

# ACTIVITY REPORT

(May-August 2024)



ICTS

INTERNATIONAL  
CENTRE *for*  
THEORETICAL  
SCIENCES

TATA INSTITUTE OF FUNDAMENTAL RESEARCH

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RAJESH GOPAKUMAR was awarded the prestigious INSA Distinguished Lecture Fellowship (2024) in Physics.

ASHOKE SEN received the 2024 ICBS Frontiers of Science Award, announced during the International Congress of Basic Sciences (ICSB) in Beijing.

SENTHIL TODADRI was elected to the National Academy of Sciences, USA.

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# I | ICTS ACTIVITIES

## **Summary of Programming Activities** *(For details see following pages)*

Programs/Discussion Meetings held: 15

Academic visitors to ICTS-TIFR:

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

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

Papers published: 29

arXiv submissions: 39

## Ia. PROGRAMS

### Quantum Information, Quantum Field Theory and Gravity

**Organizers:** Vijay Balasubramanian (University of Pennsylvania, USA), Pawel Caputa (University of Warsaw, Poland), Johanna Erdmenger (Julius Maximilian University of Würzburg (JMU), Germany), Onkar Parrikar (TIFR Mumbai), Suvrat Raju (ICTS-TIFR, Bengaluru), Tadashi Takayanagi (Yukawa Institute for Theoretical Physics (YITP), Japan) and Sandip Trivedi (TIFR Mumbai) | 12 August-6 September 2024

### Geometry in Groups

**Organizers:** Radhika Gupta (TIFR Mumbai) and Suraj Krishna M.S. (Technion-IIT, Israel) | 29 July-9 August 2024

### SysAdmin Connect 2.0

**Organizers:** Srinivasa R (ICTS-TIFR, Bengaluru), Prasanta Kumar Baruah (NCBS-TIFR, Bengaluru), Ajay Salve (TIFR, Mumbai) and Shrikant G (CAM-TIFR, Bengaluru) | 26-27 July 2024

### Engineered 2D Quantum Materials

**Organizers:** Arindam Ghosh (IISc, Bengaluru), Priya Mahadevan (SNBNCBS, Kolkata), Srimanta Middey (IISc, Bengaluru), Arun Paramekanti (University of Toronto, Canada) and Chandni U (IISc, Bengaluru) | 15-26 July 2024

### Emerging Infectious Diseases: Ecology and Evolution

**Organizers:** Uma Ramakrishnan (NCBS-TIFR, Bengaluru), Farah Ishtiaq (Tata Institute of Genetics and Society) and Ansil BR (NCBS-TIFR, Bengaluru) | 1-12 July 2024

### Summer School on Gravitational-Wave Astronomy

**Organizers:** Parameswaran Ajith (ICTS-TIFR, Bengaluru), K.G. Arun (CMI, Chennai), Bala R. Iyer (ICTS-TIFR, Bengaluru) and Prayush Kumar (ICTS-TIFR, Bengaluru) | 1-12 July 2024

### Summer School for Women in Mathematics and Statistics

**Organizers:** Siva Athreya (ICTS-TIFR, Bengaluru and Indian Statistical Institute, Bengaluru), Rhythm Grover (IIT Guwahati) and Dootika Vats (IIT Kanpur) | 17-28 June 2024

### Summer School for Women in Physics 2024

**Organizers:** S. Annapoorni (Delhi University), Ranjini Bandyopadhyay (RRI, Bengaluru), Dipankar Bhattacharya (Ashoka University, Sonapat), Mahua Ghosh (Mount Carmel College, Bengaluru), Kripa Gowrishankar (Azim Premji University, Bengaluru), Sushan Konar (NCRA-TIFR, Pune), Rajaram Nityananda (ICTS-TIFR, Bengaluru), Shirish Pathare (HBCSE, TIFR, Mumbai), Sumathi Rao (ICTS-TIFR, Bengaluru), Joseph Samuel (ICTS-TIFR, Bengaluru), T. R. Seshadri (Delhi University) and Supurna Sinha (RRI, Bengaluru) | 3-14 June 2024

### Theoretical and Practical Perspectives in Geophysical Fluid Dynamics

**Organizers:** Manita Chouksey (Institut für Ostseeforschung Warnemünde, Germany), Hossein Amini Kafiabad (Durham University, UK), Han Wang

(University of Edinburgh, UK) and Jim Thomas (ICTS-TIFR and TIFR-CAM, Bengaluru) | 20-31 May 2024

**Theoretical and Empirical Approaches to Understand Polygenic Adaptation**

**Organizers:** Kavita Jain (JNCASR, Bengaluru), Christian Schlötterer (Vetmeduni Vienna, Austria) and Sam Yeaman (University of Calgary, Canada) | 6-17 May 2024

**Workshop on Data Assimilation in Weather and Climate Models**

**Organizers:** Govindan Kutty (Indian Institute of Space Science and Technology, Valiamala), A. Chandrasekar (Indian Institute of Space Science and Technology, Valiamala) and Amit P Kesarkar (National Atmospheric Research Laboratory) | 6-17 May 2024



I. ICTS ACTIVITIES

**Ib. DISCUSSION MEETINGS**

**Kagome Off-scale**

**Organizers:** Yasir Iqbal (IIT Madras, Chennai) and Ronny Thomale (Julius Maximilians University of Wurzburg, Germany) | 12-16 August 2024

**Cosmic Revelations: A Joint DESI and eROSITA Symposium**

**Organizers:** Shadab Alam (TIFR, Mumbai) and Subha Majumdar (TIFR, Mumbai) | 22 May 2024

**Gravitational Wave Open Data Workshop**

**Organizers:** Parameswaran Ajith (ICTS-TIFR, Bengaluru), Ankur Barsode (ICTS-TIFR, Bengaluru), Bala Iyer (ICTS-TIFR, Bengaluru), Prayush Kumar (ICTS-TIFR, Bengaluru) and Akash Maurya (ICTS-TIFR, Bengaluru) | 18-20 April 2024

**9th Indian Statistical Physics Community Meeting**

**Organizers:** Ranjini Bandyopadhyay (RRI, Bengaluru), Abhishek Dhar (ICTS-TIFR, Bengaluru), Kavita Jain (JNCASR, Bengaluru), Rahul Pandit (IISc, Bengaluru), Samriddhi Sankar Ray (ICTS-TIFR, Bengaluru), Sanjib Sabhapandit (RRI, Bengaluru) and Prerna Sharma (IISc, Bengaluru) | 3-5 April 2024

**Ic. LECTURE SERIES**

**CHANDRASEKHAR LECTURES**

**Entanglement and Emergence of Gravitational Spacetime**

Tadashi Takayanagi (Yukawa Institute for Theoretical Physics, Japan) | 13, 14, 16 August 2024

**DISTINGUISHED LECTURES**

**Why We Explore?**

Robert Myers (Perimeter Institute for Theoretical Physics, Canada) | 28 August 2024

**The Atiyah Singer Index Theorem - An Overview**

Madabusi Raghunathan (Distinguished Professor, UM-DAE Centre for Excellence in Basic Sciences & Honorary Fellow, TIFR) | 22 July 2024

**Principles of Evolutionary Overdesign and Underperformance**

Michael Lynch (Center for Mechanisms of Evolution, Arizona State University) | 10 May 2024

**Id. VISITS OF SCIENTISTS**

The following researchers visited ICTS during May-August 2024.

