

# ZENIA ZURAIQ

## RESEARCH INTEREST

Theoretical astrophysics of compact stars:

Massive, magnetised compact sources (super-Chandrasekhar white dwarfs, massive neutron stars) - theory and simulation; modelling neutron star matter through constraining the high density nuclear equation of state

## ACADEMIC BACKGROUND

### Indian Institute of Science

Ph.D. (Theoretical Physics) | Aug 2022 - Present | CGPA 9.1/10

### National Institute of Technology, Tiruchirappalli (NIT-T)

M.Sc. (Physics) | Sep 2020 - Jun 2022 | CGPA 9.79/10

### Stella Maris College, University of Madras

B.Sc. (Physics) | Jun 2017 - Aug 2020 | CGPA 9.32/10

### St. John's English School and Junior College, Chennai

Class XII Board Exam (AISSE, CBSE) | May 2017 | 97.4%

Class X Board Exam (AISSE, CBSE) | May 2015 | CGPA 10/10

## ACADEMIC HIGHLIGHTS

- **Prime Minister's Research Fellowship (PMRF)** awardee - direct entry (Aug 2022)
- **AIR 36**, CSIR NET-JRF Jun 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)
- **Silver Medalist**, B.Sc. Physics, Stella Maris College (Batch of 2020)

## ADDITIONAL COURSES AND CERTIFICATES

Data Driven Astronomy (Coursera) | Learning Physics through Simple Experiments (IIT-K Course) | Statistical Mechanics (NPTEL)

## SKILLS

**Languages Known:** English, Malayalam, Hindi, Tamil

**Programming Languages:** Python, C++, MATLAB

**Tools:** LaTeX, MS Office

**OS:** Windows, Linux

**Hobbies:** Playing Guitar, Reading, Writing

## CONTACT ME AT

zeniazurairq@gmail.com,  
zeniazurairq@iisc.ac.in

I am an aspiring astrophysicist, currently pursuing my Ph.D. from the Indian Institute of Science, Bangalore, 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.

## PUBLICATIONS

1. **Zurairq, Z.**, Mukhopadhyay, B. and Weber, F., 'Massive neutron stars as mass gap candidates: Exploring equation of state and magnetic field', arXiv e-prints (2023), arXiv: [2311.02169](https://arxiv.org/abs/2311.02169)

## CONFERENCES, WORKSHOPS, MEETINGS

**ECT\* Workshop: Strongly Interacting Matter in Extreme Magnetic Fields (Trento, Italy) | Sep 2023**

**Online Talk:** Massive neutron stars: effects of EOS and magnetic field

**3rd Conference on Plasma Simulations (Raman Science Center, IIA, Leh) | Jul 2023**

**Poster:** Simulating magnetised super-Chandrasekhar white dwarf using STARS

**Fifth Zeldovich Meeting (Yerevan, Armenia) | Jun 2023**

**Talk:** Exploring massive neutron stars towards mass gap: Constraining the high density nuclear equation of state

## OUTREACH AND TEACHING

### London-Oldenburg Relativity Seminar

Online Talk (Invited) | Massive neutron stars: Effect of EOS vs magnetic field | Oct 2023

### Teaching Assistant at Indian Institute of Science

UPH101T: Introductory Mechanics (first year undergraduate course) | Aug 2023 - Present

### SPARC Public School, Bengaluru

Teaching classes VI-X introductory astronomy | Aug 2023 - Present

### PMRF OUTREACH TALKS: Christ University, Bangalore

1. Overview of fermionic compact stars I: non-interacting stars and white dwarfs | Feb 2023
2. Overview of fermionic compact stars II: introducing interactions | Apr 2023

### IISc Open Day 2023

Public Talk | Sun and Solar System | Mar 2023

### Kendriya Vidyalaya, IISc

Taught class XI NCERT physics | Jan 2023 - Apr 2023

## INTERNSHIPS AND SUMMER SCHOOLS

### IIA Summer Programme

Indian Institute of Astrophysics, Bangalore | Jul 2021

### Vigyan Vidushi

Tata Institute of Fundamental Research, Mumbai | May - Jun 2021

### Introductory Summer School in Astronomy and Astrophysics

Inter-University Centre for Astronomy and Astrophysics Pune | May 2021

### National Institute on Undergraduate Sciences (NIUS) Camp, Batch 15.1

Tata Institute of Fundamental Research, Mumbai | Jun 2018

### Summer Intern

IIUCNN, Mahatma Gandhi University, Kottayam | May 2018

## SHORT-TERM RESEARCH PROJECTS

### PROJECT: STUDY OF THE MAGNETISED CATAclysmic VARIABLE (CV) SYSTEM, BY CAM

Guide: Dr. Vikram Rana (Raman Research Institute) | Jan 2023 - Apr 2023

### PROJECT: 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

### M.Sc. THESIS: EFFECTS OF FERMION MASS AND STRONG TWO-BODY INTERACTIONS ON THE MASS-RADIUS RELATIONSHIP OF NON-ROTATING COMPACT STARS

Guide: Dr. Somnath Mukhopadhyay (NIT-T) | Dec 2021 - May 2022

### PROJECT: SYNTHESIS, CHARACTERIZATION AND PHOTOCATALYTIC EVALUATION OF COBALT FERRITE NANOPARTICLES FROM MORINGA OLEIFERA

Stella Maris College, Chennai | Jul 2019 - Oct 2019

### UNDERGRADUATE DISSERTATION: INVESTIGATION ON THE OPTICAL PROPERTIES OF TITANIUM NANOPARTICLES IN THE TREATMENT OF WASTE WATER

Guide: Dr. Belina Xavier (Stella Maris College) | Jun 2019 - Aug 2019