

ZENIA ZURAIQ

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About

I am an aspiring astrophysicist, currently pursuing my Ph.D. from the Indian Institute of Science, Bengaluru, as a Prime Minister's Research Fellow, under supervision of Prof. Banibrata Mukhopadhyay. I am also an associate member of the Indian Pulsar Timing Array (InPTA) collaboration.

Education

Aug 2022 - Present Bengaluru, India	Doctor of Philosophy (Ph.D.) - Theoretical Physics; CGPA: 9.1/10 Indian Institute of Science
Sep 2020 - Jun 2022 Tiruchirappalli, India	Master of Science (M.Sc.) - Physics; CGPA: 9.79/10 National Institute of Technology, Tiruchirappalli (NIT-T)
Jun 2017 - Aug 2022 Chennai, India	Bachelor of Science (B.Sc.) - Physics; CGPA: 9.31/10 Stella Maris College, University of Madras
May 2017 Chennai, India	Class XII Board Exam (AISSCE, CBSE); Percentage: 97.4% St. John's English School and Junior College, Besant Nagar
May 2015 Chennai, India	Class X Board Exam (AISSE, CBSE); CGPA: 10/10 St. John's English School and Junior College, Besant Nagar

Publications

1. **Zuraiq, Z.**, Mukhopadhyay, B. and Weber, F., 'Massive neutron stars as mass gap candidates: Exploring equation of state and magnetic field', Phys. Rev. D 109 (2024) 2, 023027, arXiv: 2311.02169
2. **Zuraiq, Z.**, Mukhopadhyay, B. and Weber, F., 'Exploring massive neutron stars towards the mass gap: constraining the high-density nuclear equation of state', Astron. Rep. 67 (2023) Suppl 2, S199-S206

Conferences, workshops, and research visits

Research visits

Jul 2024	Instytut Fizyki Teoretycznej, Uniwersytet Wroclawski (University of Wroclaw) Wroclaw, Poland
Jul 2024	University of Warsaw Warsaw, Poland
Jun 2024	ICRANet-Ferrara, University of Ferrara Ferrara, Italy
Feb 2024	Meeting on Pulsar Timing Array Experiments: Present and Future of Indian Collaboration The Institute of Mathematical Sciences, Chennai, India

Talks

Jul 2024	Massive, magnetized neutron stars as mass gap objects <i>Seventeenth Marcel Grossmann meeting, Pescara, Italy</i>
Jul 2024	Simulating magnetized white dwarfs by time evolution: Chandrasekhar limit and beyond <i>Seventeenth Marcel Grossmann meeting, Pescara, Italy</i>
Dec 2023	Simulating super-Chandrasekhar white dwarfs <i>International Symposium on Recent Development in Relativistic Astrophysics (ISRA 2023), Gangtok, India</i>
Dec 2023	Massive, magnetized compact stars: Theory and Simulation <i>10th International Conference on Gravitation and Cosmology (ICGC 2023), Guwahati, India</i>
Oct 2023	Massive neutron stars: Effect of EOS vs magnetic field (invited, online) <i>London-Oldenburg Relativity Seminar</i>
Sep 2023	Massive neutron stars: effects of EOSs and magnetic field (online) <i>ECT* workshop: Strongly interacting matter in extreme magnetic fields, Trento, Italy</i>
Jun 2023	Exploring massive neutron stars towards the mass gap: Constraining the high density nuclear equation of state <i>Fifth Zeldovich Meeting, Yerevan, Armenia</i>

Posters

Mar 2024	Massive neutron stars as mass gap candidates (invited) <i>PMRF Annual Symposium, Indore, India</i>
Feb 2024	Simulating super-Chandrasekhar white dwarf from main sequence star: Exploring stellar evolution codes STARS and MESA <i>42nd annual meeting of the Astronomical Society of India, Bengaluru, India</i>
Nov 2023	Massive neutron stars as mass gap candidates (best poster award) <i>In-House Symposium, Department of Physics, IISc, India</i>
Jul 2023	Simulating magnetised super-Chandrasekhar white dwarf using STARS <i>3rd Conference on Plasma Simulations, Raman Science Center, IIA, Leh, India</i>

Professional services and teaching

Teaching

Jul 2024 - Oct 2024	PMRF teaching assistant for the NPTEL course " The Joy of Computing using Python "
Apr 2024 - Jun 2024	Designed and taught value added course on Introductory Astronomy and Astrophysics <i>M.S. Ramaiah University of Applied Sciences, Bengaluru, India</i>
Jan 2024 - Mar 2024	PMRF teaching assistant for the NPTEL course Nuclear Astrophysics
Aug 2023 - Dec 2023	Teaching assistant for the course, Introductory Mechanics <i>IISc, Bengaluru, India</i>
Aug 2023 - Dec 2023	Taught Introductory Astronomy for students of classes VI-X <i>SPARC Public School, Bengaluru, India</i>
Aug 2023 - Dec 2023	Taught class XI students NCERT physics <i>Kendriya Vidyalaya, IISc, Bengaluru, India</i>

Outreach

- Volunteer at 42nd annual meeting of the Astronomical Society of India, Bengaluru, India (Feb 2024)
- Involved in organization of activities at IISc Open Day. Took part in activities like conducting a quiz, giving public talk on *The Sun and Solar System* (2023, 2024)
- *PMRF outreach talk*: Overview of fermionic compact stars: Non-interacting stars and white dwarfs, for the students of Christ University, Bengaluru (Feb 2023)