1. **Katha Ganguly**, IISER, Pune
2. **N.D. Hari Dass**, Tata Institute of Fundamental Research, Hyderabad
3. **Rajat Masiwal**, Indian Institute of Science, Bengaluru
4. **Kyubin Kwon**, University of California Santa Barbara (UCSB), USA
5. **Jonathan Schiff**, University of California, Santa Barbara, USA

6. **Soumangsu Chakraborty**, Institut de Physique Théorique, Saclay
7. **Tejaswi Venumadhav Nerella**, UCSB, USA
8. **Julius**, Harish-Chandra Research Institute, Allahabad
9. **Shai Chester**, Imperial College London, UK
10. **Joaquin Ignacio Becerra Espinoza**, University of California, USA
11. **Vishnu Prasath Thulasiraman**, Indian Institute of Science, Bengaluru
12. **Manogna**, MS Ramaiah University of Applied Sciences, Bengaluru
13. **Rahul Balaji**, Princeton University, USA
14. **Anushree Datta**, Laboratoire Matériaux et Phénomènes Quantiques, Paris and Laboratoire de physique des Solides, Orsay
15. **Amit Suthar**, Institute of Mathematical Sciences, Chennai
16. **Aavishkar Patel**, Flatiron Institute, USA
17. **Vidyanand Nanjundiah**, Centre for Human Genetics, Bengaluru
18. **Seok Kim**, Seoul National University, South Korea
19. **Ashish Goel**, Stanford University, USA
20. **Krishnendu Sengupta**, IACS, Kolkata
21. **Arvind Nair**, Tata Institute of Fundamental Research, Mumbai
22. **Madabusi Raghunathan**, Indian Institute of Technology, Mumbai
23. **Sriram Ganeshan**, City University, New York
24. **Sreedevi Mohan S.**, National Institute of Technology Calicut
25. **Hamsa Padmanabhan**, Université de Genève, Switzerland
26. **Sunceta Vardarajan**, IISER, Pune
27. **Ayana Sarkar**, University of Sherbrooke, Canada
28. **Bijay Agarwalla**, IISER, Pune
29. **Pranay Agarwal**, Indian Institute of Technology, Kanpur
30. **Lavi Upreti**, University of Konstanz, Germany
31. **Vikram Khaire**, Indian Institute for Space Science and Technology, Thiruvananthapuram
32. **Debasish Das**, University of Strathclyde, Scotland
33. **Sridip Pal**, California Institute of Technology, USA
34. **Satish Chandra**, Google, USA
35. **Sunil Mukhi**, IISER, Pune
36. **V. Ram Madhav**, Chennai Mathematical Institute, Chennai
37. **L Mahadevan**, Harvard University, USA
38. **Manan Bhatia**, Massachusetts Institute of Technology, USA
39. **Ipsita Datta**, ETH Zurich, Switzerland
40. **Soumen Basak**, IISER, Thiruvananthapuram
41. **Fazlu Rahman**, Raman Research Institute, Bengaluru
42. **Tejal Kanitkar**, National Institute of Advanced Studies, Bengaluru
43. **Sumit Kumar**, Max Planck Institute, Germany
44. **Sourendu Gupta**, Tata Institute of Fundamental Research, Mumbai
45. **Satyaki Mukherjee**, National University of Singapore
46. **Sumanta Chakraborty**, IACS, Kolkata
47. **Deepam Patel**, Purdue University, USA
48. **Camille Didier Georges Aron**, École Polytechnique Fédérale de Lausanne, Switzerland
49. **Akshatha Suresh**, National Institute of Technology Calicut
50. **G. Neeraja**, National Institute of Technology Calicut
51. **G. Niranjana**, National Institute of Technology Calicut
52. **Debmalya Sarkar**, Harvard University, USA
53. **Mohan Swaminathan**, Stanford University, USA

54. **Parijat Dey**, S.N. Bose National Centre for Basic Sciences, Kolkata
55. **Sauri Bhattacharyya**, Technion, Israel
56. **GV Shivashankar**, ETH Zurich & Paul Scherrer Institute, Switzerland
57. **Kaushik Paul**, Indian Institutes of Technology Madras, Chennai
58. **Divyajyoti**, IIT Madras, Chennai

#### e. NEWS ON GRANTS, AWARDS AND FELLOWSHIPS



ANIRBAN BASAK was selected as a **member of the National Academy of Sciences, India (NASI)**.



RIDDHIPRATIM BASU joined the Editorial Board of the Electronic Journal of Probability (EJP).



SUBHRO BHATTACHARJEE received a joint **Indo-Swedish International Mobility Grant** with his collaborator at Karlstad University, Sergej Moroz.



BRATO CHAKRABORTI received one of the Scientific **High Level Visiting Fellowships** from the French Institute in India with his collaborator at ESPCI-Paris, Anke Lindner.



RAJESH GOPAKUMAR was awarded the prestigious **INSA Distinguished Lecture Fellowship (2024) in Physics**.



MANAS KULKARNI joined the **Editorial Board of the Journal of Statistical Mechanics**.



PRAYUSH KUMAR was selected as a **member of the National Academy of Sciences, India (NASI)**.



AJITH PARAMESWARAN was elected as an **Associate Fellow of the Indian National Science Academy (INSA)**.



STHITADHI ROY was selected as one of the **associates for 2024 of the Indian Academy of Sciences (IASc)**.



ASHOKE SEN received the **2024 ICBS Frontiers of Science Award**, announced during the International Congress of Basic Sciences (ICSB) in Beijing.



