Apratim Rastogi

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Profile Summary

Recent graduate from Thapar Institute of Engineering and Technology with Physics (Hons) and Philosophy minor. My academic focus lies in the intersection of mathematical physics and theoretical concepts, with specific interests in black holes and quantum gravity. Complementing my physics background, my training in philosophy has sharpened my ability to think critically and solve complex problems with rigor and creativity. With a strong foundation in computational methods and a proven track record of academic excellence, I am seeking opportunities to contribute to cutting-edge research in theoretical physics at the graduate level.

Education

Thapar Institute of Engineering and Technology Jul 2020 - Aug 2024
Bachelor of Sciences in Physics(Hons) and minor in Philosophy **Final CGPA: 8.25/10**

City Montessori School Jul 2012 - Mar 2020
Graduated 12th grade with 85% in (PCM, and Computer Science) Graduated 10th grade with 92%

Relevant Coursework

Courses: Mechanics, Quantum Mechanics, Mathematical Physics, Numerical Analysis, Computational Methods, Introduction to Astronomy and Astrophysics, Non-Linear Dynamics, Solid State Physics, Nuclear and Particle Physics, Thermodynamics, Electricity and Magnetism, Electrodynamics, Atomic and Molecular Physics, Philosophy of science, Classical Mechanics (MSc level), Advanced quantum Mechanics (MSc level), General Relativity by Alex Flournoy (Open Courses), Geometrical Anatomy of Theoretical Physics by Dr.Frederic P Schuller (Open Courses)

Skills

Languages: Python, C/C++, Julia, FORTRAN, LaTeX
Tools: GNU Plot, Matplotlib, SageMath, Tensorflow, Git/GitHub, Unix Shell, VS Code
Soft Skills: Academic Writing and Presentation, Analytical Thinking, Strong Communication, and leadership
Other Relevant Skills: Mathematical Modeling and Numerical Analysis, Simulations, Machine Learning

Projects

Computational modeling of Leonard Jones fluid using Metropolis algorithm (Jul 2022 - Dec 2022)

- Simulated the relation between pressure and density of a randomly configured Leonard Jones fluid at two different temperatures using Metropolis Algorithm with periodic boundary conditions. Code implemented in C++ and Gnuplot

Analytical and Numerical study of Nonlinear Schrödinger's Equation (NLSE) (Nov 2023 - Dec 2023)

- We tried to solve the Nonlinear Schödinger's Equation both analytically and numerically using Lagrangian Variational method and Runge-Kutta method respectively. We tried to find the soliton solution for the equation with sinc potential. Code was implemented using Sympy and plots using matplotlib.

ArcSinH Discrete Derivative Calculus for Lattice Field Theories (Jan 2024 - Mar 2024)

- Recent work by Dr. Partha Mukhopadyay found that a non-local Derivative called Logarithmic Discrete Derivative(LDD) can be used to preserve the symmetries of spacetime continuum in the lattice field theories. My work was to investigate properties of a closely related ArcSinh Discrete Derivative (ASHDD) and its relationship with the LDD.

Event Horizon and Surface Presentism in classical GR (Jan 2024 - Ongoing)

- We aim to defend surface presentism against the problems caused by Event Horizon as posed by a recent publication by Baron and Le Bihan 2023.

Dissertation: Cavity Soliton Dynamics under central-peak shaped potentials (Jan 2024 - Jul 2024)

Investigated the cavity soliton (CS) formation and its entrapment under central peak-shaped potentials inside a semiconductor laser cavity comprising of vertical cavity surface emitting laser (VCSEL), coupled with saturable absorber (SA) and frequency selective feedback (FSF) modelled using Complex Ginzburg-Landau Equation (CGLE)

Honors and Awards

TSLAS merit-based Scholarship Aug 2023
Awarded 50% scholarship for academic performance based on Academic Years 2020 to 2023

PSI Current Debates in Philosophy of Science (Bengaluru) Jun 2023
Awarded rupees 10000 to attend and participate in the conference organized by Philosophy of Science India at Azim Premji University

International Philosophy Conference in India (Delhi) Jan 2023
Received full funding to attend and participate in the conference held in India International Center, Delhi

Scored Third Position in University for BSc Honors (all subjects) for academic year 2022-23 Dec 2023

Relevant Experiences

High School Tutor Sep 2024 - Present
I am currently serving as a physics and mathematics tutor to highschool students in my local neighbourhood.

Cogito: The Philosophy Society Dec 2020 - Jul 2023
I co-founded a philosophy society that aimed at fostering open and critical discussion on various topics.

Publication

Cavity Soliton Dynamics under central-peak shaped potential Forthcoming
We are currently writing this paper based on the findings of my undergraduate physics thesis.

Referees

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