



Curriculum Vitae

Personal details

- Name: Swapnamay Mondal
- Date of Birth : 17th June, 1989
- Gender: Male
- Marital Status: Married
- Nationality: Indian
- Current affiliation: Assistant Professor, Banaras Hindu University, Varanasi, India
- E-mail: swapnamay@bhu.ac.in, swapnamay.swapnamay@gmail.com,
- Present Address: Quarter L4 (old), Hyderabad Colony, Banaras Hindu University, Varanasi, India - 221005
- Permanent Address: Vidyasagar Pally, Nichupati, Bolpur, West Bengal, India - 731204

Research experience

worked and (/ or) working on -

- Near-Extremal and non-supersymmetric Black Holes
- Black hole formation in String theory
- Quiver Quantum Mechanics
- Solvable Deformations ($T\bar{T}$) of Quantum Field Theories
- Scaling Black Holes
- Modular Symmetry
- Black Hole Microstate Counting
- Microstate Geometries
- SYK Model and Tensor Models
- Machine Learning

Main research interests

- Black Holes, D-branes, Solvable Deformations of Quantum Field Theories, Quiver Quantum Mechanics
Machine Learning, Chaos and Thermalization,

Education

- **Ph.D**
Degree obtained in: 2017
Institute : Harish-Chandra Research Institute, Homi Bhabha National Institute, India
Discipline : Physics
Advisor : Prof. Ashoke Sen
- **M.Sc** (as part of Integrated PhD)
Degree obtained in: 2013
(First two years of coursework (2009-2011) was equivalent to M.Sc, as demarcated in the marksheet. But due to administrative delays, the degree was awarded later.)

Institute : Harish-Chandra Research Institute, Homi Bhabha National Institute, India
Subject : Physics
Percentage : 81.4

- **B.Sc**

Duration: 2006-2009

Institute: Visva Bharati University, India

Subject : Physics

Percentage: 75.5

Employment record

- 2009-2011 : Junior Research Fellow at Harish-Chandra Research Institute, India
- 2011-2016 : Senior Research Fellow at Harish-Chandra Research Institute, India
- 2016-2018 December : Post Doctoral Fellow at LPTHE, UPMC, Paris, France (under CEFIPRA fellowship)
- 2018 December - 2019 September : Visiting Research Associate at ICTS, Bengaluru, India (continuation of CEFIPRA fellowship)
- 2019 October - 2022 September: Post-Doctoral Research Fellow at Trinity College Dublin, Ireland
- 2022 October- 2023 September : Research Fellow at Dublin Institute for Advanced Studies, Dublin, Ireland
- 2024 February - now : Assistant Professor, Banaras Hindu University, Varanasi, India

Teaching Experience

- I have taught/ am teaching 4 Bachelors courses at Banaras Hindu University in 2024. I have supervised/am supervising various Bachelors + Masters laboratory courses at Banaras Hindu University in 2024.
- I have taught a Masters course on *Conformal Field Theory* at Trinity College Dublin, Ireland in fall, 2021. In this course I have delivered 10 lectures, each 90 minutes in duration. I have largely followed Di Francesco-Mathieu-Sénéchal book and have covered until introduction of minimal models in chapter 7.

Supervising Experience

- I am currently guiding 3 students in their Masters projects at the Banaras Hindu University.
- During spring-summer 2022 at Trinity College Dublin, Ireland, I have supervised a student on Masters thesis project proposed by me (on advanced topics in *Conformal Field Theory*).
- During summer 2023 at Dublin Institute for Advanced Studies, Dublin, Ireland Currently guiding two Bachelors students in their summer projects.

Awards and achievements

- Recipient of ANRF “Prime Minister early Career Research Grant” in the year 2025.
- All India rank 10 in Joint Admission Test for M.Sc (JAM) 2009
- All India rank 10 in Joint Entrance Screening Test (JEST) 2009
- Recipient of Infosys award of Harish-Chandra Research Institute for the year 2016 for excellence in research in String Theory.
- Recipient of CEFIPRA (Indo-French Centre for the Promotion of Advanced Research) fellowship in the year 2016.