## II ICTS PEOPLE

### IIa FACULTY

1. RAJESH GOPAKUMAR and JAIKUMAR RADHAKRISHNAN became Distinguished Professors.
2. RAGHU MAHAJAN joined the ICTS-TIFR faculty as Reader. He was previously at Stanford University, USA.
3. SOURENDU GUPTA joined ICTS-TIFR as a Senior Faculty Associate.

### IIb STUDENTS

#### GRADUATE PROGRAM

1. The 2024 summer semester commenced on May 1, 2024, and graduate students have registered for various summer projects.
2. A 2-credit reading course on *Introduction to Elementary Particle Physics* was offered by R. Loganayagam.
3. 22 students joined the 2024 graduate studies program August 1, 2024. The breakup is as follows:

Program	Number of students joined
Physics	12
Applied and Computational Mathematics	1
Mathematics	3
Physics of Life	6

4. Orientation session for new students was held on August 5, 2024. As part of the orientation week held between August 1-7, 2024, various research groups offered an open hour, where some of the faculty members/postdocs had informal chats with the new students about their research.  
Dr. Geetu Hotwani, ICTS counselor, provided an introductory counseling session on August 8, 2024. The session provided a brief overview on counseling needs and benefits, identification of the problem and question-answer session.
5. The Fall 2024 semester began on August 7, 2024, and classes are being conducted in hybrid mode. This semester ICTS is offering 16 courses (including elective, reading and core courses). Please refer to the website for more details:  
<https://courses.icts.res.in/course/index.php?categoryid=20>. Students from other institutions can also enroll for ICTS courses.
6. Apart from the ICTS courses, students have registered for courses offered by IISc, TIFR Colaba, CAM-TIFR and NCBS.
7. The following students registered for their PhD via Datatnet 2.0:

- a. **2021 Integrated PhD batch:** Muhammed Irshad P, Vinay Kumar, Sandip Sahoo
  - b. **2023 PhD batch:** Aditya Laxmikant Thorat, S Viswanathan, Alorika Kar, Chandranathan Anandavijayan, Harsh Nigam, Koustav Narayan Maity, Priyangshu Goswami, Ritwick Kumar Ghosh, Rishabh Kaushik, Santhiya P S
8. **Students who defended their thesis:**
- Varun Dubey (GS 2016 Int. PhD Batch) on July 30, 2024
  - Sarthak Duary (GS 2018 PhD Batch) on July 16, 2024.
  - Soumyadip Basak (GS 2017 PhD Batch) on August 6, 2024
9. **Students who submitted their thesis:**
- Basudeb Mondal (Thesis advisor: Subhro Bhattacharjee)
  - Bhanu Kiran S. (Thesis advisor: Pranav Pandit)
  - Mukesh Kumar Singh (Thesis advisor: Parameswaran Ajith)
  - Priyadarshi Paul (Thesis advisor: Suvrat Raju)
  - Tuneer Chakraborty (Thesis advisor: Suvrat Raju)
  - Manisha Goyal (Thesis advisor: Vishal Vasani)
10. **Students who submitted their synopsis:**
- Jitendra Kethepalli (Thesis advisor: Anupam Kundu)
  - Saikat Santra (Thesis advisor: Anupam Kundu)
  - Mahaveer Prasad (Thesis advisor: Manas Kulkarni)
  - Divya Jaganathan (Thesis advisor: Rama Govindarajan)
11. **Graduate Studies Admissions 2024:**
- a) The offline interviews for admission into the 2024 Applied and Computational Mathematics Program was conducted on May 10, 2024 via TIFR GS and CSIR stream. There was one offer made (<https://www.icts.res.in/announcements>) and one candidate joined the program:

Name	Affiliation
Prajwal Jadhav	IISER, Pune

- b) The offline interviews for the 2024 Physical Sciences Program 2024 were conducted on May 16, 17, 20 and 21 May 2024 via JEST/GATE/CSIR. Seven offers (<https://www.icts.res.in/announcements>) were made and five candidates joined the program:

Name	Affiliation
Shreyash Bhattacharjee	St Xavier's College, Kolkata
Ashif Seikh	Jamia Millia Islamia, New Delhi

Vamshi Krishna Talala	University of Chicago
Saikat Bera	HRI, Allahabad
Anjali Bhattar	University of Calcutta

## POSTDOCTORAL PROGRAM

- The postdoctoral application for the summer cycle is currently at the screening stage: <https://www.icts.res.in/academic/postdoctoral-fellowships>.
- Subsequent affiliations of postdocs who finished their tenure at ICTS-TIFR between May - August 2024:
  - Krishnendu N.V.** joined University of Birmingham as a postdoctoral fellow.
  - Amiya Mishra** joined Yau Center of SEU as a postdoctoral fellow.
  - Soumi Ghosh** joined KTH Royal Institute of Technology as a postdoctoral fellow.
- From the Fall 2024 hiring cycle, the following five candidates have joined ICTS as postdoctoral fellows - Rajesh Ghosh, Indranil Mukherjee, Durbar Roy, Mahesh Chandrasekhar Gandikota and Anuj Mishra.

## VISITING STUDENTS PROGRAM

- Applications were invited for the ICTS Long Term Visiting Students Program 2024. <https://www.icts.res.in/academic/long-term-visiting-student-program>.

The following students have joined the program:

Name	Current Affiliation	Faculty Mentor
Aikya Banerjee	IISER Kolkata	Samridhi Sankar Ray
Devesh Dhole	IIT, Bombay	Prayush Kumar
Nishant Uchale	Savitribai Phule Pune University	Jim Thomas
Preethi G	IISER Thiruvananthapuram	Manas Kulkarni
Pustam Raut	VTU	Jim Thomas
Sangeetha V	St Josephs University	Vijaykumar Krishnamurthy
Satyam Sinha	IISER Pune	Abhishek Dhar
Sayantan Mandal	IISER Tirupati	Sumathi Rao

Shivani Choudhury	Bangalore University	Sumathi Rao
Shraddhanjali Choudhury	IIT Madras	Sthitadhi Roy
Sidarth S	IIT Madras	Brato Chakrabarti
Soumyadeep Sarma	IISc, Bengaluru	Manas Kulkarni & Abhishek Dhar

## SUMMER RESEARCH PROGRAM

The summer research program 2024 was conducted between 19 May-13 July 2024. Ten students joined the eight-week long program. For more details, please visit <https://www.icts.res.in/academic/summer-research-program>

