

AIKYA BANERJEE

DPhil Student • Theoretical Astrophysics and Plasma Physics

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Education

Doctor of Philosophy

Merton College, University of Oxford

Oxford, UK

October 2025 - ongoing

- DPhil student in Theoretical Astrophysics and Plasma Physics under the guidance of Dr. Archie Bott & Prof. Alexander Schekochihin.

Bachelor of Science & Master of Science

Indian Institute of Science Education and Research Kolkata

Kolkata, India

2020-2025

- BS-MS in *Physical Sciences* with a minor in *Mathematical Sciences*. CGPA 9.32/10

Secondary and Higher Secondary Education

Hooghly Collegiate School (Govt)

Chinsurah, India

till 2020

- 95% in the Secondary Examination in 2018 from *West Bengal Board of Secondary Education*.
- 99.8% in the Higher Secondary Examination in 2020 from *West Bengal Council of Higher Secondary Education*. Subjects: Physics, Chemistry, Mathematics, Statistics, Bengali and English.

Research Interests

Turbulence, Plasma Physics, & Statistical Mechanics I am primarily lies in plasma physics and turbulence. Additionally, I am intrigued by non-equilibrium statistical mechanics and active matter systems.

Publications

- **A. Banerjee**, R. Mukherjee, S. D. Murugan, S. Bhattacharjee & S.S. Ray “Intermittent fluctuations determine the nature of chaos in turbulence” ([arXiv:2505.09538](#))
- **A. Banerjee**, P. Jana & P.K. Mohanty, “Geometric percolation of spins and spin-dipoles in Ashkin-Teller model”. ([Physical Review B 111](#), 014403)
- A. Brandenburg & **A. Banerjee**, “Turbulent magnetic decay controlled by two conserved quantities”. ([Journal of Plasma Physics. 91](#), E5 (2025))
- S.K. Saha, **A. Banerjee** & P.K. Mohanty, “Site-percolation transition of run-and-tumble particles”. ([Soft Matter](#), 2024, 20, 9503-9509)

Research Experience

Many-body chaos in fully developed turbulence

International Centre for Theoretical Sciences

Bangalore, India

August, 24-May, 25

- We showed how intermittent fluctuations determine the nature of chaos in fully developed turbulence. Mentor **Prof. Samriddhi Sankar Ray**

Non-equilibrium statistical mechanics and exactly solvable models

Indian Institute of Science Education and Research

Kolkata, India

March, 23-December, 24

- We studied — (a) the phase separation transition in a model of run and tumble particles on lattice, (b) geometric percolation transition in the Ashkin Teller model. Mentor **Prof. P. K. Mohanty**.

Turbulent decay controlled by two conserved quantities

Sweden (Virtually)

Nordic Institute for Theoretical Physics (NORDITA)

March-July, 24

- We studied the relevant conserved quantities in helical and non-helical magnetic turbulence and estimated timescale over which one dictates the other. Mentor **Prof. Axel Brandenburg**.

Diffusion of magnetic skyrmions

Mainz, Germany

Johannes Gutenberg University Mainz

May-July, 24

- I received the German Academic Exchange Service (DAAD) - WISE fellowship to study diffusion and relevant time scales for magnetic skyrmions. Mentor **Prof. Peter Virnau**.

Shell model in turbulence

Bangalore, India

International Centre for Theoretical Science

May, 22-July, 23

- I studied shell model, a local cascade model for turbulence. Mentor **Prof. Samriddhi Sankar Ray**.

Teaching Experience

Statistical and Thermal Physics - A1

Merton College, University of Oxford

Oxford, UK

Oct, 25 - present

- Graduate Teaching Assistant. Instructor **Prof. Alex Schekochihin**

Thermal Physics - PH2202

Indian Institute of Science Education and Research

Kolkata, India

Jan - May, 24

- The course was aimed for second year undergraduate students focusing mainly on thermal physics and basic statistical mechanics. Instructor **Prof. Koushik Dutta**

Mechanics I - PH1101

Indian Institute of Science Education and Research

Kolkata, India

Aug - Dec, 23

- This is an introductory course for first year undergraduate students. Instructor **Prof. Golam M Hossain**

Schools and External Courses

- Bangalore School of Statistical Physics (BSSP) - XV by International Centre for Theoretical Sciences, Bengaluru and Raman Research Institute. Sept, 24
- ICTS summer course *The Fascinating World of Flows* by International Centre for Theoretical Sciences, Bengaluru. June-July, 23
- Introductory Summer School in Astronomy and Astrophysics - 2023 by Inter-University Centre for Astronomy and Astrophysics (IUCAA). May-June, 23
- Exposure cum nurture camp (18.1), National Initiative on Undergraduate Science (NIUS) by Homi Bhabha Centre for Science Education, Tata Institute of Fundamental Research. Dec, 21
- Summer workshop for undergraduate students, D S Kothari Centre for Research and Innovation in Scienc Education, Miranda House, Delhi. June-July, 21

Achievements

Academic Achievements

- **Clarendon Fund Scholarship** — recipient of the Clarendon Fund Scholarship for full-time DPhil at the University of Oxford.
- **DAAD-WISE** fellow-2024 by the German Academic Exchange Service. [\[Certificate\]](#)

- **KVPY fellow** (a national fellowship for basic science students) in the SA stream (2018) by the Department of Science and Technology, Government of India. [[Award Letter](#)]
- **National Initiative for Undergraduate Science(NIUS)- Physics** Scholar (18th batch) of the Homi Bhabha Center for Science Education, Tata Institute of Fundamental Research. [[Certificate](#)]
- Received the **Mrinal K. Dewanjee Best Student Award** in Biological Sciences by Indian Science News Association, 2019. [[Certificate](#)]
- Secured **1st rank in state**(among 0.76 million students) in the **Higher Secondary Examination** conducted by West Bengal Council of Higher Secondary Education, 2020.
- Secured **2nd Position** in 2022 & 2023 at **Abhiprajna**, a Pan-India Science Competition organized by IISER Tirupati.

Other Achievements

- Received Prize in **Shankar International Painting Competition** in the year 2018. [[Certificate](#)]
- Received the **National Painting Award - 2014** for securing 1st rank in Blue Group in the national level painting competition by the **Indian Council for Child Welfare**. [[Certificate](#)]
- **Centre for Cultural Resources and Training (CCRT)** scholar by Govt. of India (ID: [SCHO2013-14/0362](#)).

Skills

Coding skills

Python, Julia, Mathematica, R, $\text{\LaTeX}$, and HTML; Fluid simulations.

Languages

English (Fluent), Bengali (Native), Hindi

Advanced Courses

Statistics-II, Quantum Field Theory, Advanced Optics Laboratory, Advanced Statistical Mechanics, General Relativity and Cosmology, Fluid and Magneto-hydrodynamics, Symmetry methods in physics, Evolutionary dynamics.

Selected talks

- **Turbulent magnetic decay controlled by two conserved quantities** at the NORDITA Summer Workshop Conference (2024), Stockholm (virtually). [[Presentation](#)]
- **Influence of Sun in Secondary Cosmic Ray Flux** at International Cosmic Day event, 2021 by International Particle Physics Outreach Group, DESY (Deutsches Elektronen-Synchrotron) [[Certificate](#)]
- **GM Crops - Promises and Apprehensions** at Bose Institute, Kolkata (India) on 20th February, 2020. [[Certificate](#)]