Suvadeep Roy

Current Ph.D. Adv – Prof. Dr. Bennie F. L. Ward,
Research Assistant, Baylor University
MS Physics, IISER Kolkata
Former INSPIRE Scholar, DST, Govt. of India

Curriculum Vitae

17 August 1996
1825 South 3rd Street, Apt. 605, Waco, TX, US 76706
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RESEARCH INTEREST

Elementary Particle Theory and Precision Collider Physics; Quantum Information Theory, Quantum Foundations, and Black Hole Information

PH.D. RESEARCH

Collinearly Enhanced Resummed Electroweak Precision Calculation of Collider Processes AUG 2021–AUG 2026
***Prof. Dr.* Bennie F. L. Ward** (*Elementary Particle Theory, Baylor University*)
Funded as RA, BU

Develop amplitude-level YFS/CEEX-based electroweak-resummed predictions for $Z/\gamma^* \to \ell^+\ell^- + n\gamma$ in LHC kinematics at 8 and 13 TeV.
Implement and test exact multiphoton ISR/FSR and interference effects in KKMC-hh for realistic fiducial cuts.
Compare collinearly enhanced, YFS-resummed KKMC-hh predictions with LHC data as input to precision measurements and PDF studies.

MASTER'S RESEARCH

Curious Aspects of AdS/CFT AUG 2019–JUNE 2020
IISER Kolkata, SINP
Prof. Dr.* Arnab Kundu** (SINP***), ***Prof. Dr.* Prasanta K. Panigrahi** (***IISER Kolkata***)
Funded by DST, Govt. of India
Review of superstring theory and AdS/CFT.
Study of correlators in equilibrium and far-from-equilibrium holographic systems.
Analysis of gravitational scattering in AdS–Reissner–Nordström–Vaidya black-hole backgrounds and calculation of 4-point OTOCs in the corresponding boundary CFT/QGP toy model.

SELECTED RESEARCH EXPERIENCES

Study of Black Holes through Topological Insulators
Prof. Dr. Prasanta K. Panigrahi (*IISER Kolkata*)
Fund: DST, Govt. of India
Explored phase transitions in topological insulators as analogues of black-hole evaporation, relating decoherence and phase transitions to information-loss questions and simple constraints on effective spacetime geometry.
Study of AOKI Phase in Lattice QCD
Prof. Dr. Dipankar Chakrabarti (*IIT Kanpur*)
Funded by DST, Govt. of India
Studied doubled fermions and representative QCD-inspired models, analyzed the Aoki phase and Gross–Neveu phase structure, and learned Monte Carlo methods for lattice QCD with emphasis on parity- and flavor-breaking phases.
Quantum Cloning and Cryptographic Issues
Prof. Dr. Dipankar Home (*Bose Institute*)
Funded by DST, Govt. of India
Analyzed quantum cloning and approximate cloning machines, and how

EDUCATION

Baylor University, TX Aug 2021—Aug 2026
Ph.D., RA, Elementary Particle Theory| GPA: **3.9/4**
Dissertation: Collinearly Enhanced Resummed Electroweak Precision Calculations of Collider Processes
Advisor: **B. F. L. Ward**
IISER Kolkata, India 2015—2020
Integrated BS–MS in Physics (Major); MS GPA: **9.84/10**
MS Thesis: *Correlators in Holography* (Advisors: **Arnab Kundu** (SINP), **P. K. Panigrahi** (IISER Kolkata))

PROGRAMMING SKILLS

EXPERT C++, Python, ROOT, MadGraph5_aMC@NLO
Fortran, HERWIG, HERWIRI, PYTHIA
TensorFlow, Matlab, Mathematica, C, Java

PUBLICATIONS

Roy, Suvadeep et al. (2020). Quantum circuit design methodology for multiple linear regression. *IET Quantum Communication*, *1*(2), 55–61. DOI: 10.1049/iet-qtc.2020.0013

Roy, Suvadeep et al. Experimental Realization of Quantum Violation of Entropic Noncontextual Inequality in Four Dimension Using IBM Quantum Computer. *arXiv:1710.10717 [quant-ph].*

Roy, Suvadeep. Correlators in Holography (MS thesis).

(Some other works are in preparation. All publications are first author or co–first where applicable.)

SELECTED PPT AND POSTER

2022 New Developments in KKMC-hh: Quark-Level Exponentiated Radiative Corrections and Semi-Analytical Results (BU)
2022 Feynman Diagrams and Hypergeometric Functions: ϵ-Expansion Approaches
2022 Holographic Entanglement Entropy and How It Can Be Translated to Rewriting Models (Wolfram)
2021 Role of IR-Improvement in LHC/FCC Physics (BU)
2020 Curious Aspects of AdS/CFT (IISER Kolkata)
2019 Asia Pacific Conference and Workshop on Quantum Information Science (IISERK, HRI, ICTP)

RA AND TEACHING EXPERIENCE

2021–2026 Research Assistant (Elementary Particle Theory)
Dept. of Physics & Astronomy, Baylor University
2021 Teaching Fellow (Ashoka University) – FOT
Special Relativity; Introduction to Astrophysics and Astronomy; Metamaterials

their disturbance–information trade-offs impact security and attack strategies in quantum key-distribution protocols.

Novel Aspects of Preparation Contextuality and Steering
Prof. Dr.* Alok K. Pan** (NIT Patna***)
Funded by DST, Govt. of India
Intensive study of preparation contextuality and EPR steering, using inequalities and quantum bounds to probe nonlocality/contextuality and monogamy, and applying these insights to the analysis and design of QKD protocols (manuscripts in preparation).