Name	Affiliation	Faculty Mentor	Project Title
Aishik Raysharma	ISI, Kolkata	Anirban Basak & Riddhipratim Basu	Large Deviations for Wigner Matrices
Anuraag Reddy	IISER, Pune	Prayush Kumar	3D Summation-by-Parts Scheme for Linear Wave Equations on Hyperboloidal Slices
Aritra Roy	IIT, Dhanbad	Rama Govindarajan	Advanced Numerical Algorithms for Turbulent & Applied Fluid Flow Problems
Arjun Mandyam Dhati	IISER, Pune	Akshit Goyal	Stability and Resource Coupling in Microbial Communities
Bikram Halder	ISI, Bengaluru	Siva Athreya	Relationship Between Spectral Gap and Curvature
Gaurang Agrawal	IISER, Pune	Deepak Dhar	Applied Category Theory and its Relevance to Quantum Physics
Malav Dhaval Doshi	ISI, Bengaluru Centre	Anirban Basak & Riddhipratim Basu	Percolation Theory and Kesten's Theorem
Pathik Das	IISER, Mohali	Shashi Thutupalli	Origins Of Life: Jeewanu, The Protocell
Sarthak Girdhar	IIT Bombay	Sumathi Rao	Surface Transport in Floquet Weyl Semimetals
Vanshika Mittal	Azim Premji University, Bengaluru	Siva Athreya	Simulating the Ising Model using Markov Chain Monte Carlo
Aishik Raysharma	ISI, Kolkata	Anirban Basak & Riddhipratim Basu	Large Deviations for Wigner Matrices
Anuraag Reddy	IISER, Pune	Prayush Kumar	3D Summation-by-Parts Scheme for Linear Wave Equations on Hyperboloidal Slices

## SUMMER COURSE

There was one summer course conducted this year. The following are the details:

Dynamics of Biological Systems, taught by Akshit Goyal and Brato Chakrabarti. The course was conducted in hybrid mode. 213 students registered for the course, of which 28 were selected for classroom participation. Certificates were issued to participants on successful completion of the course.

## LECTURE SERIES (Academic)

A Short Course on the Atiyah-Singer Index Theorem was taught by Madabusi Raghunathan (Distinguished Professor, UM-DAE Centre for Excellence in Basic Sciences & Honorary Fellow, TIFR) from 24 July-2 August 2024

# III

## OUTREACH

### PUBLIC LECTURE

#### The Dynamic Universe

Shri Kulkarni (California Institute of Technology, USA) | 28 July 2024

#### Evolution of Women Over the Last 50 Years

Sudha Murty (Founder of Infosys Foundation, Author, Philanthropist, Chairperson of Murty Trust and Rajya Sabha MP) | 18 June 2024

### KAAPI WITH KURIOSITY

#### Magnetic Reconnection: The Engine Behind Solar Flares and Aurorae

Pallavi Bhat (ICTS-TIFR, Bengaluru) | 25 August 2024

#### Hyperbolicity

Indira Chatterji (Université Côte d'Azur à Nice, France) | 28 July 2024

#### Secrets of the Indian Savanna

Abi T Vanak (Ashoka Trust for Research in Ecology and the Environment (ATREE), Bengaluru) | 30 June 2024

#### The Accelerating Expanding Universe: Dark Matter, Dark Energy, and Einstein's Cosmological Constant

Bharat Ratra (Kansas State University, USA) | 26 May 2024

### VIGYAN ADDA

#### Experimental Evolution

Christian Schlötterer (Institute of Population Genetics, Vienna) | 30 May 2024

### MATHS CIRCLE INDIA

ICTS is leading a pan-TIFR effort to seed Maths Circles for talented middle school students across the country. To establish proof of concept, ICTS has conducted eight online Maths Circle India sessions during May-August 2024.

#### Session 61

**Conducted by:** Aadi B, Kriti Arora, Yamuna Nataraj | **Interactive session:** 17 August 2024

#### Session 60

**Conducted by:** Aadi B, Aritra Roy, Kriti, Varsha, Yamuna Nataraj | **Interactive session:** 3 August 2024

#### Session 59

**Conducted by:** Sai Venkat, Sayed Sahil, Rishith Reddy, Sanskar Agrawal, Anilatmaja Aryasomayajula, Shilpak Banerjee | **Interactive session:** 19 July 2024

#### Session 58

**Conducted by:** Sai Venkat, Sayed Sahil, Rishith Reddy, Sanskar Agrawal, Anilatmaja Aryasomayajula, Shilpak Banerjee | **Interactive session:** 5 July 2024

### **Session 57**

**Conducted by:** Sai Venkat, Sayed Sahil, Rishith Reddy, Sanskar Agrawal, Anilatmaja Aryasomayajula, Shilpak Banerjee | **Interactive session:** 20 June 2024

### **Session 56**

**Conducted by:** Sai Venkat, Sayed Sahil, Rishith Reddy, Anilatmaja Aryasomayajula, Shilpak Banerjee | **Interactive session:** 7 June 2024

### **Session 55**

**Conducted by:** Manoj Kummini, Krishna Hanumanthu | **Interactive session:** 17 May 2024

### **Session 54**

**Conducted by:** Manoj Kummini, Krishna Hanumanthu | **Interactive session:** 3 May 2024

## **ICTS-RRI MATHS CIRCLE**

ICTS in collaboration with RRI launched in-person maths circle sessions. These sessions are conducted once every two weeks for Bengaluru students studying in grades 6-10. During May-August 2024, eight maths circle sessions were held at the Raman Research Institute, Bengaluru.

### **Session 33**

**Conducted by:** Ashwin Guha | **Interactive session:** 24 August 2024

### **Session 32**

**Conducted by:** Ashwin Guha | **Interactive session:** 10 August 2024

### **Session 31**

**Conducted by:** Ajit Bhand | **Interactive session:** 27 July 2024

### **Session 30**

**Conducted by:** Yamuna Nataraj | **Interactive session:** 13 July 2024

### **Session 29**

**Conducted by:** Biman Nath | **Interactive session:** 22 June 2024

### **Session 28**

**Conducted by:** Biman Nath | **Interactive session:** 8 June 2024

### **Session 27**

**Conducted by:** Yamuna Nataraj | **Interactive session:** 25 May 2024

### **Session 26**

**Conducted by:** Yamuna Nataraj | **Interactive session:** 11 May 2024

## **MATHS CHALLENGE INDIA**

The monthly [Maths Circle India Challenge](#) has recently been introduced. It is a maths competition open to everyone, where every second Friday of the month a new problem will be uploaded on the website. One will have three weeks to solve it and submit their answer.

## SCIENCE OUTREACH IN SCHOOLS

There were two Prism sessions held during the period of the report.

