
Dr. Subhodeep Sarkar

Postdoctoral Researcher in Theoretical Physics
subhodeeps.github.io | subhodeep.sarkar1@gmail.com

CURRENT POSITION AND AFFILIATION

Postdoctoral Researcher

- Centre for Strings, Gravitation and Cosmology, Department of Physics, Indian Institute of Technology, Madras, Tamil Nadu, India.

RESEARCH INTERESTS

Gravitation and Black Hole Physics

Black Hole Perturbation Theory, Quasinormal Modes of Black Holes, Internal Structure of Black Holes, Classical and Quantum Aspects of Black Holes, Black Holes in Modified Theories of Gravity, Gravitational Lensing and Black Hole Shadow.

EMPLOYMENT

Indian Institute of Technology, Madras, Tamil Nadu, India

- Position: Postdoctoral Researcher Aug 2024 – Present
Division: Centre for Strings, Gravitation and Cosmology
Department: Physics
Mentor: Prof. Dawood Kothawala
Funding Agency: Centre for Industrial Consultancy and Sponsored Research, IIT-M
- Position: Project Scientist (equiv. Postdoctoral Fellow) Apr 2024 – Aug 2024
Division: Centre for Strings, Gravitation and Cosmology

Jamia Millia Islamia (Central University), New Delhi, India

- Position: Junior Research Fellow Feb 2023 – Mar 2024
Department: Centre for Theoretical Physics
Grant No.: CRG/2020/004347
Principal Investigator: Prof. Anjan Ananda Sen
Funding Agency: Science and Engineering Research Board (SERB), Department of Science and Technology (DST), Government of India

Indian Institute of Information Technology, Allahabad, Uttar Pradesh, India

- Position: Senior Research Fellow Jul 2021 – Apr 2022
Department: Applied Sciences
- Position: Junior Research Fellow Jul 2019 – Jul 2021
Department: Applied Sciences
Project: Near Horizon Structure of Black Holes
Grant No.: ECR/2017/002124
Principal Investigator: Dr. Srijit Bhattacharjee
Funding Agency: Science and Engineering Research Board (SERB), Department of Science and Technology (DST), Government of India

EDUCATION

Indian Institute of Information Technology, Allahabad, Uttar Pradesh, India

- Ph.D., Physics, November 2024
- Thesis Title (tentative): *A Descent into the Maelström: Probing the near-horizon structure of black holes using perturbative techniques*
 - Supervisor: Dr. Srijit Bhattacharjee, IIIT, Allahabad
 - CGPA/DGPI : 9.44

- Completed Credits: 76 (Min. Credits: 64)
- Note: Thesis defended and declared provisionally qualified on 4 November 2024.

Jamia Millia Islamia (Central University), New Delhi, India

M.Sc., Physics, June 2018

- CGPA: 9.5 (*Placed in First Class with Distinction*)
- Project Supervisor: Prof. Anjan Ananda Sen
- Topic: The Generalized Proca Action in the Randall-Sundrum Braneworld Scenario
- Special Papers: General Theory of Relativity, Quantum Field Theory, Particle Physics, Classical Field Theory

Asutosh College, University of Calcutta, Kolkata, West Bengal, India

B.Sc.(Honours), Physics, June 2016

- Result: First Class with Honours (*Secured 63.625 %*)

National Gems Higher Secondary School, Kolkata, West Bengal, India

Indian School Certificate Examination - I.S.C. (Higher Secondary), May 2012

- Result: *Secured 96.00% (aggregate)*

Indian Certificate of Secondary Education - I.C.S.E. (Secondary), May 2010

- Result: *Secured 95.40% (aggregate)*

PUBLICATIONS AND PREPRINTS

Published Papers

1. Sunil Singh Bohra, Subhodeep Sarkar and Anjan Ananda Sen, *Gravitational atoms in the braneworld scenario*, *Phys. Rev. D* **109** (2024) 104021 [2312.07295] [{INSPIRE}](#).
2. Subhodeep Sarkar, Mostafizur Rahman and Sumanta Chakraborty, *Perturbing the perturbed: Stability of quasinormal modes in presence of a positive cosmological constant*, *Phys. Rev. D* **108** (2023) 104002 [2304.06829] [{INSPIRE}](#).
3. **Subhodeep Sarkar**, Shailesh Kumar and Srijit Bhattacharjee, *Can we detect a supertranslated black hole?*, *Phys. Rev. D* **105** (2022) 084001 [2110.03547] [{INSPIRE}](#).
4. Srijit Bhattacharjee, **Subhodeep Sarkar** and Arpan Bhattacharyya, *Scalar perturbations of black holes in Jackiw-Teitelboim gravity*, *Phys. Rev. D* **103** (2021) 024008 [2011.08179] [{INSPIRE}](#).
5. Srijit Bhattacharjee, Shailesh Kumar and **Subhodeep Sarkar**, *Mass inflation and strong cosmic censorship in a nonextreme BTZ black hole*, *Phys. Rev. D* **102** (2020) 044030 [2005.09705] [{INSPIRE}](#).

