ACTIVITY REPORT

(September-December 2023)

ICTS International Centre for Theoretical Sciences
TATA INSTITUTE OF FUNDAMENTAL RESEARCH

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ICTS Senior Faculty Associates JAHNAVI PHALKEY and MUKUND THATTAI received the 2023 Infosys Prize for Humanities and Physical Sciences, respectively. Phalkey, Founding Director of Science Gallery Bengaluru, was recognized for her “brilliant and granular insights into the individual, institutional, and material histories of scientific research in modern India.” Thattai, Professor at the National Centre of Biological Sciences, was awarded for his “groundbreaking contributions to evolutionary cell biology.”

I ICTS ACTIVITIES

Summary of Programming Activities *(For details see following pages)* Programs/Discussion Meetings held: 11

Academic visitors to ICTS-TIFR: 45

Seminars and colloquia: *(For details see Annexure – A)*

Summary of Research Activities *(For details see Annexure - B)*

Papers published: 37

arXiv submissions: 17

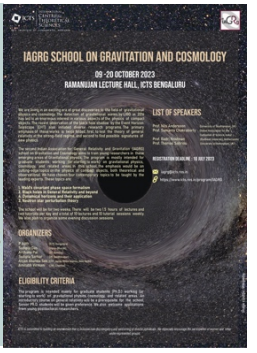
Ia. PROGRAMS

ICTP-ICTS Winter School on Quantitative Systems Biology
Organizers: Vijaykumar Krishnamurthy (ICTS-TIFR, Bengaluru), Daniel Needleman (Harvard University, USA), Simone Pigolotti (OIST, Japan) and Shashi Thutupalli (ICTS/ NCBS-TIFR, India) | 4-15 December 2023

Algebraic and Combinatorial Methods in Representation Theory
Organizers: B Ravinder (IIIT Tirupati), R Venkatesh (IISc, Bengaluru) and S Viswanath (IMSc, Chennai) | 13 - 24 November 2023

Active Matter in Complex Environments
Organizers: Tapomoy Bhattacharjee (NCBS-TIFR, Bengaluru), Christina Kurzthaler (Max Planck Institute for the Physics of Complex Systems, Germany) and Sumantra Sarkar (IISc, Bengaluru) | 23 October-3 November 2023

IAGRG School on Gravitation and Cosmology
Organizers: Amitabh Virmani (CMI, Chennai), Anjan Ananda Sen (CTP, Jamia Millia Islamia, New Delhi), Archana Pai (IIT Bombay, Mumbai), Sudipta Das (VBU, Santiniketan), Sudipta Sarkar (IIT Gandhinagar) and Parameswaran Ajith (ICTS-TIFR, Bengaluru) | 9-20 October 2023



Condensed Matter meets Quantum Information
Organizers: Yuval Gefen (Weizmann Institute, Israel), Ganpathy Murthy (University of Kentucky, USA) and Sumathi Rao (ICTS-TIFR, Bengaluru) | 25 September-6 October 2023

Rational Points on Modular Curves
Organizers: Chandrakant Aribam (IISER Mohali), Shaunak Deo (IISc, Bengaluru), Narasimha Kumar (IIT Hyderabad) and Pierre Parent (Institute Mathematics De Bordeaux, France) | 11-22 September 2023

Bangalore School on Statistical Physics - XIV
Organizers: Abhishek Dhar (ICTS-TIFR, Bengaluru) and Sanjib Sabhapandit (RRI, Bengaluru) | 11-22 September 2023

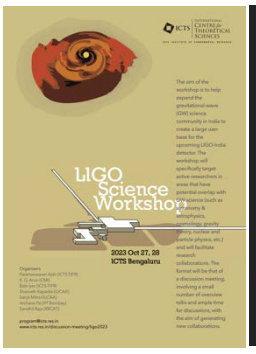
Ib. DISCUSSION MEETINGS

Field Theory and Turbulence
Organizers: Katepalli R. Sreenivasan (New York University, USA), Loganayagam Ramalingam (ICTS-TIFR, Bengaluru), Luca Moriconi (UFRJ, Rio de Janeiro, Brazil) and Mahendra K. Verma (IIT Kanpur) | 18 - 22 Dec. 2023

Lectures on Probability and Stochastic Processes
Organizers: Siva Athreya (ICTS-TIFR & ISI Bengaluru) and Koushik Ramachandran (TIFR-CAM, Bengaluru) | 17- 21 November 2023

Active Matter and Beyond
Organizers: Jean-François Joanny (Collège de France), Vijaykumar Krishnamurthy (ICTS-TIFR), Cristina Marchetti (University of California, Santa Barbara, USA), Gautam Menon (Ashoka University, Sonipat and IMSc, Chennai), Shraddha Mishra (IIT Varanasi (BHU), Madan Rao (NCBS-TIFR, Bengaluru) and Prerna Sharma (IISc, Bengaluru) | 6 - 10 November 2023

LIGO Science Workshop
Organizers: Parameswaran Ajith (ICTS-TIFR, Bengaluru), K. G. Arun (CMI, Chennai), Bala Iyer (ICTS-TIFR, Bengaluru), Shasvath Kapadia (IUCAA, Pune), Sanjit Mitra (IUCAA, Pune), Archana Pai (IIT Bombay, Mumbai) and Sendhil Raja (RRCAT, Indore) | 27 - 28 October 2023



Ic. LECTURE SERIES

INFOSYS-ICTS CHANDRASEKHAR LECTURES

The Allure of Active Matter
Sriram Ramaswamy (IISc, Bengaluru) | 6-8 November 2023

DISTINGUISHED LECTURES

Exact Solution of Decaying Turbulence
Alexander Migdal (New York University, Abu Dhabi, UAE) | 19 December 2023

Duality in Condensed Matter Physics and Field Theory
Eduardo H Fradkin (University of Illinois at Urbana-Champaign, USA) | 27 September 2023

FOUNDATION DAY LECTURE
Dimensions: 1,2,3,4...
Mahan Mj (TIFR, Mumbai) | 13 December 2023

Id. VISITS OF SCIENTISTS

The following researchers visited ICTS during September-December 2023.