### **PRISM 7: Exploring Newton's Laws with Tug-of-war and Drag Forces with Dropped Cones**

Kaushik Basu (University of California, Berkeley) | 3 August 2024

### **PRISM 6: Magnifying Science in Field Settings**

Rahul Chajwa (Stanford University, California) | 2 May 2024

## CONNECT INDIA ART RESIDENCY

Connect India is an art residency program launched by Arts at CERN and Pro Helvetia in 2021, serving as a platform to foster experimentation in art and science by integrating CERN's cutting-edge research with international scientific organisations. The Swiss artist, Lou Masduraud and the Indian artist, Shailesh BR are the artists selected this year. The two artists, Masduraud and Shailesh BR, will spend a three-week residency at ICTS-TIFR. They will receive support from the curatorial teams from Arts at CERN and ICTS to explore new forms of artistic expression and transform these explorations into art productions.



## ANNEXURE - A

The following are the details of seminars and colloquia during the period May-August 2024:

**Intraseasonal Variability and the Abrupt Seasonal Transition in the Boundary Layer during Monsoons** | Rajat Masiwal (Indian Institute of Science, Bengaluru) | 23 August 2024

**Astrometric Analysis of Dark Matter Subhalos in Galaxy Clusters: Highly Magnified Image Pairs as Probes of Critical Curve Perturbations** | Joaquin Becerra Espinoza (Stanford University, California, USA) | 22 August 2024

**Monopoles, Duality, and Deconfined Quantum Tricriticality** | Shai Chester (Imperial College London, UK) | 20 August 2024

**Emergent time in Hamiltonian General Relativity** | Naveen Prabhakar (ICTS-TIFR, Bengaluru) | 16 August 2024

**Stability Analysis of Shallow Water equations** | Mukesh Singh Raghav (ICTS-TIFR, Bengaluru) | 12 August 2024

**Correlated and Topological Phases in Twisted Graphene Layers** | Anushree Dhatta (Laboratoire Matériaux et Phénomènes Quantiques, Paris, and Laboratoire de physique des Solides, Orsay) | 8 August 2024

**Non-AdS Holography from the Worldsheet** | Soumangsu Chakraborty (Institute of Theoretical Physics, Saclay) | 8 August 2024

**Positive Geometry, Corolla Polynomial, and the Gauge Theory Amplitudes** | Amit Suthar (Institute of Mathematical Sciences, Chennai) | 7 August 2024

**Quantum Hall Ferromagnetism Near Charge Neutrality in Graphene** | Ganpathy Murthy (University of Kentucky, USA) | 7 August 2024

**Gravitational-Wave Microlensing as a Probe of Compact Dark Matter** | Soumyadip Basak (ICTS-TIFR, Bengaluru) | 6 August 2024

**Aspects of Black Hole Cohomologies** | Seok Kim (Seoul National University, South Korea) | 31 July 2024

**Two Aspects of Periodically Driven Closed Quantum Systems** | Krishnendu Sengupta (Indian Association for the Cultivation of Science, Kolkata) | 31 July 2024

**Beyond Voting: Social Choice in the Digital Age** | Ashish Goel (Stanford University, USA) | 30 July 2024

**Direct and Indirect Measurements in Quantum Mechanics** | Varun Dubey (ICTS-TIFR, Bengaluru) | 30 July 2024

**Disorder and Transport in Strange Metals: Lessons from Theory and Computation** | Aavishkar Patel (Flatiron Institute, New York, USA) | 26 July 2024

**Inertial Particles in Unsteady Hydrodynamic Environments: Theory & Numerics** | Divya Jaganathan (ICTS-TIFR, Bengaluru) | 24 July 2024

**Lagrangian Intermittency and Vertical Confinement of Tracers in Stratified Turbulence** | Arun Kumar Varanasi (ICTS-TIFR, Bengaluru) | 22 July 2024

**Signatures of Chaos and Integrability in Isolated and Open Quantum Many-body Systems, and Controlling Chaos in the Kicked Top Model** | Mahaveer Prasad (ICTS-TIFR, Bengaluru) | 22 July 2024

**Magnetic Reconnection - An Alternative Explanation of Radio Emission in Galaxy Clusters** | Subham Ghosh (ICTS-TIFR, Bengaluru) | 19 July 2024

**Aspects of Celestial Amplitude and Flat-Space Limit of AdS/CFT** | Sarthak Duary (ICTS-TIFR, Bengaluru) | 16 July 2024

**Physics of Fast Radio Burst and Their Use as Cosmological Probes** | Pawan Kumar (University of Texas Austin, USA) | 15 July 2024

**On the Formal Moduli of En-monoidal Categories** | Bhanu Kiran Sandepudi (ICTS-TIFR, Bengaluru) | 12 July 2024

**Unravelling the Growth of the First Black Holes using JWST and PTAs** | Hamsa Padmanabhan (Universite de Geneve, Switzerland) | 10 July 2024

**The Generalized Second Law in Crossed Product Constructions** | Suneeta Vardarajan (Indian Institute of Science Education and Research, Pune) | 10 July 2024

**Reconstitution of Actin Cytoskeletal Dynamics and Functions in Cell-sized Confinement** | Makito Miyazaki (RIKEN Center for Biosystems Dynamics Research (BDR), Japan) | 9 July 2024

**Collective Chiral Behaviors in Single Cells and a Multicellular System** | Tatsuo Shibata (RIKEN Center for Biosystems Dynamics Research (BDR), Japan) | 9 July 2024

**Semiclassical Strings and Holography Beyond AdS** | Meseret Asrat (ICTS-TIFR, Bengaluru) | 3 July 2024

**Hyperbolic Lattices: From Hofstadter Butterfly to Experimentally Realizable Cayley Crystal Decomposition** | Lavi Upreti (University of Konstanz, Germany) | 28 June 2024

**Gap Statistics and Density Crossovers in Confined Particles with Power-law Interactions** | Saikat Santra (ICTS-TIFR, Bengaluru) | 28 June 2024

**What's Missing in the Low-redshift Intergalactic Medium?** | Vikram Khaire (Indian Institute for Space Science and Technology, Thiruvananthapuram) | 27 June 2024

**Universality in Spin-refined High-energy Data of Higher D CFT** | Sridip Pal (California Institute of Technology, USA) | 26 June 2024

