

Aditya Vijaykumar

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RESEARCH INTERESTS Gravitational Wave Astronomy and Astrophysics, Tests of General Relativity and Cosmology, Scientific Computing

EMPLOYMENT **CITA Postdoctoral Fellow** Sep 2023 - *Present*
Canadian Institute for Theoretical Astrophysics (CITA), Toronto
Graduate Student Aug 2018 - Aug 2023
International Centre for Theoretical Sciences (ICTS-TIFR), Bengaluru
Fulbright-Nehru Doctoral Research Fellow Aug 2022 - Mar 2023
Department of Physics, The University of Chicago

EDUCATION **International Centre for Theoretical Sciences (ICTS-TIFR), Bengaluru** 2018 - 2023
PhD in Physics. Mentor: Prof. Ajith Parameswaran.
Thesis Title: *Exploring gravity, astrophysics, and cosmology with gravitational waves*
Birla Institute of Technology and Science (BITS), Pilani 2013 - 2018
M.Sc. (Hons.) Physics and B.E. (Hons.) Mechanical Engineering

AWARDS

1. **Justice Oak Award for Outstanding thesis in Astronomy 2024**, Astronomical Society of India (ASI)
2. **V. V. Narlikar Best Thesis Award 2024**, Indian Association for General Relativity and Gravitation (IAGRG)
3. **Fulbright-Nehru Doctoral Research Fellowship 2022**, US Department of State and Government of India
4. **Graduate Fellowship 2018-2023**, ICTS-TIFR
5. **S.N. Bhatt Memorial Excellence Fellowship 2018**, ICTS-TIFR
6. **Summer Research Fellowship 2016**, Indian Academy of Sciences
7. **INSPIRE-DST Scholarship for Higher Education 2013-2018**, Government of India

PUBLICATION [NASA-ADS Link](#)

LIBRARY

SEMINARS

- Seminar at Caltech March 2025
- Seminar at UCLA March 2025
- IGC seminar, Penn State University October 2024
- IUCAA gravitational wave seminar August 2024
- Gravity Exploration Institute seminar, Cardiff University July 2024
- CIERA seminar, Northwestern University June 2024
- GRAPPA seminar, University of Amsterdam May 2024
- Strong seminar, Niels Bohr Institute April 2024
- CITA Seminar, University of Toronto January 2024
- TASTY Seminar, University of Toronto January 2024

	• IUCAA gravitational wave seminar, Pune	July 2023
	• Physics seminar, IISER Pune	July 2023
	• Physics seminar, IIT Gandhinagar	June 2023
	• Gravitational wave seminar, Seoul National University (virtual)	October 2022
	• IGC seminar, Penn State University	August 2022
	• Lorentz Institute seminar, Leiden (virtual)	June 2020
	• IUCAA gravitational wave seminar, Pune	September 2019
	• Albert Einstein Institute seminar, Hannover	July 2019
CONFERENCES AND MEETINGS	• APS Meeting, Anaheim, CA	March 2025
	• Midwest Relativity Meeting, Ann Arbor, MI	November 2024
	• PAX Meeting, London, UK (panelist)	July 2024
	• CASCA Meeting, Toronto	June 2024
	• Gravitational waves: A new ear on the chemistry of galaxies, Leiden	April 2024.
	• Globular Clusters and their Tidal Tails, Toronto	May 2024
	• Joint CITA-PI Gravitational waves meeting	October 2023
	• Pune-Mumbai Cosmology Meeting	August 2023
	• The Quest for Precision Gravitational-wave Cosmology, KICP, Chicago	September 2022
	• Second Chennai Symposium on Gravitation and Cosmology, Chennai (virtual)	February 2022
	• Advances in Computational Relativity, ICERM, Brown University (virtual)	September 2020
	• ICTS In-house Symposium, Bengaluru	February 2020
	• Astrophysics of Supermassive Black Holes, ICTS, Bengaluru	December 2019
	• International Conference on Gravitation & Cosmology, Mohali	December 2019
	• Future of Gravitational Wave Astronomy, ICTS, Bengaluru	August 2019
	• GR22 and Amaldi13, Valencia	July 2019
MENTORSHIP	• Ben Stadel (University of Alberta)	May 2024 - <i>Present</i>
	• Kaustubh Gupta (IISER, Pune)	May 2022 - May 2023
	• Adhrit Ravichandran (IIT Roorkee → UMass Dartmouth)	Sep 2021 - Aug 2022
	• Kruthi Krishna (IISc → Radboud University)	Sep 2020 - Aug 2021
	• Harsh Narola (IISER, Tirupati → Utrecht University)	Sep 2020 - Aug 2021

