Mudit Garg

Nationality : Indian
Date of Birth : 19/01/1996

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h-index: 5

Education

08/2021 – *07/2025*	PhD in Gravitational Waves Astrophysics **University of Zurich**	Advisor: Prof. Dr. Lucio Mayer
09/2018 – 12/2020	Master of Science in Physics **with distinction** **ETH Zurich** Thesis: Relativistic, ghost-free, and covariant hybrid model for MOND: f(Q) *under Prof. Dr. Lavinia Heisenberg*	GPA: 5.87/6
07/2014 – 06/2018	Bachelor of Technology in Engineering Physics **Indian Institute of Technology Delhi** Thesis: Geodesics near a charged black hole in $(R \pm \mu^4/R)$ gravity *under Prof. Dr. Ajit Kumar*	GPA: 8.15/10

Selected Talks/Presentations

02/2024	**Seminar:** DAMTP General Relativity University of Cambridge *Astrophysical signatures on the LISA data stream from MBHBs*	Cambridge
09/2023	**Meeting:** LISA Astrophysics Working Group University of Milano-Bicocca *The minimum measurable eccentricity from GWs of LISA MBHBs*	Milan
09/2023	**Meeting:** the Swiss-Austrian joint Physical Society meeting University of Basel *The minimum measurable eccentricity from GWs of LISA MBHBs*	Basel
07/2023	**Conference:** Gravitational-wave populations: what's next? University of Milano-Bicocca *The measurability of gas and eccentricity from GWs of LISA MBHBs*	Milan
07/2023	**Call:** LISA data challenge working group *Measuring eccentricity from GWs of LISA MBHBs*	Online
11/2022	**Conference:** LISA data analysis: from classical methods to machine learning *CNRS, L2IT, APC, CEA, and CNES* *The imprint of Gas on GWs from LISA IMBH Binaries*	Toulouse
09/2022	**Conference:** Origin, growth and feedback of black holes in dwarf galaxies *Donostia International Physics Center* *The imprint of Gas on GWs from LISA IMBH Binaries*	San Sebastian
05/2022	**Conference:** Intermediate-Mass Black Holes: New Science from Stellar Evolution to Cosmology CIERA, Northwestern University *Gas impact on GWs from LISA IMBH Binaries*	San Juan

† Will participate

Publications

2024	Measuring eccentricity and gas-induced perturbation from gravitational waves of LISA massive black hole binaries ***Mudit Garg***, *Andrea Derdzinski, Shubhanshu Tiwari, Jonathan Gair, Lucio Mayer*	Submitted to MNRAS
2023	The minimum measurable eccentricity from gravitational waves of LISA massive black hole binaries ***Mudit Garg***, *Shubhanshu Tiwari, Andrea Derdzinski, John G. Baker, Sylvain Marsat, Lucio Mayer*	MNRAS
2022	The imprint of gas on gravitational waves from LISA intermediate-mass black hole binaries ***Mudit Garg***, *Andrea Derdzinski, Lorenz Zwick, Pedro R. Capelo, Lucio Mayer*	MNRAS
2022	Dirty waveforms: multiband harmonic content of gas-embedded gravitational wave sources *Lorenz Zwick, Andrea Derdzinski,* ***Mudit Garg****, Pedro R. Capelo, Lucio Mayer*	MNRAS
2020	Non-linear extension of non-metricity scalar for MOND *Fabio D'Ambrosio,* ***Mudit Garg****, Lavinia Heisenberg*‡	PLB
2020	ADM formulation and Hamiltonian analysis of Coincident General Relativity *Fabio D'Ambrosio,* ***Mudit Garg****, Lavinia Heisenberg, Stefan Zentarra*‡	arXiv

‡ Alphabetical order

Research visits

02/2024	**Institute of Gravitational Wave Astronomy** *Host: Prof. Dr. Alberto Vecchio*	Birmingham
02/2024	**Institute of Cosmology and Gravitation** *Host: Prof. Dr. Ian Harry*	Portsmouth
11/2023	**Max Planck institute for Gravitational Physics (Albert Einstein Institute)** *Host: Dr. Jonathan Gair*	Potsdam

