Samir Choudhuri

CONTACT INFORMATION

Samir Choudhuri
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NATIONALITY — Indian

RESEARCH INTERESTS — Cosmic Dawn and Epoch of Reionization, 21-cm Cosmology, Low Frequency Radio Interferometry, Statistical Inference, Diffuse Synchrotron Emission

ACADEMICS

Post Doctoral Fellow,**Queen Mary University of London and UC Berkley**, 2019-present
Post Doctoral Fellow, **National Centre for Radio Astrophysics-TIFR**, India 2016-2019
Ph.D., **Indian Institute of Technology Kharagpur**, India 2011-2016
M.Sc. in Physics, **Jadavpur University**, Kolkata-India, Performance: 1st Class 2009-2011
B.Sc. in Physics, **Suri Vidyasagar College**, India, Performance: 1st Class 2006-2009

FELLOWSHIPS AWARDS AND MEMBERSHIPS

- Fellow of the Royal Astronomical Society (FRAS) (since Feb, 2021)
- Royal Astronomical Society Undergraduate Summer Bursary (project student- Romain Pioch, Paris) (2020)
- South African Radio Astronomy Observatory (SARAO) Fellowship 2018 (declined)
- Member of the "Epoch of Reionization and Cosmology" science working group for the Square Kilometre Array-India (since 2015)
- CSIR-UGC, India, Junior Research Fellowship, 2011
- Qualified in Graduate Aptitude Test (GATE), 2011
- CSIR-UGC, India, Junior Research Fellowship, 2010

REFEREED PUBLICATIONS

1. *Patterns of primary beam non-redundancy in close-packed 21 cm array observations*
   S. Choudhuri, P. Bull, H. Garsden. 2021, submitted MNRAS
2. *Angular power spectrum of supernova remnants: effects of structure, geometry and diffuse foreground*
   S. Choudhuri, P. Saha, N. Roy, S. Bharadwaj, J. Dey. 2021, MNRAS, 501, 3364
3. *All sky angular power spectrum: I. Estimating brightness temperature fluctuations using TGSS 150 MHz survey*
   S. Choudhuri, Abhik Ghosh, Nirupam Roy et al. 2020, MNRAS, 494, 1936
4. *An Image-based Tapered Gridded Estimator (ITGE) for the angular power spectrum*
   S. Choudhuri, P. Datta, S. Bharadwaj 2019, MNRAS, 483, 3910
5. *Turbulent power spectrum in warm and cold neutral medium using the Galactic H* I *21 cm emission*
   S. Choudhuri, N. Roy 2019, MNRAS, 483, 3437
6. *Validating a novel angular power spectrum estimator using simulated low frequency radio-interferometric data*
   S. Choudhuri, N. Roy, S. Bharadwaj, Sk. S. Ali, A. Ghosh, P. Dutta, 2017, New Astronomy, 57, 94
7. *The angular power spectrum measurement of the Galactic synchrotron emission in two fields of the TGSS survey*

S. Choudhuri, S. Bharadwaj, Sk. S. Ali, N. Roy, H. T. Intema, A. Ghosh, 2017, MNRAS Letters, 470, L11

8. *The visibility based Tapered Gridded Estimator (TGE) for the redshifted 21-cm power spectrum*
S. Choudhuri, S. Bharadwaj, S. Chatterjee, Sk. S. Ali, N. Roy, A. Ghosh, 2016, MNRAS, 463, 4093
9. *Tapering the sky response for angular power spectrum estimation from low-frequency radio-interferometric data*
S. Choudhuri, S. Bharadwaj, N. Roy, A. Ghosh, Sk. S. Ali, 2016, MNRAS, 459, 151
10. *Visibility-based angular power spectrum estimation in low-frequency radio interferometric observations*
S. Choudhuri, S. Bharadwaj, A. Ghosh, Sk. S. Ali, 2014, MNRAS, 445, 4351

With significant contribution:

