ABHINOVE NAGARAJAN S

Email: n.abhinove@iitg.ac.in
(He/Him)

EDUCATION

Indian Institute of Technology, Guwahati *September 2020 - June 2022*
M.Sc. Physics 8.43/10

Loyola College (University of Madras) *2017-2020*
B.Sc. Physics Cumulative GPA: 9.33/10

PSBB Senior Secondary School *2016*
All India Senior School Certificate (High School Certificate) Aggregate score 476/500
Subjects: Physics, Chemistry, Biology, Mathematics, English

RESEARCH EXPERIENCE

Indian Institute of Technology Guwahati Guwahati, India
Department of Physics *July 2021 - April 2022*

MSc Dissertation advised by Dr. Sayan Chakrabarti

- Explored black hole superradiance in various backgrounds and derived the amplification factors analytically and numerically (using Mathematica).
- Investigated superradiance in rotating Ashtekar, Olmedo Singh black holes which include quantum corrections inspired by loop quantum gravity.
- Discovered that for small black holes with very high angular momenta, scalar field superradiant amplification in AOS can exceed that of Kerr. Preprint submitted to ArXiv.
- Thesis available here

Institute of Mathematical Sciences Chennai, India
Advisor: Dr. Sitabhra Sinha, Department of Physics *June 2021-February 2022*

- Investigated ordering in the empirical brain network of the Macaque monkey, using the Ising model of statistical mechanics
- Assessed whether communication between areas of the connectome depend on the dynamics (such as ordering or diffusion) or is a property of the community structure, by comparing ordering in the empirical network to that in randomzied networks.
- Found that global convergence to a steady state is the slowest for the empirical network, as compared to that in randomized networks, suggesting that global ordering is not desirable.
- A report can be found here

Indian Institute of Science Bengaluru, India
Advisor: Dr. Arvind Ayyer, Department of Mathematics *April 2019 - July 2019*

- Selected as an Indian Academy of Science Summer Fellow.
- Studied the mathematics of card shuffling and how riffle shuffles are an example of Markov Chains.
- Reviewed a paper on card shuffling and developed a computer program using Python and SageMath to simulate all possible permutations of a deck of cards after a riffle shuffle.

Indian Institute of Technology, Madras Chennai, India
Advisor: Dr. Rajesh Narayanan, Department of Physics *May 2015 - June 2015*

- Selected as a summer intern of the Research Science Initiative at IIT-M
- Explored the idea of finite size scaling, for magnetic phase transitions between ferromagnetic and paramagnetic phases.
- Studied the behavior of various thermodynamic quantities in the critical regime and determined the critical exponents in the power laws they obeyed using finite size scaling.

PUBLICATIONS/PREPRINTS

- Devi, Saraswati and **S, Abhinove Nagarajan** and Chakrabarti, Sayan and Majhi, Bibhas Ranjan "Shadow of quantum extended Kruskal black hole and its super-radiance property" doi:10.48550/arxiv.2105.11847

CONFERENCES AND SUMMER SCHOOLS

- Participant at Indian Strings Meeting 2021, Organised by IIT Roorkee
- Winter School on Physics of the Early Universe, ICTS Bengaluru, Jan 2022
- Kavli Asian Winter School on Strings, Particles and Cosmology, Jan 2022

ACADEMIC ACHIEVEMENTS AND HONORS

- All India Rank 211 - IIT JAM 2020
- Selected as an Indian Academy of Sciences, Summer Research Fellow 2019
- Loyola Physics Association - Merit Scholarship
- Best All Rounder, High School Graduating Class 2016
- Selected as Research Science Initiative Summer Intern - IIT Madras 2015 (Summer of Junior Year of High School)

TEACHING AND WORK EXPERIENCE

Warhorse Innovations Private Limited October 2018 - March 2020

- Researched and designed course content for classes on social welfare policy, debate, argumentation and scientific thinking.
- Contributed to building a gamified program for students at a prominent management institute.
- Designed and conducted an experimental science class for a class of 25+ high school students

SKILLS

Programming Skills

- Python - NumPy, Matplotlib, Seaborn, Pandas
- Mathematica
- Julia
- LaTex