TEACHING	<ul style="list-style-type: none"> • Instructor and organizer, LIGO-Virgo Collaboration Gravitational-Wave Open Data Workshop #5 and #6 at ICTS. • Tutor for the Numerical Relativity graduate course, ICTS, Jan-April 2022. • Co-organizer and tutor, ICTS Workshop on Parameter Estimation with bilby, ICTS, Bengaluru, India, August 2020 (Online) • Tutor, Light and Beyond—Summer Course for Undergraduate Students by Prof. Rajaram Nityananda, June 2020 (Online) • Tutor, LIGO-Virgo Collaboration Gravitational-Wave Open Data Workshop #3, May 2020 (Online) • Tutor for the following mini-courses, ICTS Summer Schools on Gravitational Wave Astronomy, ICTS, Bengaluru, India: 	
OUTREACH	<ul style="list-style-type: none"> • Co-PI of the <i>IndiaBioscience Outreach Grant</i> to communicate science using stage theatre. • Panelist at the <i>Bengaluru: The Astronomy City</i>, a Q&A event organized for National Science Day, February 2022. • Moderated a discussion with Prof. Smitha Vishveshwara on her collaborative science theatre project <i>Quantum Voyages</i> as a part of Cosmic Zoom Online Exhibition, April 2021 • Articles on the ICTS blog: <ul style="list-style-type: none"> 1. A Conversation with ICTS Scientists Studying the Indian Monsoon, November 2019 2. Summer School on Gravitational Wave Astronomy, November 2019 • Talk titled <i>The Whats, Whys and Hows of Gravitational-wave Astronomy</i>, BMS College of Engineering, Bengaluru, November 2019 • Talk titled <i>Gravitational Waves - A New Tool for Cosmology!</i> at Vigyan Samagam, Visvesvaraya Industrial and Technological Museum, Bengaluru, India, August 2019 	
TECHNICAL SKILLS	Programming Languages - Python, C, C++, Shell Script Softwares - MATLAB, Mathematica Tools/Frameworks - L ^A T _E X, Git	
REFERENCES	Prof. Parameswaran Ajith International Centre for Theoretical Sciences (ICTS-TIFR), Shivakote, Hesarahatta-Hobli, Bengaluru, 560089, India. ajith@icts.res.in	Prof. Daniel E. Holz The University of Chicago, Michelson Center for Physics, Chicago, IL 60637, USA. holz@uchicago.edu
	Prof. Maya Fishbach Canadian Institute for Theoretical Astrophysics, 60 St George St, Toronto, ON M5S 3H8, Canada. fishbach@cita.utoronto.ca	Prof. Shasvath J. Kapadia Inter-University Centre for Astronomy and Astrophysics, Post Bag 4, Ganeshkhind, Pune, 411007, India shasvath.kapadia@iucaa.in

20. Kanchan Soni, **Aditya Vijaykumar**, Sanjit Mitra
Assessing the potential of LIGO-India in resolving the Hubble Tension
Submitted to Nature Astronomy, [arXiv:2409.11361](#).
19. Avinash Tiwari, **Aditya Vijaykumar**, Shasvath J. Kapadia, Sourav Chatterjee, Giacomo Fragione
Profiling stellar environments of gravitational wave sources
Submitted to Phys. Rev. Lett., [arXiv:2407.15117](#).
18. Alexandra G. Hanselman, **Aditya Vijaykumar**, Maya Fishbach, Daniel E. Holz
Gravitational-wave dark siren cosmology systematics from galaxy weighting
ApJ 979 9, [arXiv:2405.14818](#).
17. Sreejith Nair, **Aditya Vijaykumar**, Sudipta Sarkar
Bounds on the charge of the graviton using gravitational wave observations
JCAP 11 (2024) 004, [arXiv:2405.05038](#).
16. **Aditya Vijaykumar**, Alexandra G. Hanselman, Michael Zevin
Consistent eccentricities for gravitational wave astronomy: Resolving discrepancies between astrophysical simulations and waveform models
ApJ 969 132, [arXiv:2402.07892](#).
15. Mukesh Kumar Singh, Shasvath J. Kapadia **Aditya Vijaykumar**, Parameswaran Ajith
Impact of higher harmonics of gravitational radiation on the population inference of binary black holes
ApJ 971 23, [arXiv:2312.07376](#).
14. Kruthi Krishna, **Aditya Vijaykumar**, Apratim Ganguly, *et al*
Accelerated parameter estimation in Bilby with relative binning
[arXiv:2312.06009](#).
13. **Aditya Vijaykumar**, Maya Fishbach, Susmita Adhikari, Daniel E. Holz
Inferring host galaxy properties of LIGO-Virgo-KAGRA's black holes
ApJ 972 157, [arXiv:2312.03316](#).
12. Divyajyoti, N.V. Krishnendu, Muhammed Saleem, Marta Colleoni, **Aditya Vijaykumar**, K.G. Arun, Chandra Kant Mishra
Effect of double spin-precession and higher harmonics on spin-induced quadrupole moment measurements
Phys. Rev. D 109, 023016, [arXiv:2311.05506](#).
11. Avinash Tiwari, **Aditya Vijaykumar**, Shasvath J. Kapadia, Giacomo Fragione, Sourav Chatterjee
Accelerated binary black holes in globular clusters: forecasts and detectability in the era of space-based gravitational-wave detectors
MNRAS, 527, 8586, [arXiv:2307.00930](#).
10. **Aditya Vijaykumar**, Avinash Tiwari, Shasvath J. Kapadia, K.G. Arun, Parameswaran Ajith
Waltzing binaries: Probing line-of-sight acceleration of merging compact objects with gravitational waves
ApJ 954 105, [arXiv:2302.09651](#).
In press: Astrobites
9. Adhrit Ravichandran, **Aditya Vijaykumar**, Shasvath J. Kapadia, Prayush Kumar
Rapid Identification and Classification of Eccentric Gravitational Wave Inspirals with Machine Learning
Submitted to *Physical Review D*, [arXiv:2302.00666](#).