Quantum Machine Learning with Quantum Neuron
Prof. Dr.* Prasanta K. Panigrahi** (IISER Kolkata***)
DST, Govt. of India
Learned quantum machine learning; designed and simulated quantum-neuron–style circuits. Coauthored the IET Quantum Communication article "Quantum Circuit Design Methodology for Multiple Linear Regression," demonstrating an HHL-based circuit for exponentially accelerated linear solves applied to regression.

Mathematical Study of the Unaligned Radio-Jet Vectors for Different Galaxies
Prof. Dr.* Patrick Dasgupta** (Delhi University***)
Funded by DST, Govt. of India
Analyzed galaxy radio-jet alignments, developing geometric and projection methods to characterize intrinsically misaligned jets whose 2D projections appear aligned.

Simulating Charge Diffusion over the Anode of Piggyback MICROMEGAS
Prof. Dr.* Supratik Mukhopadhyay** (SINP***)
Funded by DST, Govt. of India
Developed C++ simulations for micro-pattern gas detectors, modeling mesh/anode dynamics and geometry-aware charge diffusion to compute realistic anode-pad charge distributions incorporating pad dimensions.

READING AND SEMINAR PROJECTS

(Mar 2019 – Feb 2020) Study of Universal Phenomenon as Quantum Computer
Supervisor: Prof. Prasanta K. Panigrahi, Department of Physical Sciences, IISER Kolkata

(Jan 2019 – May 2019) Data Analysis to Detect the Geographical Origin of Songs
Instructor: Prof. Koel Das, Department of Mathematical Sciences, IISER Kolkata

(Sep 2018 – Jun 2019) Study of the Processes of Quantization of Space-Time
Supervisor: Prof. Prasanta K. Panigrahi, Department of Physical Sciences, IISER Kolkata

(Aug 2018 – Dec 2018) Study of Solitons as Spiked String Solutions in AdS/CFT
Instructor: Prof. Prasanta K. Panigrahi, Department of Physical Sciences, IISER Kolkata

(Aug 2018 – Dec 2018) Study of Optical Analogues of Quantum Black Holes & Transformation Media (Invisibility)
Instructor: Prof. Prasanta K. Panigrahi, Department of Physical Sciences, IISER Kolkata

(Dec 2016 – Aug 2017) Study on Quantum Decoherence
Supervisor: Prof. Dipankar Home, NASI-Senior Scientist Platinum Jubilee Fellow, Bose Institute

(Dec 2016 – Feb 2017) Study on Quantum Brownian Motion
Supervisor: Prof. Sunandan Gangyopadhyay, DPS, IISER Kolkata

(Mar 2016 – Jun 2016) Intensive Summer School on Quantum Information, Computation, and Cryptography
Supervisor: Prof. Guruprasad Kar, Physics and Applied Mathematics Unit, ISI Kolkata

2019–2020 Teaching Assistant (IISER Kolkata, DPS)
Classical Mechanics, Optics, Electronics, and Quantum Mechanics

SELECTED CONFERENCES

2025 STRINGS (**New York University, Abu Dhabi**)
2024 STRINGS (**CERN, EPFL, ETHZ, LAPTh, Geneva**)
2023 Amplitudes **(CERN)**
2023 RADCOR 2023(**CERN**)
2023 Thematic Program on Op. Algebras and Applications (**The Fields Institute for Research in Math. Sc.**)
2021 Wolfram Physics Project Winter School
2021 Gravity and Emergent Gauge Fields in Condensed and Synthetic Matter ***(MITP, CNRS, UU, HU)***
2021 Workshop on Quantum Gravity, Holography and Quantum Information ***(MPI, LMU, ASCTP)***
2021 Dualities in Topology and Algebra ***(ICTS-TIFR, ISI)***
2021 Nonperturbative and Numerical Approaches to Quantum Gravity, String Theory and Holography ***(ICTS-TIFR)***
2020 Fields, Gravity, and Information ***(UF)***
2020 Winter School on High Energy Physics ***(ICTP, IUB)***
2020 Quantum Field Theory at the Boundary ***(MITP)***
2020 Strings, Fields and Holograms ***(ETHZ)***
2020 Recent Developments in S-Matrix Theory ***(ICTS)***
2020 Annual Meeting of Indian Association for General Relativity and Gravitation ***(IAGRG)***
2019 Summer School in Gauge and String Theory ***(DESY)***
2019 International School on Amplitudes and Cosmology, Holography and Positive Geometries ***(INFN)***
2019 Asia Pacific Conference and Workshop on Quantum Information Science ***(IISERK, HRI, ICTP)***

AWARDS

2019 **Assistant Professor of Physics Eligibility**
University Grants Commission National Eligibility Test
2021 **Featured Contributor for Wolfram Summer School**
Translating HEE to rewriting model
2015 **INSPIRE Fellowship Grant 2015–2020**
DST, Govt. of India; Academically **Top 1%** in India
2013 **IOCL Scholarship 2013–2015**
Indian Oil Corporation Limited, Govt. of India
2010 **International Mathematics Olympiad**
IMO BCC; Gold Medal Winner (State Level)

REFERENCE

Prof. Dr. Bennie Franklin Leon Ward
POSITION Distinguished Professor in Physics
INSTITUTION Elementary Particle Theory, Baylor University
EMAIL *BFL_Ward@baylor.edu*

Prof. Dr. Anzhong Wang
POSITION Professor in Physics
INSTITUTION Gravity, Cosmology & Astroparticle Physics, BU
EMAIL *Anzhong_Wang@baylor.edu*

Prof. Dr. Gerald B. Cleaver
POSITION Professor in Physics
INSTITUTION EUCOS – CASPER (Head), Baylor University
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