11. *The auto and cross angular power spectrum of the Cas A supernova remnant in radio and X-ray*
P. Saha, S. Bharadwaj, S. Chakravorty, N. Roy, **S. Choudhuri**, H. M. Gunther, R. K. Smith , 2021, MNRAS, 502, 5313
12. *Stringent constraint on the radio signal from dark matter annihilation in dwarf spheroidal galaxies using the TGSS*
A. Basu, N. Roy, **S. Choudhuri**, K. K. Datta, D. Sarkar , 2021, MNRAS, 502, 1605
13. *First multi-redshift limits on post-Epoch of Reionization (post-EoR) 21 cm signal from z = 1.96 - 3.58 using uGMRT*
A. Chakraborty, A. Datta, N. Roy, S. Bharadwaj, T. R. Choudhury, K. K. Datta, S. Pal, M. Choudhury, **S. Choudhuri**, P. Dutta, D. Sarkar, 2021, Astrophysical Journal Letters, 907, L7
14. *Demonstrating the Tapered Gridded Estimator (TGE) for the Cosmological HI 21-cm Power Spectrum using 150 MHz GMRT observations*
S. Pal, S. Bharadwaj, A. Ghosh, **S. Choudhuri**, 2021, MNRAS, 501, 3378
15. *Characterizing EoR foregrounds: A study of the Lockman Hole Region at 325 MHz*
A. Mazumder, A. Chakraborty, A. Datta, **S. Choudhuri** et al. 2020, MNRAS, 495, 4071
16. *A study of Kepler's supernova remnant: angular power spectrum estimation from radio frequency data*
P. Saha, S. Bharadwaj, N. Roy, **S. Choudhuri** et al. 2019, MNRAS, 489, 5866
17. *Detailed study of ELAIS N1 field with the uGMRT - II. Source properties and spectral variation of foreground power spectrum from 300-500 MHz observations*
A. Chakraborty, N. Roy, A. Datta, **S. Choudhuri** et al. 2019, MNRAS, 490, 243
18. *Detailed study of ELAIS N1 field with the uGMRT - I.Characterizing 325 MHz foreground for redshifted 21 cmobservation*
A. Chakraborty, A. Datta, **S. Choudhuri** et al. 2019, MNRAS, 487, 4102
19. *A Tapered Gridded Estimator (TGE) for the Multi-Frequency Angular Power Spectrum (MAPS) and the Cosmological HI 21-cm Power Spectrum*
S. Bharadwaj, S. Pal, **S. Choudhuri** et al. 2019, MNRAS, 483, 5694
20. *Imaging the redshifted 21-cm pattern around the first sources during the cosmic dawn using the SKA*
R. Ghara, T. Roy Choudhury, K. K. Datta, **S. Choudhuri**, 2017, MNRAS, 464, 2234
21. *The prospects of measuring the angular power spectrum of the diffuse Galactic synchrotron emission with SKA1 Low*
Sk. S. Ali, S. Bharadwaj, **S. Choudhuri**, A. Ghosh, N. Roy, 2016, JOAA, 37, 35

Publications in Conference Proceedings

22. *The angular power spectrum measurement of the Galactic synchrotron emission using the TGSS survey*
S. Choudhuri, S. Bharadwaj, Sk. S. Ali, N. Roy, H. T. Intema, A. Ghosh, 2018, Proceedings of the International Astronomical Union, 333, 157

23. *Prospects of detection of the first sources with SKA using matched filters*
R. Ghara, T. R. Choudhury, K. K. Datta,...., **S. Choudhuri**,....,Sambit K. Giri, 2018, Proceedings of the International Astronomical Union, 333, 122

24. *Foreground simulation and power spectrum estimation for 610 MHz GMRT observations*
S. Choudhuri, S. Bharadwaj, Sk. S. Ali, 2014, ASI Conference Series, 13, 315

