

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

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, 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 - L^AT_EX, Git</p>
AWARDS AND CO- CURRICULAR ACHIEVEMENTS	<ul style="list-style-type: none"> • 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
MORE	Please visit https://adivijaykumar.github.io/academic/