Publications

[link to list of all publications](#)

- “Statistical Mechanics of Exponentially Many Low Lying States”; [accepted in SciPost Physics](#) ,[arxiv:2310.12264](#)
- “Non-trivial saddles in microscopic description of black holes”; [JHEP07\(2024\)123](#) [arxiv:2312.04643](#)
- “Black holes and the loss landscape in machine learning” ; [JHEP10\(2023\)107](#) [arxiv:2306.14817](#)
- “Supersymmetric black holes and $T\bar{T}$ deformation”; [Phys.Rev.D107,L121903](#), [arxiv:2207.01462](#)

- “Super-maximal chaos and instability”; *J. Phys. A: Math. Theor.* 57 025002 ,arXiv:1801.09669
- “Scaling Black Holes and Modularity”; *JHEP03(2022)001* arxiv: 2110.05504
- “Multi-centered black holes, scaling solutions and pure-Higgs indices from localization”; *SciPost Phys.* 11, 023 (2021) arxiv:2103.03205
- “Quiver indices and Abelianization from Jeffrey-Kirwan residues”; *JHEP10(2019)184*, arxiv:1907.01354
- “Phase Thermalization: from Heavy Fermi Liquid to Incoherent Metal”; *Int J Theor Phys* 64, 1 (2025)t , arxiv:2012.15666
- “A simple model for Hawking radiation”; *JHEP03(2020)119*, arxiv:1901.03483
- “The full space of BPS multicenter states with pure D-brane charges”; *JHEP06(2019)011* arxiv:1810.10019
- “Tensor Models for Black Hole Probes”; *JHEP07(2018)095*, 1711.04385
- “Conformality of $1/N$ corrections in SYK-like models”; 10.1103/PhysRevD.100.125005, 1706.00412
- “Do All BPS Black Hole Microstates Carry Zero Angular Momentum?”; *JHEP04(2016)082*, arxiv:1511.06978
- “Entanglement of Spatial Regions vs. Entanglement of Particles” ; *JHEP08(2016)121*, arxiv:1501.01743
- “Surviving in a Metastable de Sitter Space-Time”; *JHEP09(2015)139* , arxiv:1506.00772
- “BPS state counting in $N=8$ supersymmetric string theory for pure D-brane configurations” ; *JHEP10(2014)186* , arxiv:1405.0412
- “An extremal black hole with a unique ground state”; arxiv:2411.11096

Preprints

Schools and conferences attended

- Solvay Workshop on near-extremal black holes, Solvay, Belgium in September 2024
- Irish Theoretical Physics Meeting 2023, September 6-9, 2023, Maynooth University, Ireland
- Computer science for knotty math problems, November 7-11, 2022, Dublin Institute for Advanced Studies, Ireland
- Workshop on Quivers, Calabi-Yau threefolds and DT Invariants, April 11-15, 2022, Sorbonne Université - Campus Pierre et Marie Curie, Paris, France
- Hamilton Mathematical Institute workshop on “Quantum Gravity and Modularity”, May 3-14, 2021, Trinity College Dublin, Ireland (attended online)
- KITP program on “Modularity in Quantum Systems”, Oct 16- Dec 18, 2020, KITP, USA (attended online)
- Indian Strings Meeting in Dec,2018 at IISER Thiruvananthapuram, India
- Cargèse Summer School on Quantum Gravity, Strings and Fields, 11-23 June, 2018, Corsica, France
- Spring School on Superstring Theory and Related Topics from 25th March - 2nd April, 2015 at ICTP, Trieste, Italy
- Indian Strings Meeting in Dec,2014 at Puri, India
- Spring School on Superstring Theory and Related Topics from 31st March - 8th April, 2014 at ICTP, Trieste, Italy
- The 8th Asian Winter School on Strings, Particles and Cosmology from Jan 09-18, 2014 at Puri, India
- National Strings Meeting in Dec, 2013 at IIT Kharagpur, India
- Indian Strings Meet in Dec 2012 at Puri, India
- Strings to LHC in Dec, 2012 at Puri,India
- Advanced String School in Oct 2012 at Puri, India

