

Avirup Ghosh

Assistant Professor, Kulti College

CONTACT INFORMATION Department of Physics, *email:avirup.avi@gmail.com*
Kulti College, Kulti, Paschim
Bardhaman, West Bengal,
PIN-713343

RESEARCH INTERESTS Black Hole Thermodynamics, Quasi-local Horizons, Semi-classical approaches to black Hole entropy, Geometric aspects of Holographic entanglement entropy from Anti-deSitter/Conformal Field Theory Correspondence, Asymptotic and near horizon symmetries

OTHER INTERESTS Quantum Computation, Data Science, Machine Learning.

POSITIONS HELD **Kulti College**, Kulti, Paschim Bardhaman, West Bengal, India
Assistant Professor in Physics, November, 2023-Present

Interdisciplinary Center for Theoretical Study, University of Science and Technology of China, Hefei, Anhui, China
Post-doctoral Fellow, September, 2019-August, 2021

Indian Institute of Technology, Gandhinagar, Gujarat, India
SERB, National Post-Doctoral Fellow, August, 2017-August, 2019
Research Associate, December, 2016-August, 2017

EDUCATION **Saha Institute Of Nuclear Physics**, Kolkata, India
Ph.D. Candidate, Theoretical Physics, August 2010

Dissertation Title: “Thermodynamics of Horizons: Some aspects of Semi-Classical Approaches” , Awarded by University of Calcutta,

Post M.Sc., 2009-10

University of Calcutta, Kolkata, India
Department of Physics
M.Sc., Physics (specialization in High energy physics), 2007-2009

Presidency College, Kolkata, India
Department of Physics
B.Sc., Physics, 2003-2006

1. **“Gravitational collapse in Einstein-Gauss-Bonnet gravity,”**
Ayan Chatterjee, Suresh C. Jaryal and **Avirup Ghosh**.
arXiv:2108.11680 [gr-qc]
DOI:10.1103/PhysRevD.106.044049
Phys.Rev.D **106** (2022), no. 4, 044049
2. **“Dynamical horizons and supertranslation transitions of the horizon,”**
Ayan Chatterjee and **Avirup Ghosh**.
arXiv:2009.09270 [gr-qc]
DOI:10.1103/PhysRevD.103.024046
Phys. Rev. D **103**, no.2, 024046 (2021)
3. **“Supertranslation transition between quasilocal black holes,”**
Amit Ghosh, **Avirup Ghosh** and Pritam Nanda.
arXiv:2003.01645 [gr-qc]
DOI:10.1103/PhysRevD.102.124061
Phys. Rev. D **102**, no.12, 124061 (2020)
4. **“Constraints on higher curvature gravity from time delay between GW170817 and GRB 170817A,”**
Avirup Ghosh, Soumya Jana, Akash K Mishra and Sudipta Sarkar.
arXiv:1906.08014 [gr-qc]
DOI:10.1103/PhysRevD.100.084054
Phys. Rev. D **100**, no.8, 084054 (2019)
5. **“Boundary Conservation from Bulk Symmetry,”**
C. Fairoos, **Avirup Ghosh** and Sudipta Sarkar.
arXiv:1805.05919 [gr-qc]
DOI:10.1142/S0218271818470235
Int. J. Mod. Phys. D **27**, no.14, 1847023 (2018)
6. **“Black Hole Entropy production and Transport coefficients in Lovelock Gravity”**
C. Fairoos, **Avirup Ghosh** and Sudipta Sarkar.
arXiv:1802.00177 [gr-qc]
DOI:10.1103/PhysRevD.98.024036
Phys. Rev. D **98**, no. 2, 024036 (2018)
7. **“Inhomogeneous Jacobi equation for minimal surfaces and perturbative change in holographic entanglement entropy”**
Avirup Ghosh and Rohit Mishra.
arXiv:1710.02088 [hep-th]
DOI:10.1103/PhysRevD.97.086012
Phys. Rev. D **97**, no. 8, 086012 (2018)
8. **“On the physical process first law for dynamical black holes”**
Akash Mishra, Sumanta Chakraborty, **Avirup Ghosh** and Sudipta Sarkar.
arXiv:1709.08925 [gr-qc]
DOI:10.1007/JHEP09(2018)034
JHEP **1809**, 034 (2018)
9. **“Massless charged particles: Cosmic censorship, and the third law of black hole mechanics”**
C. Fairoos, **Avirup Ghosh** and Sudipta Sarkar.
arXiv:1709.05081 [gr-qc]
DOI:10.1103/PhysRevD.96.084013
Phys. Rev. D **96**, no. 8, 084013 (2017)

