Sindhu Satyavolu

Tata Institute of Fundamental Research,
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Education

Tata Institute of Fundamental Research — Mumbai, India
Ph.D. in the Department of Theoretical Physics, Advisor: Prof. Girish Kulkarni — 2018–present

Indian Institute of Technology–Madras — Chennai, India
B.Tech. in Engineering Physics, Minor in Photonics — 2014–2018

- Thesis: The Matter Power Spectrum, Advisor: Prof. Sriramkumar L

Research Interests

- **First billion years of the Universe:** Simulations and observations of quasar absorption spectrum, Supermassive black hole growth, Epoch of Reionisation.

Publications

[1] **S. Satyavolu**, G. Kulkarni, L. C. Keating, and M. G. Haehnelt, "The need for obscured supermassive black hole growth to explain quasar proximity zones in the epoch of reionization", *MNRAS*, vol. 521, no. 2, pp. 3108–3126, May 2023. arXiv: 2209.08103 [astro-ph.GA].

[2] **S. Satyavolu**, A.-C. Eilers, G. Kulkarni, *et al.*, "New quasar proximity zone size measurements at z 6 using the enlarged XQR-30 sample",, vol. 522, no. 4, pp. 4918–4933, Jul. 2023. arXiv: 2305.00998 [astro-ph.GA].

[3] V. D'Odorico, E. Bañados, G. D. Becker, *et al.*, "XQR-30: The ultimate XSHOOTER quasar sample at the reionization epoch",, vol. 523, no. 1, pp. 1399–1420, Jul. 2023. arXiv: 2305.05053 [astro-ph.GA].

[4] C. Mazzucchelli, M. Bischetti, V. D'Odorico, *et al.*, "XQR-30: Black Hole Masses and Accretion Rates of 42 z>6 Quasars", *arXiv e-prints*, arXiv:2306.16474, arXiv:2306.16474, Jun. 2023. arXiv: 2306.16474 [astro-ph.GA].

Collaborations

- **XQR–30** collaboration (Coordinator: Dr. Valentina D'Odorico) — 2022-
  1 first authored publication, 1 in prep, contributing author on 3 papers
- **EREBUS–JWST** collaboration led by Xiaohui Fan — 2023-
  Involved in 1 current project
- **LSST** DP0 delegate — 2022-

Talks and Posters

- Reionisation in the Summer, MPIA Heidelberg, Germany (in-person) 2023
- Lars Hernquist group meeting, Harvard-Smithsonian CfA (in-person) 2023
- First light, MIT, USA (in-person) 2023
- Largest Cosmological Surveys and Big Data Science, ICTS, Bengaluru (in-person) 2023
- Cosmology on Safari, Hluhluwe, South Africa (in-person) 2023
- Astronomical Society of India meeting, IIT Indore, Indore, India (in-person) 2023
- National Astronomy Meeting (poster+flash talk), online 2022
- State of the Universe seminar, Tata Institute of Fundamental Research, Mumbai, India (in-person) 2022

Conferences and Workshops

- Participant, Rubin LSST workshop, 41st Astronomical Society of India meeting, IIT Indore, India 2023
- Online Attendee, What Drives the Growth of Black Holes?, Iceland 2022
- Online Attendee, 40th Astronomical Society of India meeting, IIT Roorkee, Roorkee, India 2022
- Online Attendee, Quasars and Galaxies through Cosmic Time 2022
- Online Attendee, SAZERAC conference 2021
- Online Attendee, Royal Astronomical Society meeting: Edge of Cosmic Reionisation 2021
- Online Attendee, SAZERAC conference 2020
- Participant, GIAN course on Dark Matter: The Astroparticle Perspective, JNU, New Delhi, India 2018
- Project student, Vacation Students Research Program, Inter-University Center for Astronomy and Astrophysics, Pune, India 2017

Teaching and Academic Services

- **Teacher and Mentor** in Vigyan Vidushi course for Women in Science, online Fall 2022
  Classical Mechanics
- **Teaching Assistant** at TIFR, Mumbai, India Fall 2020
  Advanced Electrodynamics
- **Teaching Assistant** at TIFR, Mumbai, India Spring 2020
  Introduction to Electrodynamics
- Co-organiser, State of the Universe Seminar, TIFR, Mumbai, India 2022-present
- Coordinator, Bhoutics: Physics fest of IIT Madras, Chennai, India 2016

Travel Awards

- Infosys-TIFR Leading Edge grant 2023

Academic projects

Density profiles of ultra-light scalar dark matter TIFR, Mumbai
Advisor: Prof. Basudeb Dasgupta 2019

- Studied density profiles of ultra-light scalar dark matter using the Schrödinger-Poisson equation and their implications for the core-cusp problem.

Spherical Collapse model to explain Dark matter halo formation IUCAA, Pune
Advisor: Prof. Aseem Paranjape 2017

- Studied spherical collapse model to derive required density contrast for collapse/shell crossing to occur for different cosmologies.

Design of Spectrum Analyzer IIT Madras
Department of Electrical Engineering 2017

- Designed and built from scratch a superheterodyne spectrum analyzer for VLF radio frequencies.

Solar tracking using Light-dependent resistors IIT Madras
Center for Innovation 2015

- Designed a circuit to align solar panels along the direction of maximum power output, using LDRs and servo motors programmed using Arduino.

Other Accomplishments

- Ranked 3rd across India in the Joint Entrance Screening Test for admission into PhD programmes 2018