1. **Mahesh Kakde,** Indian Institute of Science, Bengaluru
2. **Srinivas Raghu**, Stanford University, USA
3. **Subir Sachdev**, Harvard University, USA
4. **B.S. Sathyaprakash**, Pennsylvania State University, USA and Cardiff University, UK
5. **Karl Herbert Spohn**, Technical University of Munich, Germany
6. **Ajit Kumar Mehta**, University of California, Santa Barbara, USA
7. **Tanmay Vachaspati**, Arizona State University, USA
8. **Immanuvel Paul**, Newcastle University, UK
9. **Trishen Gunaratnam**, University of Geneva, Switzerland
10. **Sreehari Perumanath**, University of Warwick, UK
11. **Sridip Pal,** Caltech, USA
12. **Debasish Chaudhuri**, Institute of Physics, Bhubaneshwar
13. **Saif Ali**, Weizmann Institute, Israel
14. **Manoj Gupta**, S. N. Bose National Centre for Basic Sciences, Kolkata
15. **Shubhayu Chatterjee**, Carnegie Mellon University, USA
16. **Kyubin Kwon**, University of California, Santa Barbara, USA
17. **Uddipan Banik**, Princeton University, USA
18. **Jonathan Schiff**, University of California, Santa Barbara, USA
19. **Bipin Kumar**, Indian Institute of Tropical Meteorology (IITM), Pune
20. **Ayan Bhattacharya**, Indian Institute of Technology Bombay, Mumbai
21. **Adwait Gaikwad**, Tel-Aviv University, Israel
22. **Lakshmi Priya**, Tel Aviv University, Israel
23. **Shri Vignesh K**, Indian Institute of Madras, Chennai

24. **Aritra Roy**, Indian Institute of Technology (ISM) Dhanbad
25. **Arvind Arun Dev**, Cornell University, USA
26. **Shreya Vardhan**, Stanford University, USA
27. **Parthasarathi Majumdar**, Indian Association for the Cultivation of Science, Kolkata
28. **Pavan Dharanipragada**, Institute of Mathematical Sciences, Chennai
29. **Bhubanjyoti Bhattacharya**, Lawrence Technological University, USA
30. **Soumik Ghosh**, University of Chicago, USA
31. **Kanaya Malakar**, Brandeis University, USA
32. **Bulbul Chakraborty**, Brandeis University, USA
33. **Vatsal**, Indian Institute of Technology Bombay, Mumbai
34. **Vivek Natarajan**, Indian Institute of Technology Bombay, Mumbai
35. **Apratim Kaviraj**, Deutsches Elektronen-Synchrotron (DESY), Germany
36. **Sucheta Majumdar**, ENS de Lyon, France
37. **Ajit Bhand**, IISER, Bhopal
38. **Nisheeta Desai**, TIFR, Mumbai
39. **Sumiran Pujari**, Indian Institute of Technology Bombay, Mumbai
40. **Shanmugapriya Prakasam**, Chennai Mathematical Institute, Chennai
41. **Alok Laddha**, Chennai Mathematical Institute, Chennai
42. **Isha Anantpurkar**, UC Santa Barbara, USA
43. **Ranveer Kumar Singh**, Rutgers University, USA
44. **Vidyanand Nanjundiah**, Centre for Human Genetics, Bengaluru
45. **Sunil Mukhi**, IISER, Pune

e. NEWS ON GRANTS, AWARDS AND FELLOWSHIPS

ABHISHEK DHAR was selected for the prestigious **J. C. Bose National Fellowship** of the Science and Engineering Research Board (SERB), Department of Science & Technology, Government of India. DHAR was also awarded the pan-TIFR **TAA BM Udgaonkar: Excellence in Teaching Award** for 2022 in Phvsics.

ICTS graduate student SAHIL KUMAR SINGH received the **best poster award** for his work titled '*Thermalization and hydrodynamics in an interacting integrable system: the case of hard rods*', presented at the recent School/Workshop on Wave dynamics: Turbulent vs Integrable Effects held at ICTP, Trieste. The work was done in collaboration with Abhishek Dhar, Herbert Spohn, and Anupam Kundu.

JIM THOMAS received a **grant** for the '*Internal gravity waves and deep ocean diffusivity*' project under the Deep Ocean Mission of the Ministry of Earth Sciences to work on ocean dynamics and the climate.

II ICTS PEOPLE

IIa FACULTY

1. ADHIP AGARWALA (Indian Institute of Technology, Kanpur), LAKSHYA BHARDWAJ (Mathematical Institute, University of Oxford, UK), ARCHAK PURKAYASTHA (IIT Hyderabad) and FRANK DEN HOLLANDER (Leiden University, The Netherlands) joined ICTS as ICTS Faculty Associates.

IIb STUDENTS

GRADUATE PROGRAM

1. **Sugan Durai Murugan** (Advisor: Samriddhi Sankar Ray) successfully defended his thesis on 17 November 2023.
2. **Srikanth Pai B** (Advisor: Pranav Pandit) successfully defended his thesis on 29 November 2023.
3. **Alan George Sherry** (GS Int. PhD 2020) registered for PhD under Abhishek Dhar in September 2023.
4. **Bikram Pain** (GS Int. PhD 2021) registered for PhD under Sthitadhi Roy in November 2023.
5. **Early offer for PhD/ IPhD program**: Students selected for summer research program were provided the opportunity of early offer for PhD/ IPhD program in Physics 2024. **Three** students were shortlisted for a written exam and interview based on their performance in their project and presentation, and recommendation letter and the combined score (25% on written test and 75% on interview). The committee proposed offers to two candidates: Ujjwal Basumatary and Sri Krithika Venkatesh.