Talks and seminars

- *Invited talk* at Solvay Workshop on near-extremal black holes, Solvay, Belgium in September 2024
- *Invited talk* at Institute for Advanced Studies, Princeton, USA in June 2023
title: *Black Holes and TT deformations*
- *Invited talk* at New York University, USA in June 2023
title: *Black Holes and TT deformations*
- Irish Theoretical Physics Meeting 2023, Maynooth University, Ireland in September 2023
title: *Black Holes and TT deformations*
- IISc Bengaluru, India in February 2023
title: *Black Holes and TT deformations*
- ICTS Bengaluru, India in January 2023
title: *Black Holes and TT deformations*
- NISER Bhubaneswar, India in January 2023
title: *Black Holes and TT deformations*
- Institute of Physics, Bhubaneswar, India in January 2023
title: *Black Holes and solvable deformations*
- Indian Association for the Cultivation of Sciences, Kolkata, India on December 2022
title: *Supersymmetric Black Holes and TT deformations*
- *Invited talk* at Institute of Physics of the Czech Academy of Sciences, Prague, Czech Republic in October 2022
title: *Black Holes and Integrable deformations*
- *Invited talk* at Dublin Institute for Advanced Studies, Dublin, Ireland in March 2022
title: *Scaling Black holes and Modularity*
- *Invited talk* at Hamilton Mathematical Institute Workshop on Quantum Gravity and Modularity, Trinity College Dublin, Ireland in May 2021
title: *Scaling Solutions, Pure Higgs States from localization*
- *Invited talk* at Harish-Chandra Research Institute, Prayagraj, India in September 2019
title: *Quiver invariants from Jeffrey- Kirwan residues*
- *Invited talk* at CPhT, École Polytechnique, France in November, 2018
title: *Fuzz in the Horizon?*
- Saha Institute of Nuclear Physics, Kolkata, India in August, 2018
title: *SYK Models for Black Hole Probe*
- *Invited talk* at 15th Workshop on non-perturbative quantum Chromodynamics, IAP, Paris, France in June 2018
title: *Tensor Models for Black Hole Probe*
- *Invited talk* at LPT, Orsay, France in December, 2017
title: *Tensor Models for Black Hole Probe*
- *Invited talk* at IPhT, Saclay, France in November, 2017
title: *Tensor Models for Black Hole Probe*
- UC Davis, Davis, USA in November, 2015,
title: *Black Hole microstate counting using pure D brane systems*
- Caltech, Pasadena, USA in November, 2015
title: *Black Hole microstate counting using pure D brane systems*
- USC, Los Angeles, USA in November, 2015
title: *Black Hole microstate counting using pure D brane systems*
- UCLA, Los Angeles, USA in November, 2015
title: *Black Hole microstate counting using pure D brane systems*
- New York University, New York, USA in November, 2015
title: *Black Hole microstate counting using pure D brane systems*
- Brandeis University, Boston, USA in November, 2015
title: *Black Hole microstate counting using pure D brane systems*

- University of Chicago, Chicago, USA in November, 2015
title: *Black Hole microstate counting using pure D brane systems*
- CERN, Geneva, Switzerland in April, 2015
title: *Black Hole microstate counting using pure D brane systems*
- ICFO, Barcelona, Spain in April, 2015
title: *A Unified Formulation for Entanglement of Distinguishable and Indistinguishable Particles*
- SISSA, Trieste, Italy in March, 2015
title: *A Unified Formulation for Entanglement of Distinguishable and Indistinguishable Particles*
- ICTP, Trieste, Italy in March, 2015
title: *Black Hole microstate counting using pure D brane systems*
- Indian Strings Meeting, Puri, India in December, 2014
title: *Pure D-brane Systems and Black Hole Microstate Counting*

References

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