

Aditya Vijaykumar

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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**

Mentored by Prof. Chethan Krishnan July 2017 - Present
Complexity in context of 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. So far, we have reviewed definitions and properties of complexity of quantum states, and tried to derive results about the same.

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 (a manuscript is under preparation).

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, Quantum Field Theory, Introductory Astronomy and Astrophysics

CONFERENCES AND SCHOOLS ATTENDED	<ul style="list-style-type: none"> • ICTS Summer School on Gravitational Wave Astronomy, ICTS, Bengaluru, India, July 2017 • Presented a paper titled <i>Gravitational Lensing from Orbiting Binary</i> at APOGEE 2017, BITS Pilani
TECHNICAL SKILLS	<p>Programming Languages - Python, C, C++, Shell Script</p> <p>Softwares - MATLAB, Maple</p> <p>Tools/Frameworks - \LaTeX, Git</p>
SCORES, AWARDS AND CO- CURRICULAR ACHIEVEMENTS	<ul style="list-style-type: none"> • Scored 960/990 on the Subject GRE in Physics, October 2017 • Receptient 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 in 2016 • Contributor to SciPy • 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