POSTDOCTORAL PROGRAM

1. Applications are invited for the Fall 2024 hiring cycle: https://www.icts.res.in/academic/postdoctoral-fellowships
2. Following offers were made from the Spring 2024 hiring cycle:

S. No.	Research Group	Name	Current Affiliation	Current Designation
1	Mathematics	Savita Rani	Guru Gobind Singh Indraprastha University, New Delhi	Research Scholar
2	Statistical Physics and Condensed Matter	Debojyoti Kundu	Shiv Nadar Institution of Eminence, Noida	Research Scholar
3	Statistical Physics and Condensed Matter	Rekha Kumari	IIT Kanpur	Research Scholar

3. From the Spring 2024 hiring cycle, 1 candidate has joined ICTS as a postdoctoral fellow i.e. Savita Rani
4. Subsequent affiliations of postdocs who finished their tenure at ICTS-TIFR between Sep- Dec 2023.
    a. **Siddhartha Mukherjee** joined as postdoctoral fellow at Université Côte d'Azur, Nice.
    b. **Victor Godet** joined as postdoctoral fellow at SISSA, Italy.

VISITING STUDENTS PROGRAM

1. Applications are invited for the ICTS Long-Term Visiting Students Program 2024: https://www.icts.res.in/academic/long-term-visiting-student-program
2. Applications are invited for the ICTS S.N. Bhatt Memorial Excellence Fellowship Program 2024: https://www.icts.res.in/academic/summer-research-program

III OUTREACH

PUBLIC LECTURE

On Quarks and Turbulence
David Tong (University of Cambridge, UK) | 20 December 2023 | Chandrasekhar Auditorium, ICTS-TIFR, Bengaluru

KAAPI WITH KURIOSITY LECTURES

Marine Living Resources: A Blue Future
Sherine Sonia Cubelio (Centre for Marine Living Resources & Ecology, Kochi) | 10 December 2023 | J.N. Planetarium, Bengaluru

High Fidelity Sound Reproduction: Practical Aspects for the DIYer
Reji Philip (Raman Research Institute, Bengaluru) | 19 November 2023 | J.N. Planetarium, Bengaluru

The Extreme Physics of Zombie Stars
Nils Andersson (University of Southampton, UK) | 8 October 2023 | J.N. Planetarium, Bengaluru

The Imaging Story: Black Holes to MRI
Rajaram Nityananda (ICTS-TIFR, Bengaluru) | 17 September 2023 | J.N. Planetarium, Bengaluru

EINSTEIN LECTURES

The Map of a Cat and Feynman's Other Intersections with Biology: Their Relevance for Today
Shashi Thutupalli (ICTS-TIFR and NCBS-TIFR, Bengaluru) | 26 November 2023 | Kiru Rangamandira, Mysore

MATHS CIRCLE INDIA SESSIONS

Session 47

Conducted by: Mainak Ghosh, Chetan Balwe | **Interactive session**: 3 November 2023

Session 46

Conducted by: Mainak Ghosh, Vaibhav Vaish, Chetan Balwe | **Interactive session**: 20 October 2023

Session 45

Conducted by: Vaibhav Vaish, Jotsaroop Kaur, Mainak Ghosh, Chetan Balwe | **Interactive session**: 6 October 2023

Session 44

Conducted by: Vaibhav Vaish, Jotsaroop Kaur, Mainak Ghosh, Chetan Balwe | **Interactive session**: 22 September 2023

Session 43

Conducted by: Arghya Chakraborty, Malhar Managoli, Eeshan Modak, Hariharan Narayanan, Piyush Srivastava | **Interactive session**: 8 September 2023

MATHS CIRCLE INDIA SPECIAL EVENT

MCI Special talk: Divisibility tests and recurring decimals

Apoorva Khare (Indian Institute of Science, Bengaluru) | **Interactive session**: 17 November 2023 |Online

ICTS-RRI MATHS CIRCLE

Session 19

Conducted by: Divakaran D | **Interactive session:** 16 December 2023 | Raman Research Institute, Bengaluru

Session 18

Conducted by: Apoorva, Khushi, Nishanth, Manu, Aditya and Kshitij | **Interactive session:** 25 November 2023 | Raman Research Institute, Bengaluru

Session 17

Conducted by: Supurna Sinha, Joseph Samuel | **Interactive session:** 28 October 2023 | Raman Research Institute, Bengaluru

Session 16

Conducted by: Aditya Subramanian, Nishanth Shetty, Apoorva Dinesh Singh, Manu M Bhat, Parthanil Roy | **Interactive session:** 14 October 2023 | ICTS

Session 15

Conducted by: Kiran Estake, Kshitij Sharma, Parthanil Roy | **Interactive session:** 09 September 2023 | Raman Research Institute, Bengaluru

PRISM SESSIONS

PRISM 5: A Mathematics Adventure for Young Minds: Srinivasa Ramanujan's Birthday Anniversary | Kaushik Basu (University of California, Berkeley, USA) | 22 December 2023 | ICTS-TIFR, Bengaluru

