Aditya Vijaykumar

vijaykumar.aditya@gmail.com • +91 8385857855 • RP 240, BITS Pilani, Pilani, Rajasthan, India

Research Interests

Theoretical Physics

Education

Birla Institute of Technology and Science (BITS), Pilani
M.Sc. (Hons.) Physics and B.E. (Hons.) Mechanical Engineering 2013 - 2018 (Expected)

High School - **St. Vincent's High School, Pune** (Maharashtra HSC) - 94.27% 2011 - 2013
Secondary School - **Rosary High School, Pune** (Maharashtra SSC) - 93.27% 1999 - 2011

Research Experience

Visiting Student (Masters Thesis) Centre for High Energy Physics (CHEP), Indian Institute of Science (IISc), Bangalore, India
To be mentored by Prof. Chethan Krishnan July 2017 - June 2018
Locality, Entanglement and Quantum Gravity - We aim to extract lessons for quantum gravity by studying the interplay of entanglement and locality in tractable physical systems like lattice models, and proceed from there.

Summer Research Intern
The Inter-University Centre for Astronomy and Astrophysics (IUCAA), Pune, India
Mentored by Prof. Raghunathan Srianand May 2016 - July 2016
Analysis of Quasar Absorption Lines from SDSS Photometric Data - Using photometric data of quasars with absorbers in their line of sight taken from the Sloan Digital Sky Survey (SDSS), we used some image processing techniques such as stacking to establish a correspondence between the results already obtained from the spectral data also taken from SDSS. We used some statistical methods to establish this result.

Summer Research Intern
The National Centre for Radio Astrophysics (NCRA-TIFR), Pune, India
Mentored by Prof. Yashwant Gupta May 2015 - July 2015
Testing and Debugging the Transient Detection Pipeline of GMRT - Squashed crucial bugs and tested the transient pipeline using test data from known and reliable transient sources such as pulsars. Also reviewed key concepts of radio astronomy and pulsar astrophysics in the process.

Selected Projects

Gauge Theory in Particle Physics
Mentored by Prof. Biswanath Layek, BITS Pilani Aug 2016 - Dec 2016
A brief introduction to gauge theory and its applications in particle physics. We started off by studying gauges, their properties, and usage, and went on to apply these concepts to electromagnetism, QED, QCD and some other cases.

Entanglement Production in Coupled Chaotic Systems
Mentored by Prof. J N Bandyopadhyay and Prof. Tapomoy G Sarkar, BITS Pilani Aug 2016 - June 2017
A computational study of chaotic properties of a coupled chaotic system. We considered a coupled top, and using some approximation methods to the Hamiltonian, found the chaotic properties within some parameter ranges. A rigorous statistical analysis of the properties followed, with results. (expected to be published soon)

Black Holes and Naked Singularities
Mentored by Prof. Tapomoy G Sarkar, BITS Pilani Jan 2017 - June 2017
An in-depth study on black holes and their various aspects. Starting with a review of black holes with different metrics, we also conducted a brief review of naked singularities and paths to quantum gravity. We also revised a fair bit of general relativity in the process.

Relevant Courses

Classical Mechanics, Electromagnetic Theory, Quantum Mechanics, Mathematical Methods in Physics, Statistical Mechanics, Computational Physics, Particle Physics, General Theory of Relativity and Cosmology, Introductory Quantum Field Theory, Intrductory Astronomy and Astrophysics

Technical Skills

Programming Languages - Python, C, C++, Shell Script
Softwares - MATLAB, Maple
Tools/Frameworks - LaTeX, Git

Awards and Co-Curricular Achievements

- Recepient of the INSPIRE-DST Scholarship for Higher Education for the period 2013 to 2018
- Selected for the Summer Research Fellowship of the Indian Academy of Sciences
- Captain (Head) of the Clock Tower Restoration Team, BITS Pilani
- Chief Coordinator of APOGEE 2016, the 34th edition of BITS Pilani's official annual technical festival
- Founding Head of the Student Academic Cell, BITS Pilani, a think-tank responsible for improving the academic environment in BITS, Pilani

More

Please visit https://adivijaykumar.github.io/academic/