Memos

1. #081*: 1D Beam Expansion Models for the HERA Primary Beam*
S. Choudhuri, P. Bull, N. Kern, 2020
`http://reionization.org/wp-content/uploads/2013/03/HERA081_HERA_Primary_Beam_Chebyshev_Apr2020.pdf`

Conferences, Workshops, Professional Talks and Posters

- A precursor view of the SKA Sky International Webinar **(Oral)** **Mar 2021**
- SKA International EoR Science Working Group monthly meeting **(Oral)** **Feb 2021**
- SKA India Cosmic Dwan and EoR Online seminar, India **(Oral)** **Jan 2021**
- Online seminar at "Packed Ultra-wideband Mapping Array (PUMA)", USA **(Oral)** **Jan 2021**
- URSI National Radio Science Meeting, Univ. of Colorado, Boulder, USA **(Oral)** **Jan 2021**
- Hydrogen Epoch of Reionization Array (HERA) Datacon, USA **(Oral)** **Dec 2020**
- International webinar on "A Journey from Quark to Universe"
Balarampur College, India **(Oral-Invited)** **Sept 2020**
- One-day International webinar, BB College, Asansol - India **(Oral-Invited)** **June 2020**
- The First Billion Years of the Universe, IIT Indore - India **(Oral-Invited)** **Jan 2020**
- HERA Annual Meeting, Institute of Astronomy, Cambridge, UK **Sept 2019**
- 21-cm Cosmology Meeting, University of Cambridge - UK **(Oral)** **April 2019**
- Astronomy Coffee Seminar, University of Cambridge - UK **(Oral)** **April 2019**
- London Relativity and Cosmology Seminar, Queen Mary, London - UK **(Oral)** **April 2019**
- SKA Key Science Workshop, Jodrell Bank, Macclesfield - UK **(Oral)** **April 2019**
- SKA General Science Meeting, Jodrell Bank, Macclesfield - UK **(Poster)** **April 2019**
- The Metrewavelength Sky Conference - II, NCRA, India **(Poster)** **March 2019**
- Frontiers in 21 cm Cosmology, Kodaikanal Solar Observatory -India **(Oral)** **Dec 2018**
- Lecture course on Optical/Infrared Interferometry, IUCAA-India **April 2018**
- ASI Annual Meeting, Osmania University -India **(Oral, Thesis Presentation)** **Feb 2018**
- Universe after the first 200 million years,
Presidency University-India **(Oral-Invited)** **Dec 2017**
- IAU Symposium: Peering towards Cosmic Dawn, Dubrovnik-Croatia **(Oral)** **October 2017**
- School on EoR and 21 cm Cosmology, NCRA-India **July 2017**
- Astronomy Colloquium, National Centre for Radio Astrophysics **(Oral)** **April 2017**
- SKA 2016: Science for the SKA generation, Goa-India **(Poster)** **Nov 2016**
- Workshop on Epoch of Reionization, CTS, IIT Kharagpur **(Oral)** **July 2016**
- National Workshop on Cosmology with the HI 21-cm Line, RRI-Bangalore **(Oral)** **June 2015**
- Astronomy Seminar, Oskar Klein Centre, Stockholm University **(Oral)** **May 2015**
- The Olympian Symposium 2015, Greece **(Poster)** **May 2015**
- Cosmological Structures from Reionization to Galaxies, ICTP-Italy **(Oral)** **May 2015**
- Statistical Applications to Cosmology and Astrophysics, ISI-Kolkata **(Oral)** **Feb 2015**
- Workshop on Galaxies and Cosmology, NCRA-India **July 2014**
- 32nd Meeting Astronomical Society of India, IISER-Mohali **(Poster)** **Mar 2014**
- The Metrewavelength Sky Conference, NCRA-India **(Poster)** **Dec 2013**
- Radio Astronomy School, NCRA-India **Aug 2013**
- Workshop on Cosmology, Delhi University-India **Jan 2013**