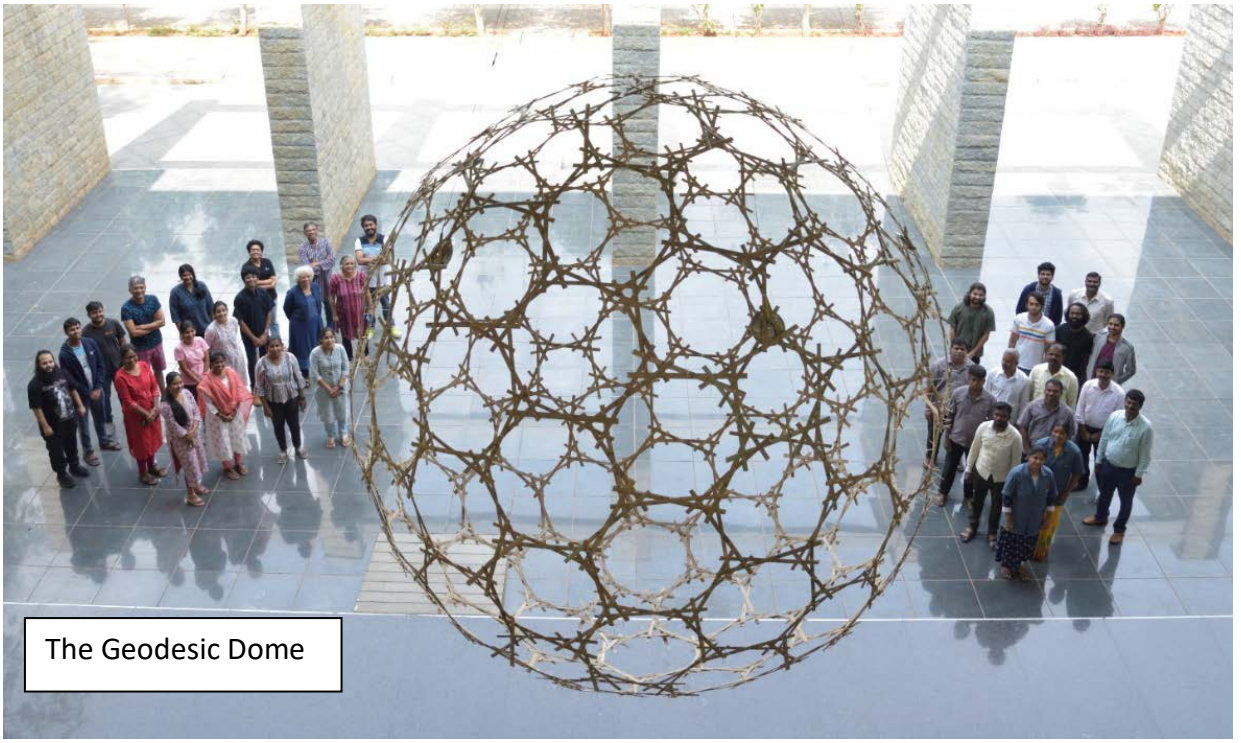
PRISM 4: Magical STEM | Manish Jain, Jyothi Krishnan and Ashutosh Bhakuni (Centre for Creative Learning, IIT Gandhinagar) | 2 December 2023 | ICTS-TIFR, Bengaluru

SCIENCE DRAWING COMPETITION

A science drawing competition was held on campus from 2-10 December 2023. An online panel discussion titled*, Bengaluru: The Astronomy City*, was organised with premier astronomy organisation in Bengaluru on February 27, 2013.

GEODESIC DOME

A team from Centre for Creative Learning, IIT Gandhinagar, led an event of making a Geodesic Dome at ICTS, followed by talks on Enigma machines and other related science toys and machines on December 4, 2023.



The Geodesic Dome

ICTS BLOG

The ICTS blog on the website has regular features on the latest scientific developments. https://blog.icts.res.in/

ANNEXURE - A

The following are the details of seminars and colloquia during the period September-December 2023:

Precision Cosmology with Gravitational-wave Observations | B.S. Sathyaprakash (Penn State, USA and Cardiff University, UK) | 21 December 2023

Information-theoretic Aspects of Scrambling and Chaos | Namit Anand (NASA Quantum AI Lab, USA) | 8 January 2024

Cosmology with Cross-Correlations: CMB & Large-Scale Structure | Neha Anil Kumar (Johns Hopkins University, USA) | 20 December 2023

Deformation Theory of Tensor Triangulated Categories | Angel Israel Toledo Castro (Université Côte d'Azur, France) | 18 December 2023

Cosmic Strings: A Review and Some New Results | Tanmay Vachaspati (Arizona State University, USA) | 15 December 2023

Bubbles Generate their Own Kind of Turbulence | Immanuvel Paul (Newcastle University, UK) | 14 December 2023

Tensor Network Methods for Lattice Gauge Theories: From the Lack-of-thermalization to Critical Phenomena | Titas Chanda (Indian Institute of Technology Indore) | 12 December 2023

Tricritical Phenomena in the Blume-Capel Model | Trishen Gunaratnam (University of Geneva, Switzerland) | 4 December 2023

Interface Evolution of Fluids at Nanoscale: Zooming in on Droplets | Sreehari Perumanath (University of Warwick, UK) | 1 December 2023

The Dynamics of High-diversity Ecosystems: Insights from a Complex Systems' Approach | Thibaut Arnoulx de Pirey (Technion, Israel) | 30 November 2023

Breakdown of Einstein's Gravity | Puskar Mondal (Harvard University, USA) | 30 November 2023

Tauberian Theorems and High Energy Modular Bootstrap | Sridip Pal (Caltech, USA) | 29 November 2023

On Some Aspects of Dijkgraaf-Witten Theory for Finite 2-groups | Srikanth Pai B (ICTS-TIFR, Bengaluru) | 29 November 2023

