

# Curriculum Vitae

## Srijit Bhattacharjee

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- **Present position:**  
Assistant Professor(On contract)  
Department of Applied Sciences  
IIT Allahabad  
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  - **Nationality and Permanent Address**  
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## Education Summary

- Higher Secondary examination 2001, WBCHSE
- B.Sc. in Physics Hons., 2004, Jadavpur University, Kolkata, India.
- M.Sc. in Physics, 2006, Jadavpur University, Kolkata, India.
- Post. M.Sc. Associateship diploma course, Saha Institute of Nuclear Physics (SINP), 2007.
- PhD from Saha Institute of Nuclear Physics, Kolkata, India:
  - **Title of the thesis:**  
*Quantum Infrared Instabilities of Gauge and Gravity coupled Higgs Fields*
  - **Name of the Supervisor:**  
Prof. Parthasarathi Majumdar
  - Date of Award of the degree: 14 March, 2014.

## Post Doctoral appointments

1. Postdoctoral fellow at the *High energy theory group of Institute of Physics, Bhubaneswar*, India between 12 November, 2015 to 15 July, 2016.
2. Worked as post doctoral fellow at the *Discipline of Physics, Indian Institute of Technology Gandhinagar* between August 4, 2014 to November 3, 2015 and from May 2013 to January 2014.
3. Worked as post doctoral fellow (from Feb 2014 to July 2014) at the *department of Physical Sciences, IISER Mohali*, Punjab, India.

## Awards and Scholarships

- Early Career Research Award for the project titled "Near Horizon Structure of Black Holes", sponsored by DST-SERB India. Total cost: INR 20,19,400.
- Research grant approved by IIT Allahabad on the project "Probing the Interior of AdS Black holes", Nov 2017. Approximate budget INR 800000.
- Grant for National Post Doctoral Fellowship (SERB-DST India) on the project: "Internal structure of AdS Black Holes". (Forfeited)
- Joint CSIR-HRDG National Eligibility Test (LS) , December 2009
- DST International Travel grant to attend Summer School on Quantum Gravity and Quantum Cosmology, Greece, 2011.
- Junior and Senior Research Fellowship of Department of Atomic Energy, 2006-2013.
- National level tests qualified: GATE 2006 (97 percentile), JEST-2006 (AIR-275).

## Academic visits

1. January 29-30, 2018, Center for Theoretical Physics, Jamia Milia Islamia, New Delhi, India.
2. May 21-25, 2017, *Department of Physics IIT Guwahati*.
3. February 6-16, 2017, *Institute of Physics, Bhubaneswar*, Odisha, India.
4. October 5-13, 2015, at the Theory Group of *Saha institute of Nuclear Physics, Kolkata*, India.
5. June 22-26, 2015, at *Physics and Applied Mathematics Unit, ISI Kolkata*, India.
6. June 3-21, 2014 at the *Department of Theoretical Physics, Indian Association for The Cultivation of Science, Kolkata*, India.
7. December, 2013 at the division of *Theoretical Physics of Institute of Mathematical Science, Chennai*, India.
8. October, 2012 at the *Astronomy and Astrophysics division of Tata Institute of Fundamental Research, Mumbai*, India.

## Research Interests

- Classical & quantum aspects of Gravity
- Black Hole and it's Thermodynamics
- Quantum Field Theory

## List of publications

1. "Late Time Tails in Extremal Reissner-Nordstrom Black Holes: Frequency domain analysis," *Srijit Bhattacharjee*, Bidisha Chakrabarty, Partha Paul, and Amitabh Virmani. (in preparation)
2. "Supertranslation and superrotation from soldering transformations," *Srijit Bhattacharjee*, and Arpan Bhattacharyya, arXiv:1707.01112. (under revision)
3. "No hair theorems for static and stationary reflecting star", *Srijit Bhattacharjee*, Sudipta Sarkar **Phys. Rev. D. 95, 084027**.
4. "Constraining scalar-Gauss-Bonnet Inflation by Reheating, Unitarity and PLANCK" *S. Bhattacharjee*, D. Maity, R. Mukherjee; **Phys. Rev. D 95, 023514**; arXiv:1606.00698 [gr-qc].