8. Srashti Goyal, **Aditya Vijaykumar**, Jose Maria Ezquiaga, Miguel Zumalacarregui
Probing lens-induced gravitational-wave birefringence as a test of general relativity
Phys. Rev. D 108, 024052, [arXiv:2301.04826](#).
In press: Astrobites
7. Bikram Keshari Pradhan, **Aditya Vijaykumar**, Debarati Chatterjee
Impact of updated Multipole Love and f-Love Universal Relations in context of Binary Neutron Stars
Phys. Rev. D 107, 023010, [arXiv:2210.09425](#).
6. **Aditya Vijaykumar**, Shasvath J. Kapadia, Parameswaran Ajith
Can a binary neutron star merger in the vicinity of a supermassive black hole enable a detection of a post-merger gravitational wave signal?
MNRAS, 513, 3577, [arXiv:2202.08673](#).
5. **Aditya Vijaykumar**, Ajit Kumar Mehta, Apratim Ganguly
Detection and parameter estimation challenges of Type-II lensed binary black hole signals
Phys. Rev. D 108, 043036, [arXiv:2202.06334](#).
4. Sumit Kumar, **Aditya Vijaykumar**, Alexander H. Nitz
Detecting Baryon Acoustic Oscillations with third generation gravitational wave observatories,
ApJ 930 113, [arXiv:2110.06152](#).
3. M. Saleem et al. (including **Aditya Vijaykumar**)
The Science Case for LIGO-India
Class. Quantum Grav. 39 025004, [arXiv:2105.01716](#).
2. **Aditya Vijaykumar**, M. V. S. Saketh, Sumit Kumar, Parameswaran Ajith, Tirthankar Roy Choudhury
Probing the large scale structure using gravitational wave observations of binary black holes,
Phys. Rev. D 108, 103017, [arXiv:2005.01111](#).
In press: Astrobites.
1. **Aditya Vijaykumar**, Shasvath J. Kapadia, Parameswaran Ajith
Constraints on the time variation of the gravitational constant using gravitational wave observations of binary neutron stars,
Phys. Rev. Lett. 126, 141104, [arXiv:2003.12832](#).
In press: phys.org.

PAPERS
(LONG
AUTHORLIST,
WITH
SUBSTANTIAL
CONTRIBUTION)

4. Abbott et al. (LIGO Scientific and Virgo Collaborations)
Tests of General Relativity with GWTC-3,
Accepted to *Physical Review D*, [arXiv:2112.06861](#).
3. Abbott et al. (LIGO Scientific and Virgo Collaborations)
Tests of General Relativity with Binary Black Holes from the second LIGO-Virgo Gravitational-Wave Transient Catalog,
Phys. Rev. D 103 (2021) 12, 122002, [arXiv:2010.14529](#).
2. Abbott et al. (LIGO Scientific and Virgo Collaborations)
GWTC-2: Compact Binary Coalescences Observed by LIGO and Virgo During the First Half of the Third Observing Run,
Phys. Rev. X 11 (2021) 021053, [arXiv:2010.14527](#).
1. P. Virtanen et al. (including **Aditya Vijaykumar** as *SciPy 1.0 Contributor*)
SciPy 1.0—Fundamental Algorithms for Scientific Computing in Python,
Nat Methods 17, 261–272 (2020), [arXiv:1907.10121](#).