GAURAV SENTHIL KUMAR

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EDUCATION

Independent Courses – **Lund University** 10/2023 - Present

Relavent Specialized Courses: Theoretical Nuclear Physics (PhD), Statistical Tools in Astrophysics, Machine Learning.

Master of Science (Astronomy) – **University of Copenhagen** 09/2022 - 06/2024

Relavent Specialized Courses: Observational Astrophysics, Theoretical Astrophysics, Gravitational Dynamics and Galaxy Formation, Interstellar Mediums and Star Formation, and Astronomical Data Processing.

Bachelor of Science (Astronomy/Nuclear) – **Lund University** 09/2019 - 11/2022

Relavent Specialized Courses: Advanced Nuclear Physics , Galaxies & Cosmology, Stellar Structures and Evolution.

RESEARCH EXPERIENCE

Academic Employee – **Niels Bohr Institute** 10/2024 - Present

Building and designing small radio telescopes tuned to the 21cm HI line. I have developed a code for source and digital signal processing. The telescope can measure and map neutral hydrogen in the Milky Way.

Research Internship – **Cosmic DAWN Center** 09/2024 - Present

I'm classifying the Little Red Dots by performing spectral template fitting of different AGN types. Concurrently also trying to identify r-process elements in high metallically QSO-DLA spectra. I have presented at a Journal Club and actively participated in several colloquiums.

Master's Thesis – **Cosmic DAWN Center** 09/2023 - 06/2024
Supervisor: Gabriel Brammer.
Thesis: "Identifying `BSFHz` Outliers"

I worked on classifying photometric redshift outliers using EAZY with BLSHz templateset. I developed a code to systematically search through every outlier source by comparing the photometric filter cutouts and NIRSpec with the estimated spectra. Led to a collaborative paper Clausen et. al 2024.

Bachelor's Thesis – **Cosmic DAWN Center** 01/2023 - 06/2023
Supervisor: Kasper Elm Heintz, Oscar Agertz.
Thesis: "Measuring the [C II]-to-H I connection in high-redshift absorption-selected galaxies"

I analyzed QSO-DLA spectra of several sources to study the efficacy of using [C II] as a tracer for neutral hydrogen. I concluded that [C II] as a tracer in QSO-DLA is infeasible due to the low statistical probability of QSO sighlines to not pass through star forming regions.

PUBLICATIONS

Articles

Clausen, T., Steinhardt, C., Shao, A., **Kumar, G.S.** (2024) "Performance of Photometric Template Fitting for Ultra-High Redshift Galaxies" under review in *Astronomy & Astrophysics* arXiv:2412.01893

Posters

Kumar, G.S. (2024) "The `BSFHz` Photometric template-set Outliers" *Annual Danish Astronomy Meeting 2024*

TEACHING & SUPERVISION

Primary Supervisor – **Niels Bohr Institute** 01/2025 - Present

Supervising a master's student for Projects outside course scope. The student will work on my radio telescope.

Teaching Assistant – **International Highschool of Gothenburg Region** 09/2018 - 02/2019

I taught in afterschool homework help for second and first year highschool students in maths and physics.

NON-ACADEMIC

Chairman of Physics Student Union – **Lund University** 06/2020 - 06/2021

I reformed the education committee, providing a better link between the students and their student representatives in the faculty education board meetings.