5. "Internal structure of charged AdS black Holes", *S. Bhattacharjee*, S. Sarkar and A. Virmani; **Phys.Rev. D93 (2016) no.12, 124029**, arXiv:1604.03730 [hep-th].
6. Entropy functionals and c-theorems from the second law, *S. Bhattacharjee*, A. Bhattacharyya, S. Sarkar, A. Sinha; **Phys. Rev. D 93 (2016) no.10, 104045**, arXiv:1508.01658.
7. Holographic entropy increases in quadratic curvature gravity, *S. Bhattacharjee*, S. Sarkar and A. C. Wall; **Phys. Rev. D 92 064006**, arXiv:1504.04706.
8. Physical Process First Law and Caustic avoidance for Rindler Horizon, *S. Bhattacharjee* and S. Sarkar, **Phys. Rev. D 91 024024**, arXiv:1412.1287 .
9. "Standard Model with gauge inert variables", *Srijit Bhattacharjee* arXiv:1408.6519. (under review)
10. "Gravitational Coleman Weinberg Potential and it's Finite Temperature Counterpart", **Nucl. Phys. B 13096, 481**, 2014. arXiv:1210.0497 [hep-th], [gr-qc]; *Srijit Bhattacharjee* and Parthasarathi Majumdar.
11. Gauge-free Coleman-Weinberg Potential; arXiv:1302.7272[hep-th]; *Srijit Bhattacharjee* and Parthasarathi Majumdar, **EPJ C 73: 2348**, 2013.
12. Gauge invariant couplings of fields to torsions: a string inspired model; *Srijit Bhattacharjee* and Ayan Chatterjee , **Phys. Rev. D 83:106007, 2011**; arXiv:1101.0118 [hep-th].
13. "Gauge-free Electroweak theory: Radiative effects"; *Srijit Bhattacharjee* and Parthasarathi Majumdar, **Phys. Rev. D 83:085019, 2011**; arXiv:1006.1712 [hep-ph].
14. Gauge-free Electrodynamics, Parthasarathi Majumdar and *Srijit Bhattacharjee*, arXiv: 0903.4340, [hep-th].

## Conference papers

1. "Infrared Issues in Graviton Higgs Theory", arXiv:1301.7312 [gr-qc]; *Srijit Bhattacharjee* and Parthasarathi Majumdar. (**Proceedings of the 13th Marcel Grossmann Meeting, Stockholm, World Scientific, p 1962-1964 2015**).
2. Vilkovisky-DeWitt Effective Potential Revisited in Gauge-Free Framework, *Srijit Bhattacharjee* arXiv:1210.1163. [hep-th] (**Proceedings of the 13th Marcel Grossmann Meeting, Stockholm, World Scientific, p 1981-1982 2015**).

## Teaching Experience

### Courses taught/teaching

Probability and Statistics (SPAS230C) (even semester-2017,18), BioStatistics & BioMathematics (SBDA131C, SBST732C) (Fall Semester-2016, 2017), Engineering Physics (SEGP132C) (July-Dec, 2017), Selected Topics on Quantum and Statistical Mechanics (course designed for PhD scholars), General Relativity (Elective topic for PhD coursework).

### Other experiences

1. Feb, 2011, Winter School on Gravity and Cosmology, Tutor, Assam University, Silchar, India.
2. Jan-Mar, 2010, Teaching Assistant, General Relativity, Post-M.Sc. course at SINP, India.
3. Jan-March, 2009, Quantum Field Theory, Teaching Assistant, Post-M.Sc. course at SINP, India.
4. Oct, 2008, 3rd Amol Kumar Raychoudhury School on General Relativity, Instructor, SINP, India.

