Anirudh Salgundi

Research Assistant at IIT Bombay

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EDUCATION

Master of Science (Physics), CHRIST University, India June 2020 – May 2022

Thesis: "Spectral properties of GX 5-1" GPA 8.5/10

Bachelor of Science, Bangalore University, India June 2017 – Sep 2020

Physics, Chemistry and Mathematics GPA 7.89/10

PUBLICATIONS

Below is a list of Refereed Publications which have been published/under preparation

1. **Salgundi, A**., et al. (*in prep*) (2024), "Bursts, Beats, and Beyond: Uncovering landscape from accretion to ignition of 4U 1728-34 using *AstroSat*" *(submitting to JAA)*
2. Ahumada, T., Anand, S., ..., **Salgundi, A**., et al. (2024), "Searching for gravitational wave optical counterparts with the Zwicky Transient Facility: summary of O4a", PASP, 136, 114201.
3. Srinivasaragavan, G., ..., **Salgundi, A**., et al. (*in prep*) (2024), "AT 2023sva: Multi-wavelength Analysis of an Optically-Discovered Afterglow Without a Detected Gamma-ray Counterpart". *(submitting to PASP)*
4. Mondal, S., **Salgundi, A**., et al. (2023), "Evolution of low-frequency quasi-periodic oscillations in GX 339-4 during its 2021 outburst using AstroSat data", MNRAS, 526, 4718.
5. **Salgundi, A**., et al. (*in prep*) (2025), "Timing and spectral studies of 4U 1735-44 using AstroSat" *(submitting to JAA)*

Below are some of my important non-refereed publications. ***Here*** *is a full list (43 GCNs, 3 TNS, and 2 ATels).*

1. **Salgundi, A**., Swain, V., Kumar, H., et al. (2023), GRB Coordinates Network, "GRB 230812B: Zwicky Transient Facility Identifies Optical Afterglow Candidate of Fermi GRB (Trigger 713559497)", 34397, 1.
2. **Salgundi, A**., Swain, V., Kumar, R., et al. (2023), GRB Coordinates Network, "AT2023sva/GRB230916B: GIT observations of the afterglow", 34780, 1.
3. Pathak, U., **Salgundi, A**., Waratkar, G., et al. (2023), GRB Coordinates Network, "GRB 230812B: Chandra late-time detection of the X-ray afterglow", 34632, 1.
4. Swain, V., Andreoni, I., ..., **Salgundi, A**., (2023), Transient Name Server AstroNote, "AT2023lcr: Zwicky Transient Facility discovery of a fast fading red transient", Transient Name Server 178, 1.
5. Thomas, N. T., **Anirudh, S**., Giridharan, L., Gudennavar, S. B., et al. (2022), The Astronomer's Telegram, "AstroSat observes XTE J1701-462 in its Z phase", 15654, 1.

RESEARCH EXPERIENCE

Research Assistant (Indian Institute of Technology Bombay) Jan 2023 - Present

Supervisor: Prof. Varun Bhalerao

"Thermonuclear bursts in Neutron Star Low Mass X-ray Binaries"

· Studying a sample of 15 thermonuclear X-ray Bursts from two transient Low Mass X-ray Binary sources 4U 1728–34 & 4U 1735–44 using *AstroSat* data.

· Developed pipelines for basic data reduction, time-resolved burst spectral analysis, and timing analysis for exploring accretion phenomena and rapid variability in lightcurves.

· Studied millisecond variability (Quasi Periodic Oscillations) in persistent emission from the accretion disk, and estimated spin period and magnetospheric radius.

· Performed Measurements for Photospheric radius, distance of the source and the spin frequency of the Neutron Star in the system, through thermonuclear bursts.

"Fast Transients with GROWTH-India"

· Led the Discovery of optical counterpart of GRB230812B using Zwicky Transient Facility.
· Led observations with GROWTH-India Telescope for the orphan afterglow candidate AT2023sva.
· Part of the Discovery team for "ZTF23aaoohpy/AT2023lcr", fast fading transient.
· Part of the GROWTH-India Telescope team in searching Electromagnetic Counterparts to Gravitational Wave Events, in collaboration with the Zwicky Transient Facility team led by Caltech.
· Following up transient X-ray binaries undergoing outbursts.
· Daily scanning for fast transients in ZTF data through `ZTFRest`.