- *PMRF outreach talk*: Overview of fermionic compact stars: Introducing interactions, for the students of Christ University, Bengaluru (Apr 2023)
- External expert for Q/A session at “National Workshop on physical sciences for CSIR-UGC NET and GATE aspirants”, conducted by NIT-T (May 2023)
- *Talk*: Equation of motion of double pendulum using different mechanics and MATLAB, NIT-T weekly colloquium (Jun 2021)
- *Talk*: Exoplanet detection by transit method, NIT-T weekly colloquium (Oct 2020)
- *Talk*: Space Debris at Loyola Astronomy and Rocketry Club, Loyola College, Chennai (Feb 2019)

Selected short-term research projects

- Study of the magnetised cataclysmic variable (CV) system, BY Cam
Guide: Dr. Vikram Rana (Raman Research Institute) | Jan 2023 - Apr 2023
- Observation of 21cm line using custom made radio telescope from milky way galactic plane
Guide: Dr. R. Justin Joseyphus (NIT-T) | Jan 2022 - Aug 2022
- Effects of fermion mass and strong two-body interactions on the mass-radius relationship of non-rotating compact stars (M.Sc. Thesis)
Guide: Dr. Somnath Mukhopadhyay (NIT-T) | Dec 2021 - May 2022

Internships and Summer Schools

Jul 2021	IIA Summer Programme <i>Conducted by: Indian Institute of Astrophysics, Bengaluru</i>
Jun 2021	Vigyan Vidushi (VV) 2021 <i>Conducted by: Tata Institute of Fundamental Research (TIFR), Mumbai</i> One of around 50 women M.Sc. students selected on a pan-India basis
May 2021	Introductory Summer School in Astronomy and Astrophysics <i>Conducted by: Inter-University Centre for Astronomy and Astrophysics (IUCAA), Pune</i>
Jun 2018	National Initiative on Undergraduate Sciences (NIUS) Camp, Batch 15.1 <i>Conducted by: Homi Bhabha Centre for Science Education (HBCSE), TIFR, Mumbai</i> One of around 70 students selected on a pan-India basis for an exposure-cum-enrichment camp
May 2018	Intern at International and Inter University Centre for Nanoscience and Nanotechnology (IIUCNN) <i>Location: Mahatma Gandhi University, Kottayam, Kerala</i>

Academic Highlights

- Awarded **Prime Minister's Research Fellowship** (Direct Entry, Aug 2022)
- Received Ph.D. offers from: **IISc**, IIT Madras, IISER Pune, IISER Kolkata, Raman Research Institute (Aug 2022)
- **AIR 36 (JRF)**, CSIR-NET June 2021 (out of 28135 candidates)
- **AIR 51**, GATE-PH 2022 (out of 19375 candidates)
- **AIR 198**, JEST 2022 (96.12 Percentile)
- **AIR 669**, IIT-JAM 2020 (out of 16379 candidates)
- **Gold Medalist**, M.Sc. Physics, NIT-T (Batch of 2022)
- Proficiency Award (I Rank), I Year, M.Sc. Physics, Department of Physics, NIT-T

- Alumni Award for Outstanding Student, M.Sc. Physics (2021-2022), NIT-T
- **Silver Medalist**, B.Sc. Physics, Stella Maris College (Batch of 2020)
- Dr. K.H. Rajani cash award for highest mark in Nuclear Physics (B.Sc. Physics, Batch of 2020)
- Mrs. A. Suganthi Lark Josephine cash award for highest mark in Electronics (B.Sc. Physics, Batch of 2020)
- Outgoing Student of the Year 2020, Department of Physics, Stella Maris College
- Proficiency Award - I, II and III Year, B.Sc. Physics, Stella Maris College
- School Topper - Class X (2015) and Class XII (2017), St. John's English School and Junior College

Additional Courses and Certificates

Sep 2021	National Spaceonova Asteroid Search Campaign Citizen Science Program, Conducted by: International Astronomical Search Collaboration (IASC)
Jul 2021	Data Driven Astronomy Coursera Online Course, Conducted by: University of Sydney
Apr 2020	Learning Physics through Simple Experiments Online course, Conducted by: Indian Institute of Technology, Kanpur
Aug 2019	Basics of Observational Astronomy, Astrophotography and Post-processing techniques Two-day Workshop, Conducted by: SSN College of Engineering, Chennai, with Positron Foundation
Apr 2019	Statistical Mechanics NPTEL Online Course, Conducted by : Indian Institute of Technology, Madras
May 2018	Computational Astronomy One-day Workshop, Conducted by : Loyola College, Chennai

Extra-Curriculars

Jul 2017 - Feb 2019	NSS Volunteer at Adyar Cancer Institute, Chennai Helped with patient file management and sorting
Sep 2018 - Dec 2018	Opinion Writer and Panelist at <i>IndianFolk.com</i> Wrote articles on a weekly basis; participated in Live Panel Discussions on varied topics
2016	London College of Music Examinations Obtained MERIT certification in Acoustic Guitar (Grade 2) and Classical Guitar (Step 2)
2016	ISRO World Space Week Quiz, 2016 Received "Best in XIIth" Award (conducted at Birla Planetarium, Chennai)

Skills

Languages Known	English, Malayalam, Hindi, Tamil
Programming Languages	Python, C++, MATLAB, Mathematica
Tools/Codes	LaTeX, MS Office, MESA, Cambridge STARS