It's About Time (Domain)! - The Landscape of Stellar and Compact-Object Mergers Through a Time-Domain Lens | Viraj Karambelkar (California Institute of Technology, USA) | 29 November 2023

Resource-efficient Computational Models for Code-switched Speech and Text | Preethi Jyothi (IIT Bombay) | 28 November 2023

Testing Theories of Gravity with Gravitational Wave Observations | Akash Kumar Mishra (ICTS-TIFR, Bengaluru) | 28 November 2023

D=2 strings, α' -corrections, and the Black Hole Singularity | Barton Zwiebach (Massachusetts Institute of Technology, USA) | 22 November 2023

Quantum Sensing and Cooling in the Modern Era: Towards Resolving Quantized Energy Exchanges at the Level of a Single Graviton | Sreenath Kizhakkumpurath Manikandan (Stockholm University and KTH Royal Institute of Technology, Sweden) | 17 November 2023

Implications of Inviscid Hydrodynamics and its Variants for Turbulence and Statistical Physics | Sugan Durai Murugan (ICTS-TIFR, Bengaluru) | 17 November 2023

Controlling Quantum Systems and Building Quantum Computers | C. M. Chandrasekhar (Indian Institute of Science, Bengaluru) | 16 November 2023

Rethinking Recombination: Primordial Magnetic Fields and their Implications for the Hubble Tension | Jonathan Schiff (University of California, Santa Barbara, USA) | 9 November 2023

Electrically Tunable Magnetism in Van der Waals Heterostructures | Shubhayu Chatterjee (Carnegie Mellon University, USA) | 8 November 2023

Fast Radio Burst Localisation and Followup with CHIME/FRB and uGMRT | Arvind Balasubramanian (TIFR, Mumbai) | 3 November 2023

The Relaxation of Collision-less and Weakly Collisional Many-body Systems with Long Range Interactions | Uddipan Banik (Princeton University, USA) | 2 November 2023

QCD Worldsheet Axion and S-matrix Bootstrap | Adwait Gaikwad (Tel-Aviv University, Israel) | 1 November 2023

Doubly Regularized Entropic Wasserstein Barycenters | Lénaïc Chizat (École Polytechnique Fédérale de Lausanne, France) | 31 October 2023

Emanant Symmetries | Nathan Seiberg (IAS, Princeton, USA) | 30 October 2023

Persistence of Heavy-tailed Sample Averages | Ayan Bhattacharya (IIT Bombay) | 30 October 2023

Compactified Hyperboloidal Evolution in Numerical Relativity | Shalabh Gautam (ICTS-TIFR, Bengaluru) | 30 October 2023

Almost Sharp Lower Bound for the Nodal Volume of Harmonic Functions | Lakshmi Priya M.E. (Tel Aviv University, Israel) | 30 October 2023

Frictionless flow with magnetic confinement: when fluids and magnetism join hands | Arvind Arun Dev (Cornell University, USA) | 20 October 2023

On Gauge-String Dualities and String Amplitudes | Pronobesh Maity (ICTS – TIFR, Bengaluru) | 19 October 2023

Traffic Rules in Neurons | Sandhya Koushika (TIFR, Mumbai) | 19 October 2023

Petz Recovery from Subsystems in Conformal Field Theory | Shreya Vardhan (Stanford University, USA) | 18 October 2023

The Origin for WNL Stars: Impact on Ionizing Photon Budgets | Arpita Roy (Scuola Normale Superiore, Italy) | 12 October 2023

Constructing a Local AdS Holographic Dual from the ERG of a CFT | Pavan Dharanipragada (The Institute of Mathematical Sciences, Chennai) | 11 October 2023

Effective General Relativistic Description of Jamming in Granular Matter | Parthasarathi Majumdar (Indian Association for the Cultivation of Science, Kolkata) | 11 October 2023

Strong Lensing of Gravitational Waves and the Tests of General Relativity | Srashti Goyal (ICTS-TIFR, Bengaluru) | 11 October 2023

Plane Rational Curves with an M-Fold Point | Anantadulal Paul (ICTS-TIFR, Bengaluru) | 9 October 2023

Magnetic Instabilities and Dynamics in Compact Stars | Prasanta Bera (Open University of Israel) | 5 October 2023

Quantum Pseudoentanglement | Soumik Ghosh (University of Chicago, USA) | 5 October 2023

Shallow-water Wave Models and Ocean-Depth Measurement | Manisha Goyal (ICTS-TIFR, Bengaluru) | 5 October 2023

Thermal One-point Functions in Holography and Large N-Models | Justin David (Indian Institute of Science, Bengaluru) | 4 October 2023

Deconvolving Discrimination to Degender Physics Practice: The Way Forward & the Need for an Intersectional Lens | Prajval Shastri (RRI Bengaluru) | 27 September 2023

The Free Energy of the Large-N Fermionic Chern–Simons Theory in the "Temporal" Gauge | Vatsal (IIT Bombay) | 27 September 2023

Munching to be Seen: Different Angles on Accreting Supermassive Black Holes | Prajval Shastri (RRI Bengaluru) | 27 September 2023

Near Optimal Heteroscedastic Regression with Symbiotic Learning | Praneeth Netrapalli (Google Research India, Bengaluru) | 26 September 2023

On Multivariate Quantiles | Sreekar Vadlamani (CAM - TIFR, Bengaluru) | 25 September 2023

Log-concavity in 1-d Coulomb Gas Ensembles | B.S. Jnaneshwar (Indian Institute of Science, Bengaluru) | 25 September 2023

Coherent Fluctuations in the Monsoon Atmosphere and Ocean | Debasis Sengupta (ICTS-TIFR, Bengaluru) | 22 September 2023

Pathways to Planetesimal formation: New Insights from Turbulent clustering | Vishnu Prasath Thulasiraman (ICTS-TIFR, Bengaluru) | 22 September 2023