10. **“Generalized geodesic deviation equations and an entanglement first law for rotating BTZ black holes”**
Avirup Ghosh and Rohit Mishra.
arXiv:1607.01178 [hep-th]
DOI:10.1103/PhysRevD.94.126005
Phys. Rev. D **94**, no. 12, 126005 (2016)
11. **“Quasilocal first law of black hole dynamics from local Lorentz transformations”**
Ayan Chatterjee and **Avirup Ghosh**.
arXiv:1511.01709 [gr-qc]
DOI:10.1140/epjc/s10052-018-6021-8
Eur. Phys. J. C **78**, no. 7, 550 (2018)
12. **“Quasilocal rotating conformal Killing horizons”**
Ayan Chatterjee and **Avirup Ghosh**.
arXiv:1502.07128 [gr-qc]
DOI:10.1103/PhysRevD.92.044003
Phys. Rev. D **92**, no. 4, 044003 (2015)
13. **“Quasilocal conformal Killing horizons: Classical phase space and the first law”**
Ayan Chatterjee and **Avirup Ghosh**.
arXiv:1412.5115 [gr-qc]
DOI:10.1103/PhysRevD.91.064054
Phys. Rev. D **91**, 064054 (2015)
14. **“Note on Kerr/CFT correspondence in a first order formalism”**
Avirup Ghosh.
arXiv:1404.5260 [gr-qc]
DOI:10.1103/PhysRevD.89.124035
Phys. Rev. D **89**, no. 12, 124035 (2014)
15. **“Entropy from near-horizon geometries of Killing horizons”**
Olaf Dreyer, Amit Ghosh and **Avirup Ghosh**.
arXiv:1306.5063 [gr-qc]
DOI:10.1103/PhysRevD.89.024035
Phys. Rev. D **89**, no. 2, 024035 (2014)

Link to publications

PRESENTATIONS

Online Poster competition organised by the American Chemical Society(ACS) and the Science and Engineering Research Board (SERB), 2020.

Talk on “Entropy production and transport coefficient for black holes in Lovelock-gravity” at ICTS, USTC, October, 2019.

Talk on “Entropy production and transport coefficient for black holes in Lovelock-gravity” at IAGRG, January, 2019 at BITS, Pilani, Hyderabad.

Talk on “Quasi-local conformal Killing horizons” at Chennai Mathematical Institute, September, 2017.

Poster Presentation on “Quasi-local conformal Killing horizons” at IAGRG, 2015 at RRI, Bangalore

Talk on “Asymptotic symmetries of space-times” at Central University of Himachal Pradesh in 2015.

RESEARCH
PROJECTS

Geometric and Thermodynamic aspects of Holographic Entanglement Entropy,

Principal Investigator, under the mentorship of Prof. Suddipta Sarkar, under the scheme, Science Education and Research Board (SERB) National Post-Doctoral Fellowship. Period- August, 2017-August, 2019. Total grant amount- 19,20,000/-

TEACHING

Undergraduate courses in General Properties of Matter, Electrodynamics, Computational Physics, Digital Electronics Laboratory in the Department of Physics, Kulti College

Short Course titled “Hamiltonian Formulation of General Relativity” at IIT, Gandhinagar, April, 2018

HONORS AND
AWARDS

JAM 2006, AIR-20

JEST 2006, AIR-31

Selected for pursuing integrated PhD at the Indian Institute of Science (IISc), Bangalore, 2006

GATE 2009, AIR-158

JEST 2009, AIR-40

Junior Research Fellowship in Physical Sciences, CSIR, India 2009, NET, June 2009, AIR-06

Research Fellowship at Saha Institute of Nuclear Physics from DAE, India, 2009.

Selected for pursuing PhD at the Institute of Mathematical Sciences (IMSc), Chennai, 2009

Science and Engineering Research Board (SERB) National Post-Doctoral Fellowship, 2017.

Honorable mention at Gravity Research Foundation annual essay competition, 2018 for the essay “Boundary conservation from bulk symmetry” with C. Fairros and Suddipta Sarkar. Published in a special issue of International Journal of Modern Physics D as Int.J.Mod.Phys. D27 (2018) no.14, 1847023.

COMPUTER SKILLS Python, Pandas, Scikit-learn, TensorFlow, Statsmodel, Mathematica, Maple, Fortran, Latex, Linux, SQL.

CERTIFICATIONS Udemy: Data Analysis with Pandas and Python (Dec 2021)
Udemy: Machine Learning A-Z (Jan 2022)
Udemy: Python for Time Series Data Analysis (Mar 2022)
Udemy: The Complete SQL Bootcamp 2022 (Sept 2022)

OTHERS Referee: General Relativity and Gravitation (Springer), The European Physical Journal C (Springer), Pramana (Springer).

Former Joint Secretary, 2010-2011, Research Fellows' Association, Saha Institute of Nuclear Physics

Local Co-organiser of Conference- Black-holes- From Classical to Quantum Gravity, a workshop in honour of eminent relativist Prof. C.V Vishveshwara, Indian Institute of Technology, Gandhinagar, 2017

Local Co-organiser of Symposium on 'Frontier Problems in Physics' at Indian Institute of Technology, Gandhinagar, 2018