PUBLICATION METRICS

INSPIRE HEP

Papers: 5
Citations: 81
h-index: 5
Citations/paper (avg): 16.2

Google Scholar

Papers: 5
Citations: 81
h-index: 5
i10-index: 4

Semantic Scholar

Papers: 5
Citations: 52
h-index: 5
Highly Influential Citations: 3

Web of Science/Publons

Papers: 5
Citing Articles: 54
h-index: 5

SERVICE AND MEMBERSHIP	<p>Peer Review</p> <ul style="list-style-type: none"> • <i>Reviewer</i> for General Relativity and Gravitation, European Physical Journal C. <p>Academic Bodies</p> <ul style="list-style-type: none"> • <i>Life Member</i>, Indian Association for General Relativity and Gravitation (IAGRG). 																																										
TEACHING EXPERIENCE	<p>Teaching Assistant, Department of Applied Sciences, IIIT, Allahabad</p> <table border="0" style="width: 100%;"> <tr> <td style="padding-right: 20px;">Engineering Physics</td> <td style="text-align: right;">2022 Odd Semester</td> </tr> <tr> <td>Paper Code: SEGP132C</td> <td style="text-align: right;">2021 Odd Semester</td> </tr> <tr> <td>Program: B.Tech. in IT and ECE</td> <td style="text-align: right;">2020 Odd Semester</td> </tr> <tr> <td>Instructor: Dr. Srijit Bhattacharjee</td> <td style="text-align: right;">2019 Odd Semester</td> </tr> <tr> <td colspan="2"> </td> </tr> <tr> <td style="padding-right: 20px;">Biological Data Analytics (Biostatistics)</td> <td style="text-align: right;">2021 Odd Semester</td> </tr> <tr> <td>Paper Code: SBDA131C</td> <td style="text-align: right;">2020 Odd Semester</td> </tr> <tr> <td>Program: M.Tech. in Bioinformatics</td> <td></td> </tr> <tr> <td>Instructor: Dr. Srijit Bhattacharjee</td> <td></td> </tr> <tr> <td colspan="2"> </td> </tr> <tr> <td style="padding-right: 20px;">Computational Methods in Physics using Python (CoMP-Py)</td> <td style="text-align: right;">2021 Summer Break</td> </tr> <tr> <td>Program: Short Term Certificate Course</td> <td></td> </tr> <tr> <td>Instructor: Dr. Srijit Bhattacharjee</td> <td></td> </tr> <tr> <td colspan="2"> </td> </tr> <tr> <td style="padding-right: 20px;">Numerical Methods for Bioinformatics</td> <td style="text-align: right;">2022 Even Semester</td> </tr> <tr> <td>Program: M.Tech. in Bioinformatics</td> <td style="text-align: right;">2021 Even Semester</td> </tr> <tr> <td>Instructor: Dr. Srijit Bhattacharjee</td> <td></td> </tr> <tr> <td colspan="2"> </td> </tr> <tr> <td style="padding-right: 20px;">Nonlinear Dynamics and Infectious Disease Modeling</td> <td style="text-align: right;">2022 Odd Semester</td> </tr> <tr> <td>Program: M.Tech. in Bioinformatics</td> <td></td> </tr> <tr> <td>Instructor: Dr. Srijit Bhattacharjee</td> <td></td> </tr> </table>	Engineering Physics	2022 Odd Semester	Paper Code: SEGP132C	2021 Odd Semester	Program: B.Tech. in IT and ECE	2020 Odd Semester	Instructor: Dr. Srijit Bhattacharjee	2019 Odd Semester			Biological Data Analytics (Biostatistics)	2021 Odd Semester	Paper Code: SBDA131C	2020 Odd Semester	Program: M.Tech. in Bioinformatics		Instructor: Dr. Srijit Bhattacharjee				Computational Methods in Physics using Python (CoMP-Py)	2021 Summer Break	Program: Short Term Certificate Course		Instructor: Dr. Srijit Bhattacharjee				Numerical Methods for Bioinformatics	2022 Even Semester	Program: M.Tech. in Bioinformatics	2021 Even Semester	Instructor: Dr. Srijit Bhattacharjee				Nonlinear Dynamics and Infectious Disease Modeling	2022 Odd Semester	Program: M.Tech. in Bioinformatics		Instructor: Dr. Srijit Bhattacharjee	
