MANAS CHOUDHARY

EDUCATION

Indian Institute of Technology Delhi, New Delhi — November 2020 - August 2024
B. Tech. in Engineering Physics — CGPA: 9.91/10

ACHIEVEMENTS

- Awarded the President's Gold Medal for securing the highest CGPA amongst the graduating students of the class of 2024 from Bachelor of Technology and integrated bachelors and masters programmes
- Recepient of the Mudit Sharma Memorial award and Rajeev Bambawale Cash award for securing the highest CGPA amongst the graduating students of Engineering Physics and the class of 2024 respectively
- Recipient of the IIT Delhi Endowment Merit Scholarship Award for two consecutive academic years
- Recipient of Merit award for every semester at IIT Delhi
- Selected for the award of Summer Research Fellowship in 2023 by Indian Academy of Sciences for summer research at Indian Institute of Science Bangalore
- Cleared the highly competitive JEE Advanced Examination, 2020 for admission to IIT Delhi

RESEARCH INTERESTS

- Theoretical High Energy Physics, particularly AdS/CFT Correspondence and String Theory
- Mathematical Physics, particularly applications of algebraic topology and group theory in particle physics

RESEARCH PROJECTS

Analyzing loop Feynman diagrams in AdS space — New Delhi, India
Supervisor - Sarthak Parikh — October, 2022 - August, 2024
Indian Institute of Technology Delhi

- Reviewed the present methods of computing correlators of scalar field theory in AdS_d
- Generalized the method of computation of arbitrary contact diagrams using the method of Mellin transform
- Developed new mathematical identities for the computation of higher loop Feynman diagrams in AdS space

Analyzing the experimental feasibility of Dark Matter detection using LC circuit — Bangalore, India
Supervisor - Aninda Sinha — May, 2023 - July, 2023
Indian Institute of Science Bangalore

- Reviewed the current status of dark matter detection in the ADMX with special focus on the feasibility of setting up the experimental setup described in 'Axion Dark Matter Detection using an LC circuit' by P. Sikivie et.al.
- Proposed the required variations in experimental parameters for probing into the unexplored regions of the mass-coupling parameter space

Musical Note Recognition and Playback — New Delhi, India
Supervisor- Seshan Srirangarajan — March, 2022
Indian Institute of Technology Delhi

- Used MATLAB to perform the fourier spectrum analysis of music samples
- Developed an efficient program to determine the notes used in the music to perform a note-by-note analysis
- Incorporated novel methods of noise removal to improve playback quality

READING PROJECTS

Conformal Field Theory and Algebras — New Delhi, India
Supervisor - Sarthak Parikh — October, 2022 - March, 2023
Indian Institute of Technology Delhi

- Studied the construction of conformal group algebra in 2 dimensions and $d > 2$ dimensions
- Studied the symmetries of correlators of CFTs to understand AdS/CFT duality

Differential Topology and Applications — New Delhi, India
Reference - Gauge Fields, Knots and Gravity, Baez and Muniain — November 2022 - December, 2022

- Studied the language of differential topology for laws of Physics
- Used the knowledge of differential topology and Lie groups to learn about Yang-Mills and Chern-Simons theory
- Studied about knot theory and invariants and its connection with Chern-Simons theory

Group Theory in Particle Physics — New Delhi, India
Reference - Lie Algebras in Particle Physics, Howard Georgi — May 2022 - June, 2022

- Studied representation theory of continuous groups especially the irreducible representations of SU(2) and SU(3)
- Studied the applications of group theory especially in non-Abelian gauge field theories and Grand Unified Theories

EXPERIENCE

TEACHING EXPERIENCE

Teaching Assistant New Delhi, India
Professor- Abhishek Muralidhar Iyer August 2023 - November 2023
Indian Institute of Technology Delhi

- Served as the teaching assistant for the course Mathematical Physics-I for second year UG students
- Prepared additional teaching material for weekly tutorial sessions

LEADERSHIP/MENTORING EXPERIENCE

Class Representative New Delhi, India
Co-curricular and Academic Interactions Council June 2023 – May 2024

- Elected as the class representative of Engineering Physics
- Represent the students in class committee meetings
- Represent the department in student council meetings

Student Mentor New Delhi, India
Board of Student Welfare August 2023 – July 2024

- Selected as a student mentor for a group of first year students
- Collaborated with BSW Operations vertical to conduct multiple student events

Undergraduate Students' Representative New Delhi, India
Board of Academic Programmes August 2023 – July 2024
Indian Institute of Technology Delhi

- Nominated as a permanent member to the Board of Academic Programmes, IIT Delhi
- Served as the Representative of all four-year undergraduate programmes at the institute
- Coordinated with the secretaries of Student Affairs Council and Academic Interactions Council to provide student feedback on changes in curriculum structure

VOLUNTEERING EXPERIENCE

Teaching Volunteer New Delhi, India
National Service Scheme (NSS) August 2022 – May 2023

- Taught students from economically weaker backgrounds under the PAHARI scheme of the NSS
- Provided elementary education to children coming from families of maintainance staff at IIT Delhi

RELEVANT COURSES

Quantum Field Theory, General Relativity, Group Theory and its Applications, Quantum Information and Computation, Mathematical Physics-1, Mathematical Physics-2, Quantum Mechanics, Applied Quantum Mechanics, Computational Physics, Statistical Physics, Classical Mechanics, Electrodynamics