✉ yul232@ucsd.edu ◇ ☎ (+1) 805-895-2719 ◇ 🏠 y-samuel-lu.github.io

EDUCATION

- **University of California, San Diego (UCSD)** Sep. 2022—Present
Ph.D. in *Physics* with an *astrophysics* emphasis
Current GPA: 3.90/4.00
- **University of California, Santa Barbara (UCSB)** Sep. 2018—Jun. 2022
B.S. in *Physics*; B.S. in *Mathematics*; Minor in *Astronomy*
Overall GPA: 3.82/4.00 (Physics GPA: 3.93, Math GPA: 3.92)
Consecutive Dean's Honors; Physics Department Honor; College of Letters and Sciences Graduation Honor

GENERAL RESEARCH INTERESTS

Theoretical and Computational Astrophysics
C/IGM, Large-scale Structures, Compact Object Accretion, Cosmic Rays, Numerical Simulations

SELECTED COURSEWORKS

Graduate Courses: High Energy Astrophysics, Galactic Dynamics, Interstellar Medium, Stellar Physics, Astrophysical Fluid Dynamics, Parallel Computing, Emergent States of Matter, Statistics, Data Analysis and Machine Learning for Physicists
Independent Studies: Differential Geometry and Manifold Theory with Applications in General Relativity (with Dr. Jiayin Pan at UCSB)

RESEARCH EXPERIENCES

Graduate Student Researcher in FIRE Simulation Project July. 2022—Present
Prof. Dušan Kereš *UCSD*

- Participated in the collaboration of Feedback in Realistic Environments (FIRE) simulation project
- Analyzed impacts of different transport models of cosmic rays (CR) on the evolution of galaxies and the properties of CGM
- Reran some of the low-res simulations with CR transport models whose validity has been tested

Intergalactic Filaments in Simulation Nov. 2020—Apr. 2023
Prof. Nir Mandelker, Prof. S. Peng Oh *UCSB, KITP¹, HUJI²*

- Analyzed data from an enhanced resolution simulation adapting N-body + magnetohydrodynamics code (AREPO)
- Unveiled thermodynamical properties of the filaments by stacking filament slices and fitting them to isothermal models
- Studied the dynamics of the filaments by calculating different mass contributions using the modified summation method
- Studied the behaviour of the cold stream when penetrating the strong shock surrounding the halo and used it as a poster-child for further idealized simulations

¹Kavli Institute of Theoretical Physics
²The Hebrew University of Jerusalem

AGN Accretion Disk

Jul. 2020—Jun. 2022

Prof. Omer Blaes

UCSB

- Disproved several hypotheses about the origin of the $m = 2$ nonaxisymmetric anomaly on an AGN disk from a simulation, including the Rossby wave instabilities, the vorticity evolution, and the spiral density wave
- Visualized the ring-like structure in 3D and studied more about its origin by calculating the angular momentum of the disk
- Proposed new MHD simulations with longer run time to figure out the destination of the ring

PUBLICATIONS

Lu, Y.S. and Kereš, D. et al. “Constraining cosmic ray models in FIRE simulations using basic circumgalactic medium properties”, in prep

Lu, Y.S.; Mandelker, N.; Oh, S.P.; Dekel, A.; van den Bosch, F.C.; Springel, V.; Nagai, D.; van de Voort, F. (2024), “The Structure and Dynamics of Massive High- z Cosmic-Web Filaments: Three Radial Zones in Filament Cross-Sections”, [MNRAS](#), **527**, 11256

CONFERENCES

International Conference on Resolving Galaxy Ecosystems on All Scales

Poster

Dec 2023

The Chinese University of Hong Kong

Santa Cruz Galaxy Workshop

Invited talk ([video](#))

Aug 2023

UC Santa Cruz

UCSB Undergraduate Physics Research Symposium

Contributed talk ([video](#))

Sep 2021

KITP, UCSB

TEACHING / GRADING EXPERIENCES

UCSD Physics Department

Fall 2022—present

Teaching Assistant

Ran and instructed discussion sections and lab sections for undergraduate level physics courses; graded homework assignments and/or exams

UCSB Campus Learning Assistance Services (CLAS)

Sep. 2020—Jun. 2021

Math, Physics and Engineering Tutor

Taught lower division math and physics courses; ran group tutorials and drop-in sessions

UCSB Physics Department

Multiple Quarters

Learning Assistant and Grader

Assisted teaching assistants on running physics course discussion sessions; graded assignments and/or exams

SKILLS

Programming Languages

Scientific Computation

Numerical Simulation Suites

Operating Systems

Parallel Computing

Typesetting

Python, C/C++, Matlab, Mathematica

Numpy, SciPy, matplotlib, Numba, astropy

AREPO, GIZMO, Athena/Athena++

Linux, MacOS

OpenMP, MPI, CUDA

L^AT_EX, Markdown