Engineering Physics	2022 Odd Semester																																										
Paper Code: SEGP132C	2021 Odd Semester																																										
Program: B.Tech. in IT and ECE	2020 Odd Semester																																										
Instructor: Dr. Srijit Bhattacharjee	2019 Odd Semester																																										
Biological Data Analytics (Biostatistics)	2021 Odd Semester																																										
Paper Code: SBDA131C	2020 Odd Semester																																										
Program: M.Tech. in Bioinformatics																																											
Instructor: Dr. Srijit Bhattacharjee																																											
Computational Methods in Physics using Python (CoMP-Py)	2021 Summer Break																																										
Program: Short Term Certificate Course																																											
Instructor: Dr. Srijit Bhattacharjee																																											
Numerical Methods for Bioinformatics	2022 Even Semester																																										
Program: M.Tech. in Bioinformatics	2021 Even Semester																																										
Instructor: Dr. Srijit Bhattacharjee																																											
Nonlinear Dynamics and Infectious Disease Modeling	2022 Odd Semester																																										
Program: M.Tech. in Bioinformatics																																											
Instructor: Dr. Srijit Bhattacharjee																																											
MENTORING	<p>Assisted <i>Prof. Anjan Ananda Sen</i> in supervising the following students at CTP, Jamia Millia Islamia</p> <ul style="list-style-type: none"> • Nargis Rashid (Jamia Millia Islamia), M.Sc. Thesis on <i>Black Holes and Quasinormal Modes in Modified Gravity</i>, 2023. <p>Assisted <i>Dr. Srijit Bhattacharjee</i> in supervising the following students at IIIT, Allahabad</p> <ul style="list-style-type: none"> • Kayyum Yusufali Sayyad (IIIT, Allahabad), M.Tech. Thesis on <i>Infectious Disease Modeling</i>, 2023 • Sanchari Biswas (Christ University, Bangalore), M.Sc. Thesis on <i>Black Hole Shadow</i>, 2022. • Ashley Chraya (IISER Mohali), Summer Project on <i>Quasinormal Modes of Black Holes</i>, 2021. 																																										
OTHER ACADEMIC ACHIEVEMENTS	<p>National Examinations</p> <ul style="list-style-type: none"> • Qualified GATE 2019 (Rank: 993, Score: 462). • Qualified IIT JAM 2016 (Rank: 863). • Ranked in the top 1% nationwide in the Indian School Certificate Examination 2012. <p>Awards and Scholarships</p> <ul style="list-style-type: none"> • Junior Research Fellowship (DST-SERB) at Jamia Millia Islamia in 2023. • Senior Research Fellowship (DST-SERB) at IIIT, Allahabad in 2021. • Junior Research Fellowship (DST-SERB) at IIIT, Allahabad in 2019. • Merit Based Scholarship for Performance in 1st Year M.Sc. Examination at Jamia Millia Islamia in 2017. 																																										