## Invited and Contributed Talks/Posters

1. **Near horizon structure of black holes**, invited talk at the Centre for Theoretical Physics, Jamia Milia Islamia, New Delhi, January 30, 2018.
2. **Near Horizon Physics of Black Holes**, Seminar at the department of Physics, IIT BHU, September 1, 2017.
3. **Mass Inflation instability in Black Holes**, seminar at the department of Physics, IIT Guwahati, May 24, 2017.
4. **Internal structure of AdS Black Holes**, contributed talk in the parallel session of Classical gravity at 29-IAGRG meeting, IIT Guwahati
5. **Entropy Functionals and Second Law**, invited talk at the XI meeting on Field Theoretic Aspects of Gravity 2016, February 24, held at S N Bose National Centre for Basic Science, Kolkata, India.
6. **Entropy Functionals and Second Law for Curvature Squared Gravity Theories**, contributed talk at Advances in Astroparticle Physics & Cosmology 2015, Saha Institute of Nuclear Physics, Kolkata, India, 16 October.
7. **Entropy Functionals and Second Law for Curvature Squared Gravity Theories**, seminar given at the Theory group, Saha Institute of Nuclear Physics, Kolkata, 8 October, 2015.
8. **Entropy Functionals and Second Law for Curvature Squared Gravity Theories**, invited talk at the Young Researchers' Conference, Institute of Physics, Bhubaneswar, 29 September, 2015.
9. **Physical process first law for Rindler horizon**, contributed talk at Young Physicists Meet 2015, Physical Research Laboratory, Ahmedabad; March 12, 2015.
10. **Applicability of First Law for Rindler Horizon**, invited talk at the FTAG 2014, IISER Mohali, Punjab; 10th December, 2014.
11. **Applicability of First Law for Rindler Horizon**, invited talk at APC division, Saha Institute of Nuclear Physics, Kolkata, 2nd May 2014.
12. **Applicability of First Law for Rindler Horizon**, invited talk at the division of Theoretical Science, S N Bose National Centre for Basic Sciences, Kolkata, 30th April, 2014.
13. **Applicability of First Law for Rindler Horizon**, invited talk at PAMU, ISI, Kolkata, 28th April, 2014.
14. **Infrared Instability in Graviton Higgs Theory**, Oral Presentation in XIII Marcel Grossmann Meeting, Stockholm, Sweden, July 2012.
15. **Vilkovisky-DeWitt effective potential revisited in gauge-free approach**, Poster presented at XIII Marcel Grossmann Meeting, Stockholm, Sweden, July 2012.
16. **Gauge invariant couplings of fields to torsion: A string inspired model**, Poster presented at XIII Marcel Grossmann Meeting, Stockholm, Sweden, July 2012.
17. **Gauge invariant coupling of fields to torsion: A string inspired model**, Poster presented at the COSGRAV12, Indian Statistical Institute, Kolkata, India. Feb 2012.
18. **Gauge invariant coupling of fields to torsion: A string inspired model**, Talk given at the 7th International Conference on Gravitation and Cosmology (ICGC), Goa, India, Dec 2012.
19. **Gauge invariant coupling of fields to torsion: A string inspired model**, Oral Presentation at the Sixth Aegean Summer School on Quantum Gravity and Quantum Cosmology, Island of Naxos, Greece, September 2011.
20. **Towards Gravitational Coleman Weinberg Mechanism**, Invited talk at the VIII meeting on Field Theoretic Aspects of Gravity, HNB Garhwal University, Srinagar, India, April 2010.
21. **Gauge Free Electroweak Theory: Radiative Effects**, Contributed talk at XIX DAE-BRNS High Energy Physics Symposium, Jaipur, India, Dec 2010.