Disordered QFTs and Parisi-Sourlas supersymmetry | Apratim Kaviraj (DESY, Germany) | 22 September 2023

Workshop on Well-Being in Science | Brandon Vaidyanathan (The Catholic University of America, USA) | 21 September 2023

Motion Planning for 1D Parabolic PDEs | Vivek Natarajan (IIT Bombay) | 21 September 2023

BMS Symmetry of Gravity from Hamiltonian Formulation(s) | Sucheta Majumdar (ENS de Lyon, France) | 20 September 2023

Beauty and the Beast Part 2: Apprehending the Missing Supercurrent | Ranveer Kumar Singh (Rutgers University, USA) | 18 September 2023

Some Aspects of Black Hole Microstate Counting | Shanmugapriya Prakashan (Chennai Mathematical Institute) | 13 September 2023

Deconfined Pseudocriticality in a Model Spin-1 Quantum Antiferromagnet | Nisheeta Desai (TIFR, Mumbai) | 13 September 2023

The Heating Conundrum in Driven Critical Systems | R. Chitra (ETH Zurich, Switzerland) | 11 September 2023

Exploring Mechanisms Driving Chromosome Structural Features Across the Tree of Life | Sumitabha Brahmachari (Rice University, USA) | 6 September 2023

Emergent Encoding of Dispersal Network Topologies in Spatial Metapopulation Models | Prajwal Padmanabha (University of Padova, Italy) | 1 September 2023

Compactified Hyperboloidal Evolution in Numerical Relativity | Shalabh Gautam (ICTS-TIFR, Bengaluru) | 1 September 2023

COLLOQUIA

Stark's conjectures | Mahesh Kakde (Indian Institute of Science, Bengaluru) | 18 December 2023

Weak Measurements: A Peephole to the Quantum World | Yuval Gefen (The Weizmann Institute of Science, Israel) | 10 October 2023

High Dimensional Expanders and Some Recent Applications | Prahladh Harsha (TIFR Mumbai) | 3 October 2023

ANNEXURE - B

PAPERS PUBLISHED – 54

In Journals - 37

1. *Finite Decomposition of Minimal Surfaces, Maximal Surfaces, Time-like Minimal Surfaces and Born-Infeld Solitons,* **Rukmini Dey, Kohinoor Ghosh**, Sidharth Soundararajan. J. of the Ramanujan Mathematical Society, 38 (3), 225-236 (2023)
2. *Environment Seen from Infinite Geodesics in Liouville Quantum Gravity,* **Riddhipratim Basu**, Manan Bhatia, Shirshendu Ganguly. Accepted in Annals of Probability (2023) arXiv:2107.12363
3. *First Detection Probability in Quantum Resetting via Random Projective Measurements*, Shashank Kumar Roy, **Manas Kulkarni**, Satya N. Majumdar J. Phys. A: Math. Theor. 56 (38) 385003 (2023)
4. *Probing Robustness of Nonlinear Filter Stability Numerically Using Sinkhorn Divergence*, **Pinak Mandal, Shashank Kumar Roy, Amit Apte**. Physica D: Nonlinear Phenomena, 451, 133765 (2023)
5. *Quantum Information Geometry of Driven CFTs,* Jan de Boer, **Victor Godet**, Jani Kastikainen, Esko Keski-Vakkuri, J. High Energy Physics 2023 (09) 87 (2023)
6. *Gear-up for the Action Replay: Leveraging Lensing for Enhanced Gravitational-Wave Early-Warning,* Sourabh Magare, **Shasvath J. Kapadia**, Anupreeta More, **Mukesh Kumar Singh, Parameswaran Ajith**, A. N. Ramprakash. The Astrophysical Journal Letters, 955 (2) L31 (2023)
7. *The Connection Between Hilbert-space Return Probability and Real-space Autocorrelations in Quantum Spin Chains*, **Bikram Pain**, **Kritika Khanwal**, **Sthitadhi Roy**. Phys. Rev. B (Letter) 108 (14), L140201 (2023)
8. *Extending Black-hole Remnant Surrogate Models to Extreme Mass Ratios*, Matteo Boschini, Davide Gerosa, Vijay Varma, Cristobal Armaza, Michael Boyle, Marceline S. Bonilla, Andrea Ceja, Yitian Chen, Nils Deppe, Matthew Giesler, Lawrence E. Kidder, **Prayush Kumar**, Guillermo Lara, Oliver Long, Sizheng Ma, Keefe Mitman, Peter James Nee, Harald P. Pfeiffer, Antoni Ramos-Buades, Mark A. Scheel, Nils L. Vu, Jooheon Yoo. Phys. Rev. D 108 (08), 084015 (2023)
9. *Quantum Spin Hall Insulator in Proximity with a Superconductor: Transition to the Fulde-Ferrell-Larkin-Ovchinnikov State Driven by a Zeeman Field*, Suman Jyoti De, Udit Khanna, **Sumathi Rao**, Sourin Das. Phys. Rev. B (Letter) 108 (16), L161403 (2023)