2. Visiting Student Researcher (Indian Institute for Astrophysics) Nov 2022 - Dec 2022
Supervisor: Dr. Santanu Mondal

· Conducted energy-dependent time-averaged temporal analysis of a transient black hole X-ray binary GX 339-4 by utilising archival data from *NICER* and *AstroSat* missions
· Studied energy dependence and time evolution of Quasi Periodic Oscillations (QPOs) and their harmonic components in the power density spectrum.
· Developed pipelines energy dependent and time resolved temporal studies of persistent sources.
· Co-authored a Publication.

APPROVED TARGET OF OPPORTUNITY PROPOSALS

***Chandra* DDT (Co-PI)** Sep 2023
50 ks observations with ACIS instrument
"Observing GRB230812B - To understand Jet Physics for an Extremely Bright GRB"

***AstroSat* ToO (Co-PI)** Aug 2022
40 ks observations with LAXPC and SXT instrument
"AstroSat/SXT confirms GX 339-4 to be in the low-hard state"

***AstroSat* ToO (Co-PI)** Sep 2022
40 ks observations with LAXPC and SXT instrument
"AstroSat observes XTE J1701-462 in its Z phase"

SKILLS

Astronomy Softwares	`XSPEC, XSELCT, FTOOLS, ds9, IRAF`
Programming Languages	Python, Bash
Python Packages	`Astropy, Stingray, Numpy, Scipy, Pandas, Matplotlib, Seaborn`
Languages	English, Kannada, Telugu, Hindi

CONFERENCES AND WORKSHOPS

1. Transients 2024 (*Conference - Poster Presentation*) April 2024
   Broadband spectral and timing analysis of Slow Burster 4U 1728–34 using AstroSat
2. The 42nd meeting of the Astronomical Society of India (*Conference - Poster Presentation*) Feb 2024
   a. *Broadband spectral and timing analysis of Slow Burster 4U 1728–34 using AstroSat*
   b. *GRB 230812B - Exploring Jet physics and Polarization for an extremely bright Gamma Ray Burst*
3. Zwicky Transient Facility Summer School (*Summer school - Remote attendee*) July 2023
4. The 41st meeting of the Astronomical Society of India (*Conference - Poster Presentation*) March 2023
   Spectro-Temporal behaviour of Black Hole X-ray Binary GX 339-4 using AstroSat data
5. Conference on 7 years of AstroSat (*Conference - Attendee*) Sep 2022
6. Time Domain and Multi-Messenger Astronomy workshop (*Workshop - Remote Attendee*) Aug 2022

PROJECT MENTORING

Nishanth Karthik Nayak Nov 2022
First Year undergraduate (Physics) at Pennsylvania University
"Determining Distances and Ages of Open Clusters"

Shibam Sundar Mahakud Nov 2022
First Year undergraduate (Mechanical Engineering) at Indian Institute of Technology Bombay
"Determining Distances and Ages of Open Clusters"

Manan V Jain Sep 2022
Final Year undergraduate (Aerospace Engineering) at Amrita Vishwa Vidyapeetham
"Building Citizen Science program back end infrastructure for SSERD (a Non Profit Organization)"

AWARDS AND FELLOWSHIPS

Indian Institute for Astrophysics Visiting student fellowship — Nov 2022
Best Student Science Communicator Award (*Awarded by Govt. of Karnatka, India*) — Sep 2018

OUTREACH AND POSITIONS OF RESPONSIBILITIES

Student POC, TechConnect, IIT Bombay — Dec 2024
LOC member, Transients 2024 confernce — April 2018
Booth Co-ordinator, TechConnect, IIT Bombay — Dec 2023
Program Head - Asteroid search campaign at SSERD — March 2020 - Present
Astronomy Education Content Developer for ISRO's YUVIKA program — June 2022
Associate editor - Shasthra Snehi — 2020-2023

EXTRACURRICULAR AWARDS AND ACHIEVEMENTS

Cultural Patronage - State level inter college Theatre arts competition — Feb 2020
Sri Thirunarayana Memorial Prize - For best freshman student in Cultural activities. — Sep 2017

REFERENCES

Prof. Varun Bhalerao
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Department of Physics, Indian Institute of Technology Bombay
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Prof. Blesson Mathew
Assistant Professor
Department of Physics and Electronics, CHRIST University
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Dr. Santanu Mondal
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