SKILLS

Languages:

- English (C1), Bengali (Native), Hindi (Bilingual).

Programming:

- Experienced in Python (Scientific Stack), and Mathematica.
- Familiar with C/C++, FORTRAN, Julia, Maple, Cadabra.

Document Creation:

- LaTeX, Markdown.

TALKS AND
POSTER
PRESENTATIONS**Talks**

- *Black hole quasinormal mode instability: Insights from the pseudospectrum* 5 Nov 2024
Strings Group Seminar
Harish-Chandra Research Institute, Prayagraj (Allahabad)
- *Black hole quasinormal mode instability: Insights from the pseudospectrum* 18 Jan 2024
CTP Seminar, Centre for Theoretical Physics
Jamia Millia Islamia, New Delhi
- *Perturbing the perturbed: The spectra and pseudospectra of asymptotically de Sitter black holes* 14 Dec 2023
Departmental Seminar, School of Physical Sciences
Indian Association for the Cultivation of Science, Kolkata
- *Perturbing the perturbed: Quasinormal mode instability in asymptotically de Sitter black holes* 09 Dec 2023
Parallel Session on Classical and Quantum Gravity
10th International Conference on Gravitation and Cosmology: New Horizons and Singularities in Gravity (ICGC 2023)
IIT Guwahati
- *Testing the Strong Cosmic Censorship Conjecture in Anti-de Sitter spacetimes* 28 Jul 2022
Departmental Seminar, School of Physical Sciences
Indian Association for the Cultivation of Science, Kolkata
- *The Strong Cosmic Censorship Conjecture in Anti-de Sitter Spacetimes* 18 May 2022
Atlantic General Relativity 2022
Memorial University of Newfoundland and Labrador, Canada
- *Testing the Strong Cosmic Censorship Conjecture in Anti-de Sitter spacetimes* [Watch on YouTube] 11 Mar 2022
Testing Aspects of General Relativity
IIT Gandhinagar, IIT Allahabad, University of Lethbridge, Canada
- *Inner-horizon Instability in BTZ Black Holes* 14 Apr 2021
21st British Gravity Meeting (BritGrav21)
University College Dublin, Ireland
- *Inner-horizon Instability in BTZ Black Holes* 05 Oct 2020
Workshop on Mathematical and Computational Approaches for Solving the Source-Free Einstein Field Equations
ICERM, Brown University, USA

Poster Presentations

- *Exploring Quasinormal Modes and Strong Cosmic Censorship in 2D Black Hole Models* 6 Dec 2023
10th International Conference on Gravitation and Cosmology: New Horizons and Singularities in Gravity (ICGC 2023)
IIT, Guwahati on behalf of IAGRG
- *Inner-horizon Instability in BTZ Black Holes* 19 Dec 2020
31st Meeting of the Indian Association for General Relativity and Gravitation (IAGRG)

IIT, Gandhinagar on behalf of IAGRG

WORKSHOPS,
CONFERENCES
AND OTHER
ACADEMIC
ACTIVITIES

Assisted in organizing

- Online Workshop on **Numerical and Analytical Relativity (NAR) 2024**, IIT, Allahabad, 20 – 22 March, 2024.
- Short Term Certificate Course on **Computational Methods in Physics using Python (CoMP-Py) 2021**, IIT, Allahabad, 01 May – 10 July 2021.
- Vritika Seminars on **Computational and Theoretical Aspects of Gravitational Physics (CompGravIITA)**, IIT, Allahabad, June – July, 2021.
- **Applications of Data Science in Astrophysics and Gravitational Wave Research (DSAP) 2019**, IIT, Allahabad, 01 – 03 November 2019.
- **XXXIV Annual Indian Association of Physics Teachers (IAPT) Convention 2019**, IIT, Allahabad, 13 – 15 October 2019.
- **National Seminar on Recent Advances & Innovations in Physics Teaching and Research (RAIPTR) 2019**, IIT, Allahabad, 13 – 15 October 2019.

Attended

- **Summer School on Gravitational-Wave Astronomy 2024** organized by ICTS, Bangalore, 01 – 12 July 2024.
- **Predictability in General Relativity** organized by RRI, ICTS and IAGRG, 28 – 29 February 2024.
- **10th International Conference on Gravitation and Cosmology: New Horizons and Singularities in Gravity (ICGC 2023)** organized by IAGRG and IIT Guwahati, 05 – 09 December 2023.
- **IAGRG School on Gravitation and Cosmology** organized by IAGRG and ICTS, Bangalore, 09 – 23 October 2023.
- **Testing Aspects of General Relativity II** hosted by IIT Gandhinagar, IIT Allahabad, University of Lethbridge, Canada, 11 – 13 April 2023.
- **Numerical Relativity Community Summer School** organized by the Institute for Computational and Experimental Research in Mathematics (ICERM), Brown University, USA, 08 – 12 August 2022.
- **First IAGRG School on Gravitation and Cosmology** organized by the Indian Association of General Relativity and Gravitation (IAGRG), 16 – 28 May 2022.
- **Atlantic General Relativity 2022** hosted by the Memorial University of Newfoundland and Labrador, Canada, 16 – 19 May 2022.
- **Testing Aspects of General Relativity** hosted by IIT Gandhinagar, IIT Allahabad, University of Lethbridge, Canada, 11 – 14 March 2022.
- **Black Hole Inside Out 2021** organized jointly by Florida Space Institute, Tokyo Institute of Technology, and Yukawa Institute of Theoretical Physics (YITP), Kyoto University, 27 September – 1 October 2021.
- **2021 North American Einstein Toolkit School** organized by the National Center for Supercomputing Applications at the University of Illinois Champaign-Urbana, USA, 26 – 30 July 2021.
- **21st British Gravity Meeting (BritGrav21)** hosted by the Relativity Group in the School of Mathematics and Statistics at University College Dublin, 12 – 16 April 2021.
- **31st Meeting of the Indian Association for General Relativity and Gravitation (IAGRG)** organized by IIT, Gandhinagar on behalf of IAGRG, 19 – 20 December 2020.
- **Virtual Workshop on Statistical Methods for the Detection, Classification, and Inference of Relativistic Objects** organized by ICERM, Brown University, USA, 16 – 20 November 2020.
- **Virtual Workshop on Mathematical and Computational Approaches for the Einstein Field Equations with Matter Fields** organized by ICERM, Brown University, USA, 26 – 30 October 2020.
- **Virtual Workshop on Workshop on Mathematical and Computational Approaches for Solving the Source-Free Einstein Field Equations** organized by ICERM, Brown University, USA, 05 – 09 October 2020.