10. *Environment Assisted Superballistic Scaling of Conductance*, **Madhumita Saha**, Bijay Kumar Agarwalla, **Manas Kulkarni**, Archak Purkayastha. Phys. Rev. B (Letter) 108 (16), L161115 (2023)
11. *Probing Octupolar Hidden Order via Janus Impurities*, Sreekar Voleti, Koushik Pradhan, **Subhro Bhattacharjee**, Tanusri Saha-Dasgupta, Arun Paramekanti. *npj Quantum Materials* 8, 42 (2023)
12. *Correlations in Gravitational-wave Reconstructions from Eccentric Binaries: A Case Study with GW151226 & GW170608*, Eamonn O'Shea, **Prayush Kumar.** Phys. Rev. D 108 (10), 104018 (2023)
13. *Unified Treatment of Mean-field Dynamo and Angular-momentum Transport in Magnetorotational Instability-driven Turbulence*, **Tushar Mondal, Pallavi Bhat**. Phys. Rev. E 108 (06), 065201 (2023)
14. *Non-local Linear Transport in Anomalous Transport*, **Anupam Kundu.** J. of Statistical Mechanics: Theory and Experiment 2023 (11), 113204 (2023)
15. *Out-of-time-ordered Correlator in the One-dimensional Kuramoto-Sivashinsky and Kardar-Parisi-Zhang Equations*, **Dipankar Roy**, David A. Huse, **Manas Kulkarni.** Phys. Rev. E 108 (05), 054112 (2023)
16. *Different Glassy Characteristics are Related to Either Caging or Dynamical Heterogeneity,* Puneet Pareek, Monoj Adhikari, **Chandan Dasgupta**, Saroj Kumar Nandi. J. Chem. Phys. 159 (17), 174503 (2023)
17. *Coupled Models of Genomic Surveillance and Evolving Pandemics with Applications for Timely Public Health Interventions*, Baltazar Espinoza, Aniruddha Adiga, Srinivasan Venkatramanan, Andrew Scott Warren, Jiangzhuo Chen, Bryan Leroy Lewis, Anil Vullikanti, Samarth Swarup, Sifat Moon, Christopher Louis Barrett, **Siva Athreya,** Rajesh Sundaresan, Vijay Chandru, Ramanan Laxminarayan, Benjamin Schaffer, H. Vincent Poor, Simon A. Levin, and Madhav V. Marathe. PNAS, 120 (48) e2305227120 (2023)
18. *Meson Spectrum of SU(2) QCD $_{1+1}$ with Quarks in Large Representations*, **Anurag Kaushal**, **Naveen S. Prabhakar, Spenta R. Wadia**, J. of High Energy Physics 2023 (11), 162 (2023)
19. *Filling an Empty Lattice by Local Injection of Quantum Particles*, Akash Trivedi, **Sparsh Gupta,** Bijay Kumar Agarwalla, **Abhishek Dhar, Manas Kulkarni, Anupam Kundu**, Sanjib Sabhapandit. Phys. Rev. A 108 (05), 052204 (2023)
20. *Volume Approximation of Strongly C-convex Domains by Random Polyhedra,* Siva Athreya, **P Gupta, D Yogeshwaran.** Advances in Mathematics, 432, 109243 (2023)
21. *Upper Tail of the Spectral Radius of Sparse Erdős-Rényi Graphs*, **Anirban Basak.** Probability Theory and Related Fields, № 3-4 (187), 885-947 (2023)

22. *Probing the Large-Scale Structure Using Gravitational-wave Observations of Binary Black Holes,* **A. Vijaykumar,** M. V. S. Saketh, **S. Kumar**, **P. Ajith**, T. Roy Choudhury. Physical Review D 108 (10) 103017 (2023)
23. *Strong Coupling of Lattice and Orbital Excitations in Quantum Magnet $Ca_{10}Cr_7O_{28}$: Anomalous Temperature Dependence of Raman Phonons*, **Srishti Pal**, Arnab Seth, Anzar Ali, Yogesh Singh, D. V. S. Muthu, **Subhro Bhattacharjee,** A. K. Sood. Phys. Rev. B (Letter) 108 (24), L241103 (2023)
24. *Emergent SU(8) Dirac Semimetal and Novel Proximate Phases of Spin-orbit Coupled Fermions on a Honeycomb Lattice*, **Basudeb Mondal**, Vijay B. Shenoy, **Subhro Bhattacharjee**. Physical Review B 108 (24), 245106 (2023)
25. *Ab-initio Insights on the Fermiology of d^1 Transition metals in Honeycomb lattice : Hierarchy of Hopping Pathways and Spin-orbit Coupling*, Manoj Gupta, Basudeb Mondal, **Subhro Bhattacharjee**, Tanusri Saha Dasgupta. Physical Review Research 5 (04), 043219 (2023)
26. *Generating Entanglement by Quantum Resetting*, **Manas Kulkarni**, Satya N. Majumdar. Phys. Rev. A 108 (06), 062210 (2023)
27. *Variability of Echo State Network Prediction Horizon for Partially Observed Dynamical Systems*, Ajit Mahata, Reetish Padhi, **Amit Apte.** Phys. Rev. E 108 (06), 064209 (2023)
28. *Single-molecule Imaging of Stochastic Interactions that Drive Dynein Activation and Cargo Movement in Cells*, Nireekshit Addanki Tirumala, Gregory Redpath, Sarah Skerhut, Pritha Dolai, Natasha Kapoor-Kaushik, Nicholas Ariotti, **K Vijay Kumar**, Vaishnavi Ananthanarayanan. Accepted in Journal of Cell Biology (2023)
29. *Irregular Dependence on Stokes Number and Non-ergodic Transport of Heavy Inertial Particles in Steady Laminar Flows*, Anu V. S. Nath, Anubhab Roy, S. Ravichandran, **Rama Govindarajan**. Accepted in Phys. Rev. Fluids (2023)
30. *Unusual Ergodic and Chaotic Properties of Trapped Hard Rods*, **Debarshee Bagchi, Jitendra Kethepalli**, Vir B. Bulchandani, **Abhishek Dhar**, David A. Huse, **Manas Kulkarni, Anupam Kundu.** Phys. Rev. E 108 (06), 064130 (2023)
31. *Rapid Identification and Classification of Eccentric Gravitational Wave Inspirals with Machine Learning*, **Adhrit Ravichandran, Aditya Vijaykumar**, **Shasvath J. Kapadia, Prayush Kumar**. Accepted by Phys Rev D. arXiv:2302.00666
32. *Transition to Chaos in Extended Systems and their Quantum Impurity Models*, **Mahaveer Prasad**, Hari Kumar Yadalam, **Manas Kulkarni**, Camille Aron. Accepted in J. Phys. A: Math. Theor. 57 (01), 015308 (2024)