## Conferences

1. 29th Meeting of Indian Association for General Relativity and Gravity(IAGRG), IIT Guwahati, May 15-17, 2017.
2. Field Theoretic Aspects of Gravity 2016, XI-th meeting, February 22-26, held at S N Bose National Centre for Basic Science, Kolkata, India.
3. Advances in Astroparticle Physics & Cosmology, held at Saha Institute of Nuclear Physics, Kolkata, India; 14-17 October 2015.
4. Young Researchers' Conference 2015, 28-30 September, held at Institute of Physics, Bhubaneswar, India.
5. Young Physicists Meet 2015, Physical Research Laboratory, Ahmedabad; March 10-13, 2015.
6. Field Theoretic Aspects of Gravity, December 8-13, 2014 held at IISER Mohali, Punjab, India.
7. Field Theoretic Aspects of Gravity, September 5-8, 2013 held at IIT Gandhinagar, India.
8. XIII Marcel Grossmann Meeting , July 1-7, 2012 held at Stockholm, Sweden.
9. International Workshop on Advances in Astroparticle and Cosmology 2012 (AAPCOS 2012), March 7-12, Darjeeling, India.
10. International Conference on Modern Perspectives of Cosmology and Gravitation, Feb 7-11 2012, Indian Statistical Institute, Kolkata, India.
11. 7th International Conference on Gravitation and Cosmology (ICGC 2011), December 14-19, Goa, India.
12. QFT-2011 at Indian Institute of Science Education and Research, February 23-27, Pune, India.
13. International Workshop on Dark Matter in LHC Era: Direct and Indirect Searches, January 2011, SINP, Kolkata, India.
14. XIX DAE-BRNS HEP Symposium, December 13-18, Jaipur, India.
15. VIII meeting on Field Theoretic Aspects of Gravity, 19-23 April, HNB Garhwal University, Srinagar, India.
16. 25th Meeting of the Indian Association for the General Relativity and Gravitation(IAGRG), January 28-31, SINP, Kolkata, India.

## Schools/Workshops

1. Workshop on "Black Holes: From Classical to Quantum Gravity" Dec 15-19, 2017 at IIT Gandhinagar, India.
2. GIAN course on **The Black Hole Information Paradox by Prof. Samir. D. Mathur** held at IIT Gandhinagar between June 27 to July 8th , 2016. Participated and *conducted a tutorial session on laws of black hole mechanics.*
3. String-meeting with **Prof. Ashoke Sen**, NISER, Bhubneswar December 17-19, 2015.
4. Asymptotia: Workshop on Asymptotic Symmetries in Classical and Quantum Gravity. Chennai Mathematical Institute, 6 - 8 December 2013.
5. September, 2011, Sixth Aegean Summer School on Quantum Gravity and Quantum Cosmology, Island of Naxos, Greece.
6. September, 2009, School on Loop Quantum Gravity, Institute Of Mathematical Sciences, Chennai, India.
7. October, 2008, 4th Amol Kumar Raychoudhury School on General Relativity, SINP, India.
8. November, 2007, SERC Preparatory School on Theoretical High Energy Physics, Banaras Hindu University, Varanasi, India.
9. October, 2007, 3rd Amol Kumar Raychoudhury School on General Relativity, SINP, India.

## Thesis/Project Supervision

### Doctoral

- Rahul Maurya (Jointly supervising with Dr. A. B. Abu Baker).

### Masters

- *Population models with varying carrying capacity*, Vipin Tirkey, M. Tech. thesis, 2016-17 (Completed).
- Ongoing Theses (5): Stochastic resonance (Arvind Saroj), Noise induced transition (Ravikiran Kumar), Application of ODE in different disease models (Sujeet Kumar), Modeling Epilepsy and Alzheimer (Shruti Gupta), Ananya Mishra (Heart disease).

### Summer Project

Vishal Mugetia on *Heart as a self-oscillatory system* (completed).

## Referee of International Journals

General Relativity & Gravitation

## Membership in National/International Association

Life member of Indian Association for General Relativity & Gravitation (IAGRG)

## References

1. Dr. Amitabh Virmani  
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