† Will participate

Programs/Schools

09/2023	**Kavli-Villum School:** Gravitational Waves *Corfu Summer Institute*	Corfu
11/2022	**Workshop:** LISA data analysis: from classical methods to machine learning *CNRS, L2IT, APC, CEA, and CNES*	Toulouse
07/2022	**Workshop:** LISA Data Challenge Workshop *LISA Data Challenge Working Group*	Online
07/2022	**Workshop:** From Scattering Amplitudes to Gravitational-Wave Predictions for Compact Binaries *ETH Zurich & University of Zurich*	Zurich
06/2022	**Meeting:** LISA Astrophysics Working Group *Institute for Gravitational Wave Astronomy, University of Birmingham*	Online
01/2022	**Saas-Fee School:** Compact-Object Astrophysics in the Era of Multi-Messenger Astronomy *Swiss Society for Astrophysics and Astronomy*	Saas-Fee
08/2021	**NBIA School:** Gravitational wave astrophysics *Niels Bohr Institute, University of Copenhagen*	Copenhagen
06/2021	**Meeting:** LISA Astrophysics Working Group *Department of Astrophysics, University of Zurich*	Online

† Will participate

Professional responsibilities and memberships

2023 –	Organizer of the 'Gravitational Waves, Black Holes, and Compact Binaries' seminar *Department of Astrophysics, University of Zurich*
2023 –	Contributor to the TianQin white paper about massive black hole binaries and environmental effects
2022 –	Contributor to the DiscIMRI code comparison project by the LISA astrophysics working group
2021 –	Member of the LISA consortium and its astrophysics, waveforms, and data challenge working groups

Skills

Programming Languages: Python | LaTeX

Languages: English | German (A1.1) | Hindi

Software: Mathematica | lisabeta

Others: PyTorch | Terminal | Git

Selected internal Talks/Presentations

	Annual PhD seminar	Department of Astrophysics, University of Zurich
03/2023	Bayesed Gravitational Waves: an MCMC story	
02/2022	The Future of Gravitational Waves	
	Annual PhD Jamboree	Department of Astrophysics, University of Zurich
11/2022	Eccentric Binaries in the LISA band	
11/2021	IMBH Binaries detectable by LISA	

Assistance

Spring 2024	**Teaching Assistant** for "Computational methods for Radiative Transfer" *Instructor: Prof. Dr. Lucio Mayer*	University of Zurich
Fall 2023	**Teaching Assistant** for "Introduction to Astrophysics" *Instructor: Prof. Dr. Prasenjit Saha*	University of Zurich
Spring 2023	**Teaching Assistant** for "Introduction to Astronomy" *Instructor: Prof. Dr. Aurel Schneider*	University of Zurich
Fall 2022	**Teaching Assistant** for "Proseminar in Astrophysics" *Instructor: Prof. Dr. Ravit Helled*	University of Zurich
Spring 2023	**Teaching Assistant** for "Universe: Contents, Origin, Evolution and Future" *Instructor: Prof. Dr. Lucio Mayer & Dr. Pedro R. Capelo*	University of Zurich
Fall 2021	**Teaching Assistant** for "Theoretical Astrophysics" *Instructor: Prof. Dr. Robert Feldmann*	University of Zurich
Spring 2021	**Research Assistant** at the Department of Astrophysics *Supervisor: Prof. Dr. Lucio Mayer*	University of Zurich
2019 – 2020	**Research Assistant** at the Chair of Strategic Management and Innovation *Supervisor: Dr. Yash Raj Shrestha & Zoe Jonassen*	ETH Zurich
Spring 2019	**Course Assistant** for "Quantum Field Theory II" *Instructor: Prof. Dr. Massimiliano Grazzini*	University of Zurich

Pre-Doctorate relevant projects

04/2020 – 11/2020	**GW Data Project**: Distinguishing deviations from GR and eccentricity effects in GWs data *Supervisor: Dr. Maria Haney*	University of Zurich
02/2020 – 06/2020	**Machine Learning Course Project**: Mini projects related to regression, feature selection, data imputation, neural networks, and CNN using PyTorch framework	ETH Zurich
10/2018 – 01/2019	**GW Theory Project**: Gravitational waves and their propagation in the ΛCDM Universe *Supervisor: Prof. Dr. Philippe Jetzer*	University of Zurich

Other Activities

- **Hobbies and Interests**: Sports, Cooking, Board games, and hiking

Last update: February 26, 2024