**Waves and Tracer Dispersion in Oceans** | Sanjay C P (ICTS-TIFR, Bengaluru) | 25 June 2024

**Bacterial and Microtubular Hydrodynamics** | Debasish Das (University of Strathclyde, Glasgow) | 25 June 2024

**Programming in the Era of Large Language Models** | Satish Chandra (Google, USA) | 21 June 2024

**Measuring Deviations from the Kerr Geometry with Black Hole Ringdown** | Soumen Basak (IISER, Thiruvananthapuram) | 13 June 2024

**Doing Morse Theory without Smale Condition** | Ipsita Datta (ETH Zurich, Switzerland) | 13 June 2024

**Morphological Characterization of Galactic Foreground Emissions** | Fazlu Rahman (Raman Research Institute, Bengaluru) | 6 June 2024

**Equilibrium and Non-equilibrium Properties of Long-ranged Systems** | Jitendra Kethepalli (ICTS-TIFR, Bengaluru) | 5 June 2024

**Multi-messenger Cosmology with Next Generation Gravitational Waves Detectors and Electromagnetic Surveys** | Sumit Kumar (Max Planck Institute, Germany) | 3 June 2024

**Principle of Holography of Information and Asymptotic Symmetries** | Chandramouli Chowdhury (ICTS-TIFR, Bengaluru) | 31 May 2024

**Gravitational Wave Astronomy of Merging Compact Binaries: Effect of Subdominant Modes of Gravitational Radiation** | Mukesh Kumar Singh (ICTS-TIFR, Bengaluru) | 31 May 2024

**Holography of Information in a Ball of Finite Radius** | Ashik H (ICTS-TIFR, Bengaluru) | 29 May 2024

**An Emergent Symmetry in Thermal QCD** | Sourendu Gupta (Tata Institute of Fundamental Research, Mumbai) | 28 May 2024

**Wasserstein Gradient Flows and Generative Models for Posterior Sampling in Inverse Problems** | Gabriele Steidl (Technische Universität, Berlin) | 28 May 2024

**Perturbing the Perturbed: Stability of the QNMs for Asymptotically de Sitter Black Holes** | Sumanta Chakraborty (Indian Association for the Cultivation of Science, Kolkata) | 27 May 2024

**What if String Theory has a de Sitter Excited State?** | Keshav Dasgupta (McGill University, Canada) 22 May 2024

**Dynamics of Scrambling of Information, from Shock Waves to Fisher-KPP** | Camille Didier Georges ARON (École Polytechnique Fédérale de Lausanne, Switzerland) | 22 May 2024

**The Development of Mathematics in France since the late XIXth Century** | Martin Andler (Université de Versailles St-Quentin, France) | 21 May 2024

**Smoothability of Maps from Singular Curves to Algebraic Varieties** | Mohan Swaminathan (Stanford University, California, USA) | 15 May 2024

**A Hitchhiker's Guide to Spin Glasses** | Daniel Fisher (Stanford University, USA) | 13 May 2024

**Black Hole Attractor Mechanism in Gravity with Scalar Field Coupled to Gauge Fields** | Jyotirmoy Barman (ICTS-TIFR, Bengaluru) | 9 May 2024

**Correlators in Conformal Field Theory with Defect** | Parijat Dey (S. N. Bose National Centre for Basic Sciences, Kolkata) | 8 May 2024

**Hall Coefficient in Strongly Correlated Metals** | Sauri Bhattacharyya (Technion, Haifa, Israel) | 8 May 2024

**Designing Block Copolymers that can Microphase Separate to Form Stable Quasicrystals** | Merin Joseph (University of Copenhagen, Denmark) | 3 May 2024

**The Hilbert Space of de Sitter Quantum Gravity** | Priyadarshi Paul (ICTS-TIFR, Bengaluru) | 3 May 2024

**Cellular Slingshots and Hidden Comet-tails in the Oceans** | Rahul Chajwa (Stanford University, USA) | 1 May 2024

**Holography of Information in de Sitter Quantum Gravity** | Tuneer Chakraborty (ICTS-TIFR, Bengaluru) | 1 May 2024

## COLLOQUIA

**Deciphering Cosmic Dawn: A Conquest of the Final Frontier** | Hamsa Padmanabhan (Universite de Geneve, Switzerland) | 9 July 2024

**Some Inverse Problems in Active Matter** | L Mahadevan (Harvard University, USA) | 13 June 2024

**Exploring Equitable and Climate Compatible Futures** | Tejal Kanitkar (National Institute of Advanced Studies, Bengaluru) | 4 June 2024

**A Global Experiment to Characterize Oceanic Internal Wave Climates** | James Girton (University of Washington, USA) | 28 May 2024

**Cosmic Revelation: Quest for Dark Energy** | Shadab Alam (TIFR, Mumbai) | 22 May 2024

**Holomorphic Curves and their Applications in Symplectic Topology** | Mohan Swaminathan (Stanford University, California, USA) | 14 May 2024

**Mechano-genomics of Cell-state Transitions** | G. V. Shivashankar (ETH Zurich & Paul Scherrer Institute, Switzerland) | 7 May 2024

## ANNEXURE - B

### PAPERS PUBLISHED – 68

#### In Journals – 29

1. *Well-posedness of Stochastic Heat Equation with Distributional Drift and Skew Stochastic Heat Equation*, **Siva Athreya**, Oleg Butkovsky, Khoa Lê, and Leonid Mytnik. Communications on Pure and Applied Mathematics 77 (5) 2708-2777 (2024)
2. *Turbulent Flows are not Uniformly Multifractal*, **Siddhartha Mukherjee, Sugan D. Murugan, Ritwik Mukherjee, Samriddhi Sankar Ray**, Phys. Rev. Lett. 132 (18), 184002 (2024)
3. *Quantum Jumps in Driven-dissipative Disordered Many-body Systems*, **Sparsh Gupta, Hari Kumar Yadalam, Manas Kulkarni**, Camille Aron. Phys. Rev. A (Letter) 109 (05), L050201 (2024)
4. *Thermalization and Hydrodynamics in an Interacting Integrable System: The Case of Hard Rods*, **Sahil Kumar Singh, Abhishek Dhar**, Herbert Spohn, **Anupam Kundu**. J. Statistical Physics 191, 66, (2024)
5. *Revisiting Logarithmic Correction to Five Dimensional BPS Black Hole Entropy*, **A. H. Anupam, Chandramouli Chowdhury, Ashoke Sen**. J. High Energ. Phys. 2024 (05), 70, (2024)
6. *Probing Black Hole Charge from the Binary Black Hole Inspiral*, N. V. Krishnendu and Sumanta Chakraborty. Phys. Rev. D 109 (12), 124047 (2024)
7. *Crossover in Density Profiles of Confined Particles in Power-law Models with Finite Range of Interaction*, **Saikat Santra, Anupam Kundu**. J. of Physics A: Mathematical and Theoretical, 57 (24) 245003 (2024)
8. *Observation of Multiple Attractors and Diffusive Transport in a Periodically Driven Klein-Gordon Chain*, **Umesh Kumar**, Seemant Mishra, **Anupam Kundu, Abhishek Dhar**. Phys. Review E 109 (06), 064124 (2024)
9. *Beyond the Tensionless Limit: Integrability in the Symmetric Orbifold*, Matthias R. Gaberdiel, **Rajesh Gopakumar**, Beat Nairz. J. High Energ. Phys. 2024 (06) 30 (2024)
10. *Fully Relativistic three-dimensional Cauchy-characteristic Matching*, Sizheng Ma, Jordan Moxon, Mark A. Scheel, Kyle C. Nelli, Nils Deppe, Marceline S. Bonilla, Lawrence E. Kidder, **Prayush Kumar**, Geoffrey Lovelace, William Throwe, Nils L. Vu. Phys. Rev. D 109 (12), 124027 (2024)
11. *Emergent Dynamics due to Chemo-hydrodynamic Self-interactions in Active Polymers*, Manoj Kumar, Aniruddh Murali, Arvin Gopal Subramaniam, Rajesh Singh, **Shashi Thutupalli**. Nature Communications 15, 4903 (2024)