- **Online Workshop on Testing GR using Gravitational Waves** organized by IIT, Gandhinagar and IACS, Kolkata, 13 – 14 August 2020.
- **Student Talks on Trending Topics in Theory (ST4) 2020**, 04 – 14 July 2020.

ACADEMIC
VISITS**National Visits**

- Indian Institute of Technology Gandhinagar, Gujarat
Host: Dr. Sudipta Sarkar
Period: 18 Nov 2024 to 22 Nov 2024
- Indian Association for the Cultivation of Science, Kolkata
Host: Dr. Sumanta Chakraborty
Period: 10 Dec 2023 to 15 Dec 2023
Period: 11 Jul 2022 to 05 Aug 2022

PROJECTS AND
INTERNSHIPS

- Project Student** Dec 2018 to Mar 2019
Saha Institute of Nuclear Physics
Supervisor: Prof. Koushik Dutta
Topic: Vector Dark Matter Production at the End of Inflation
- M.Sc. Project Student** Jul 2017 to May 2018
Centre for Theoretical Physics,
Jamia Millia Islamia
Supervisor: Prof. Anjan Ananda Sen
Topic: Gravitation (Basics of General Relativity, Modified Theories of Gravity, Generalized Proca Theories, Warped Geometry and the Randall-Sundrum Model)
- Summer Student** May 2017 to Jul 2017
Department of Theoretical Physics,
Indian Association for the Cultivation of Science
Supervisor: Prof. Dilip Kr. Ghosh
Topic: A Reading Course on Quantum Field Theory
- Visiting Student** Dec 2016 to Jan 2017
Quantum Information and Computation Group,
Harish-Chandra Research Institute
Supervisor: Prof. Ujjwal Sen
Topic: A Reading Course on Quantum Entanglement and Quantum Information Theory

REFERENCES

- Prof. Anjan Ananda Sen
Professor of Physics,
Centre for Theoretical Physics,
Jamia Millia Islamia
E-mail: aasen@jmi.ac.in
- Prof. Srijit Bhattacharjee
Assistant Professor of Physics,
Department of Applied Sciences,
IIIT, Allahabad.
E-mail: srijitb@iiita.ac.in
- Prof. Dawood Kothawala
Associate Professor of Physics,
Centre for Strings, Gravitation and Cosmology,
Department of Physics,
IIT, Madras.
E-mail: dawood@iitm.ac.in
- Prof. Sumanta Chakraborty
Assistant Professor of Physics,
School of Physical Sciences,
IACS, Kolkata.
E-mail: tpsc@iacs.res.in

- Prof. Lekha Nair
Former Head and Professor of Physics,
Department of Physics,
Jamia Millia Islamia. E-mail: lnair@jmi.ac.in
- Prof. Somasri Sen
Associate Professor of Physics,
Department of Physics,
Jamia Millia Islamia. E-mail: ssen@jmi.ac.in
- Prof. Tabish Qureshi
Former Hony. Director and Professor of Physics,
Centre for Theoretical Physics,
Jamia Millia Islamia. E-mail: tabish@ctp-jamia.res.in

CONTACT
INFORMATION

Centre for Strings, Gravitation and Cosmology
Department of Physics,
Indian Institute of Technology, Madras
Chennai, Tamil Nadu 600036.
Phone: +91 98311 35421, +91 83683 94790
Primary Email ID: subhodeep.sarkar1@gmail.com
Other Email IDs: subhdeep.sarkar@physics.iitm.ac.in, subhodeep@ctp-jamia.res.in

OTHER
INFORMATION

Date of Birth: 17 July 1993
Nationality: Indian
Religion: None
Date of C.V.: 20 December 2024