Student supervision and mentoring

PhD Mentorship

- Srijita Pal, PhD at Indian Institute of Technology Kharagpur, India (2015-present)
- Preetha Saha, PhD at Indian Institute of Technology Kharagpur, India (2014-present)

M.Sc Project Supervision

- Dimos Zografos, at Queen Mary University of London (QMUL) (2021)
- Alex Reedy, at Queen Mary University of London (QMUL) (2020)
- Romain Pioch (ENSTA Paris) (2020), Royal Astronomical Society Undergraduate Summer Bursary
- Ankur Dev at Queen Mary University of London (QMUL) (2019-2020): Now PhD at Argelander Institute for Astronomy (AIfA), Germany
- Jyotirmoy Dey at IIT Kharagpur (2015-2016): Now PhD at IIST-Trivandrum, India

Teaching Experience

- **Tutor for Radio Astronomy Data Analysis**, The First Billion Years of the Universe, IIT Indore, 27-32 Jan, 2020
- **AIPS Tutorial for Radio Data Analysis**, Radio Astronomy School 2019 at NCRA-TIFR,Pune, 19th to 30th August, 2019
- **Lectures on Power Spectrum Estimation Techniques**, School on 21-cm Cosmology at Kodaikanal Solar Observatory, 10th to 15th December, 2018
- **CASA Tutorial for radio data analysis**, School on 21-cm Cosmology at Kodaikanal Solar Observatory, 10th to 15th December, 2018
- **Computational Physics Lab**, M.Sc. Physics (1st year), IIT Kharagpur, 2013 - 2015, 3 semesters
- **Electrodynamics I**, M.Sc. Physics (1st year), IIT Kharagpur, 2013, 1 semesters
- **Preparatory Lab Class**, B.Tech. (1st year), IIT Kharagpur, 2012 - 2015, 5 semesters

Public Scientific Code

I make most of the scientific code public-available for the community. The projects are:

- **VisSim (C):** The visibility simulator for radio interferometric observations .
- **Bare Estimator (C):** The visibility based estimator for measuring the power spectrum from radio intreferometric data.
- **TGE (C):** The Tapered Gridded Estimator for angular power spectrum mesurements.
- **3D-TGE (C):** The Tapered Gridded Estimator for measuring the cylindrical and spherical power spectrum for 21cm observations.
- **I-TGE (C):** The Image-based Tapered Gridded Estimator for angular power spectrum measurements.
- **Non-redundant pipeline (Python):** Pipeline for simulating, calibrating, and analysing data from non-redundant arrays, based on the HERA stack.

See `https://github.com/samirchoudhuri` for details.

Conference and Meeting Organization

- Workshop & School on 21-cm Cosmology & Reionization, Main organizer, April 2021 `https://sites.google.com/view/eorcosmology21/home`

Computing Skill

- **Operating Systems:** Linux, WINDOWS
- **Programming Language:** C, Python
- **Application Packages:** Numerical Recipes in C, AIPS (Astronomical Image Processing Software), CASA (Common Astronomy Software Applications), MATLAB

References

Available on request.

Prof. Somnath Bharadwaj, Department of Physics, Indian Institute of Technology Kharagpur, Kharagpur-721302, India, E-mail: somnath@phy.iitkgp.ernet.in, somnathbharadwaj@gmail.com

Dr. Phil Bull, School of Physics and Astronomy, Queen Mary University of London, Mile End Road, London E1 4NS, UK, E-mail: p.bull@qmul.ac.uk, philbull@gmail.com

Dr. Nirupam Roy, Department of Physics, Indian Institute of Science, Bangalore 560012, India, E-mail: nroy@physics.iisc.ernet.in, roy.nirupam@gmail.com

Prof. Tirthankar Roy Choudhury, NCRA-TIFR, Pune University Campus, Post Bag 3, Ganeshkhind, Pune-411007, India, E-mail: tirth@ncra.tifr.res.in