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13. *Tracer Dynamics in Active Random Average Process*, **Saikat Santra**, **Prashant Singh**, **Anupam Kundu**. *J. Stat. Mech.* 2024 (06) 063204 (2024)
14. *Impact of Dephasing Probes on Incommensurate Lattices*, Bishal Ghosh, Sandipan Mohanta, **Manas Kulkarni**, Bijay Kumar Agarwalla. *J. of Statistical Mechanics: Theory and Experiment*, 2024 (06) 063101 (2024)
15. *Cytoplasmic stirring by active carpets*, **Brato Chakrabarti**, Manas Rachh, Stanislav Y. Shvartsman, Michael J. Shelley. *Proceedings of the National Academy of Sciences* 121 (30) e2405114121 (2024)
16. *Temporal Correlation in the Inverse-gamma Polymer*, **Riddhipratim Basu**, Timo Seppäläinen, Xiao Shen. *Communications in Mathematical Physics*, 405, 163, (2024)
17. *Environment Seen from Infinite Geodesics in Liouville Quantum Gravity*, **Riddhipratim Basu**, Manan Bhatia, Shirshendu Ganguly. *Annals of Probability* 52 (4) 1399-1486 (2024)
18. *Yang-Lee Zeros of Certain Antiferromagnetic Models*, Muhammad Sedik, **Junaid Majeed Bhat**, **Abhishek Dhar**, B Sriram Shastry. *Phys. Rev. E* 110 (01), 014117 (2024)
19. *Shape-dependent Motility of Polar Inclusions in Active Baths*, **Pritha Dolai**, **Aditya Singh Rajput**, **Vijaykumar Krishnamurthy**. *Phys. Rev. E* 110 (01), 014607 (2024)
20. *Magnon Transmission Across  $v=1/|l|$  Mono-layer Graphene Junction as a Probe of Electronic Structure*, **Suman Jyoti De**, **Sumathi Rao**, Ganpathy Murthy. *Phys. Rev. B* 110 (08), 085417 (2024)
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23. *Physics-inspired spatiotemporal-graph AI ensemble for the detection of higher order wave mode signals of spinning binary black hole mergers*. Tian, Minyang, E A Huerta, Huihuo Zheng, and **Prayush Kumar**. *Machine Learning: Science and Technology* 5 (2) 025056 (2024).
24. *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**. *Astrophysical J.* 971 (1) 23 (2024)

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26. *Universal Distribution of the Number of Minima for Random Walks and Lévy Flights*, **Anupam Kundu**, Satya N. Majumdar, Gregory Schehr. *Phys. Rev. E* 110 (02), 024137 (2024)
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29. *Sausage Volume of the Random String and Survival in a medium of Poisson Traps*, **Siva Athreya**, Mathew Joseph, Carl Mueller. Accepted in *Annales de l'Institut Henri Poincaré*. arXiv:2212.03166 <https://imstat.org/journals-and-publications/annaes-de-linstitut-henri-poincare/annaes-de-linstitut-henri-poincare-accepted-papers/>

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2. *RKHS, Odziejewicz, Berezin and Fedosov-type Quantizations on Smooth Compact Manifolds*, **Rukmini Dey**. arXiv:2405.02838
3. *CMC Surfaces of Revolution, Elliptic curves, and Weierstrass- $\wp$  Functions*, **Rukmini Dey, Anantadulal Paul**, Rahul Kumar Singh. arXiv:2405.19742
4. *Trapping and Extreme Clustering of Finitely-dense Inertial Particles near a Rotating Vortex Pair*, **Saumav Kapoor, Divya Jaganathan, Rama Govindarajan**. arXiv:2405.04949
5. *Optimal Tail Estimates in  $\beta$ -ensembles and Applications to Last Passage Percolation*. Jnaneshwar Baslingker, **Riddhipratim Basu**, Sudeshna Bhattacharjee, Manjunath Krishnapur. arXiv:2405.12215
6. *String Field Theory: A Review*, **Ashoke Sen**, Barton Zwiebach arXiv:2405.19421.
7. *Interacting Fields at Spatial Infinity*, **Anupam A. H, P. V. Athira, Priyadarshi Paul, Suvrat Raju**. arXiv:2405.20326
8. *Generalized Hydrodynamics and Approach to Generalized Gibbs Equilibrium for a Classical Harmonic Chain*, **Saurav Pandey, Abhishek Dhar, Anupam Kundu**. arXiv:2405.16976