33. *Associating Fast Radio Bursts with Compact Binary Mergers via Gravitational Lensing*, **Mukesh Kumar Singh,** Shasvath J. Kapadia, **Soummyadip Basak, Parameswaran Ajith**, Shriharsh P. Tendulkar. MNRAS, 527 (2), 4234-4243 (2024)
34. *Feedback Stabilization of Parabolic Coupled System and its Numerical Study,* Wasim Akram, Debanjana Mitra, Neela Nataraj, **Mythily Ramaswamy.** Mathematical Control and Related Fields. (2023)
35. *Long-ranged spectral correlations in eigenstate phases,* **Mahaveer Prasad,** Abhishodh Prakash, J. H. Pixley, **Manas Kulkarni**. J. Phys. A: Math. Theor. 57 (01) 015003 (2023)
36. *Berezin-type quantization on even-dimensional compact manifolds*, **Rukmini Dey, Kohinoor Ghosh**. J. of Physics: Conference Series 2667, 012003, (2023)
37. *Holography of Information in de Sitter Space*, **Tuneer Chakraborty, Joydeep Chakravarty, Victor Godet, Priyadarshi Paul, Suvrat Raju**. J. of High Energy Physics 2023 (12), 120, (2023)

In ArXiv - 17

1. *Controlled Martingale Problems And Their Markov Mimics*, **Siva Athreya**, Vivek S. Borkar, Nitya Gadhiwala. arXiv:2309.00488
2. *Influence Phase of AdS Observer I: Scalar Exchange*, **R. Loganayagam**, Omkar Shetye, arXiv:2309.07290
3. *Yang-Lee Zeros of Certain Antiferromagnetic Models*, Muhammad Sedik, **Junaid Majeed Bhat, Abhishek Dhar,** B Sriram Shastry arXiv:2309.14562
4. *Active Caustics*, Rahul Chajwa, Rajarshi, **Sriram Ramaswamy, Rama Govindarajan**. arXiv:2310.01829
5. *Impact of Dephasing Probes on Incommensurate Lattices*, Bishal Ghosh, Sandipan Mohanta, **Manas Kulkarni**, Bijay Kumar Agarwalla. arXiv:2310.12758
6. *Observation of Multiple Attractors and Diffusive Transport in a Periodically Driven Klein-Gordon Chain*, Umesh Kumar, Seemant Mishra, **Anupam Kundu, Abhishek Dhar**. arXiv:2310.14072
7. *Thermalization and Hydrodynamics in an Interacting Integrable System: The Case of Hard Rods*, Sahil Kumar Singh, **Abhishek Dhar**, Herbert Spohn, **Anupam Kundu**. arXiv:2310.18684
8. *Instantons in sine-Liouville Theory*, Sergei Alexandrov, Raghu Mahajan, **Ashoke Sen**. arXiv:2311.04969
9. *Mock Modularity In CHL Models*, Ajit Bhand, **Ashoke Sen**, Ranveer Kumar Singh. arXiv:2311.16252
10. *Potts and Random Cluster Measures on Locally Regular Tree-like Graphs*, **Anirban Basak**, Amir Dembo, Allan Sly. arXiv:2312.16008

11. *Dynamically Emergent Correlations Between Particles in a Switching Harmonic Trap*, Marco Biroli, **Manas Kulkarni,** Satya N. Majumdar, Gregory Schehr arXiv:2312.02570
12. *Impact of Higher Harmonics of Gravitational Radiation on the Population Inference of Binary Black Holes*, Mukesh Kumar Singh, Shasvath J Kapadia, Aditya Vijaykumar, **Parameswaran Ajith**. arXiv:2312.07376
13. *String Theory in Rolling Tachyon Vacuum*, **Ashoke Sen**. arXiv:2312.11634
14. *Beyond the Tensionless Limit: Integrability in the Symmetric Orbifold*, Matthias R. Gaberdiel, **Rajesh Gopakumar**, Beat Nairz arXiv:2312.13288
15. *Rotationally invariant first passage percolation: Concentration and scaling relations*, **Riddhipratim Basu**, Vladas Sidoravicius, Allan Sly arXiv:2312.14143
16. *Quantum jumps in driven-dissipative disordered many-body systems*, **Sparsh Gupta, Hari Kumar Yadalam**, **Manas Kulkarni**, Camille Aron arXiv:2312.17311
17. *Shape-dependent motility of polar inclusions in active baths*, **Pritha Dolai, Aditya Singh Rajput, K. Vijay Kumar**. arXiv:2312.06997

Consortium

1. *Search for Gravitational Waves Associated with Fast Radio Bursts Detected by CHIME/FRB During the LIGO--Virgo Observing Run O3a,* The LIGO Scientific Collaboration, the Virgo Collaboration, the KAGRA Collaboration, the CHIME/FRB Collaboration, R. Abbott *et. al.* Astrophys. J. 955 (2), 155 (2023)
2. *GWTC-3: Compact Binary Coalescences Observed by LIGO and Virgo During the Second Part of the Third Observing Run*, The LIGO Scientific Collaboration, the Virgo Collaboration, the KAGRA Collaboration, R. Abbott, *et. al.* Phys. Rev. X 13 (04), 041039 (2023)