9. *Hydrodynamics of a Hard-core Non-polar Active Lattice Gas*, **Ritwik Mukherjee**, Soumyabrata Saha, Tridib Sadhu, **Abhishek Dhar**, Sanjib Sabhapandit. arXiv:2405.19984
10. *Constraints on Compact Dark Matter from the Non-observation of Gravitational-wave Strong Lensing*, **Ankur Barsode**, **Shasvath J. Kapadia**, **P. Ajith**. arXiv:2405.15878. Submitted to *ApJ*
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12. *Emergent Time in Hamiltonian General Relativity*, **Anurag Kaushal**, **Naveen S. Prabhakar**, **Spenta R. Wadia**. arXiv:2405.18486
13. *Sharp Deviation Bounds for Midpoint and Endpoint of Geodesics in Exponential Last Passage Percolation*, Pranay Agarwal, **Riddhipratim Basu**. arXiv:2405.18056
14. *Mechanism of Instability in Non-uniform Dusty Channel Flow*, **Anup Kumar**, **Rama Govindarajan**. arXiv:2406.04697
15. *Harmonically Trapped Inertial Run-and-tumble Particle in One Dimension*, Debraj Dutta, **Anupam Kundu**, Sanjib Sabhapandit, Urna Basu. arXiv:2406.06120
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17. *Interacting Fields at Spatial Infinity in Strongly Disordered Quantum Many-body Systems*, **Bikram Pain**, **Sthitadhi Roy**. arXiv:2406.09392
18. *Emergent Ecological Advantage of Sequential Metabolic Strategies in Complex Microbial Communities*, Zihan Wang, Yu Fu, **Akshith Goyal**, Sergei Maslov. <https://doi.org/10.1101/2024.06.14.599039>
19. *Metabolically driven Flows Enable Exponential Growth in Macroscopic Multicellular Yeast*, Nishant Narayanasamy, Emma Bingham, Tanner Fadero, G. Ozan Bozdog, William C Ratcliff, Peter Yunker, **Shashi Thutupalli**. DOI: [10.1101/2024.06.19.599734](https://doi.org/10.1101/2024.06.19.599734)
20. *Limit Theorems for Extrema of Airy Processes*, **Riddhipratim Basu**, Sudeshna Bhattacharjee. arXiv:2406.11826
21. *Binary Neutron Star Mergers using a Discontinuous Galerkin-finite Difference Hybrid Method*, Nils Deppe, Francois Foucart, Marceline S. Bonilla, Michael Boyle, Nicholas J. Corso, Matthew D. Duez, Matthew Giesler, François Hébert, Lawrence E. Kidder, Yoonsoo Kim, **Prayush Kumar**, Isaac Legred, Geoffrey Lovelace, Elias R. Most, Jordan Moxon, Kyle C. Nelli, Harald P. Pfeiffer, Mark A. Scheel, Saul A. Teukolsky, William Throwe, Nils L. Vu. arXiv:2406.19038

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23. *D-instanton Induced Effective Action and its Gauge Invariance*, **Ashoke Sen**. arXiv:2407.06278
24. *Magnetic Reconnection: An Alternative Explanation of Radio Emission in Galaxy Clusters*, **Subham Ghosh, Pallavi Bhat**. arXiv:2407.11156
25. *Effect of Order of Transfer Matrix Exceptional Points on Transport at Band Edges*, **Madhumita Saha**, Bijay Kumar Agarwalla, **Manas Kulkarni**, Archak Purkayastha. arXiv:2407.10884
26. *Conserved Densities of Hard Rods: Microscopic to Hydrodynamic Solutions*, Mrinal Jyoti Powdel, **Anupam Kundu**. arXiv:2407.17067
27. *Dynamically Emergent Correlations in Bosons via Quantum Resetting*, **Manas Kulkarni**, Satya N. Majumdar, Sanjib Sabhapandit. arXiv:2407.20342
28. *Variational Wave-functions for Correlated Metals*, **Ankush Chaubey, Harsh Nigam, Subhro Bhattacharjee**, K. Sengupta. arXiv:2408.00834
29. *An Upper Critical Dimension for Dynamo Action: A d-dimensional Closure Model Study*, **Sugan Durai Murugan**, Giorgio Krstulovic, Dario Vincenzi, **Samriddhi Sankar Ray**. arXiv:2408.01266
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31. *Gravitational Wave Tails from Soft Theorem: A Short Review*, **Ashoke Sen**. arXiv:2408.08851
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33. *Arbitrary Order Transfer Matrix Exceptional Points and van Hove Singularities*, **Madhumita Saha**, Bijay Kumar Agarwalla, **Manas Kulkarni**, Archak Purkayastha. arXiv:2408.10103
34. *Basset History and Inertia are Relevant for Unsteady Particle Settling Dynamics and Flow Structures*, Tomek Jaroslowski, **Divya Jaganathan, Rama Govindarajan**, Beverley McKeon. arXiv:2408.12530
35. *Transport in Open Quantum Systems in Presence of Lossy Channels*, Katha Ganguly, **Manas Kulkarni**, Bijay Kumar Agarwalla. arXiv:2408.14399
36. *Phases and Phase Transitions in a Dimerized Spin- $\frac{1}{2}$  XXZ chain*, **Harsh Nigam**, Ashirbad Padhan, Diptiman Sen, Tapan Mishra, **Subhro Bhattacharjee**. arXiv:2408.14474
37. *The Fock-space landscape of many-body localisation*, **Sthitadhi Roy**, David E. Logan arXiv:2408.12685 (Invited review article for J. Phys.: Condens. Matter)

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39. *Magneto Tunnel Conductance Across Twisted Weyl Semimetal Junctions*, Nirnoy Basak, **Sumathi Rao**, Faruk Abdulla. arXiv:2408.10586

#### Consortium – 4

1. *Observation of Gravitational Waves from the Coalescence of a 2.5 - 4.5  $M_{\odot}$  Compact Object and a Neutron Star*, The LIGO Scientific Collaboration, the Virgo Collaboration, the KAGRA Collaboration: A. G. Abac, R. Abbott, *et. al.* *Astrophysical Journal Letters* 970 (02) L34 (2024)
  2. *Swift-BAT GUANO follow-up of Gravitational-wave Triggers in the Third LIGO-Virgo-KAGRA Observing Run*, Gayathri Raman, Samuele Ronchini, James Delaunay, Aaron Tohuvavohu, Jamie A. Kennea, Tyler Parsotan, Elena Ambrosi, Maria Grazia Bernardini, Sergio Campana, Giancarlo Cusumano, Antonino D'Ai, Paolo D'Avanzo, Valerio D'Elia, Massimiliano De Pasquale, Simone Dichiara, Phil Evans, Dieter Hartmann, Paul Kuin, Andrea Melandri, Paul O'Brien, Julian P. Osborne, Kim Page, David M. Palmer, Boris Sbarufatti, Gianpiero Tagliaferri , *et al.* arXiv:2407.12867
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  4. *Tests of General Relativity with GWTC-3*, The LIGO Scientific Collaboration, the Virgo Collaboration, the KAGRA Collaboration, R. Abbott, *et al.*, in press *Phys. Rev. D* (2024) arXiv:2112.06861
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