SONIA M

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EDUCATION

University of Madras Chennai, India
Master of Science in Physics June, 2018 – Sep, 2020

- CGPA: 8.5 out of 10, Graduate Aptitude Test in Engineering (GATE): Rank - 2879 out of 19375 and Joint Entrance Screening Test (JEST): Percentile - 89.07
- Major Subjects: Astrophysics and Astronomy, Quantum Mechanics, Classical Mechanics & Relativity, Electromagnetic Theory and Mathematical Physics.
- Master Thesis/Project: Quantisation of Constrained Systems - Particle on a N Dimensional Sphere. Under Dr. Sujay K Ashok, Professor, Theoretical Physics, Institute of Mathematical Science, Taramani, Chennai (Nov 2019 - Apr 2020).

University of Madras Chennai, India
Bachelor of Science in Physics June, 2014 – April, 2017

- CGPA: 8.6 out of 10
- Major Subjects: Astrophysics, Quantum Mechanics & Relativity, Electromagnetism, Mathematical Physics & Mechanics.

PROJECT WORK

The Institute of Mathematical Sciences Chennai, India
ONGOING PROJECT: June, 2024 – Present
Under Dr. Sujay K Ashok, Professor, Theoretical Physics, Institute of Mathematical Science.
Special theory and General theory of Relativity

- A study based project helps to understand the structure of space-time and the mathematical symmetries underlying physical laws.
- Understanding the important concepts of Principle of Equivalence, Tensors, Christoffel symbols, Covariant derivatives, Curvature Tensors and Einstein's field equation which led to Schwartzchild solution and deflection of light by the Sun.
- Worked with a Mathematica tool to solve complex geometric problems.

Lie Groups and Lie Algebras

- A study based project that has deepened my understanding of symmetry in physics.
- Concepts of SU(2), SU(3), SO(2), Killing form, Semi-simple Lie Algebra are currently being studied which is key to understanding conservation laws, particle classifications, and interactions in nature.

The Institute of Mathematical Sciences Chennai, India
MASTER PROJECT: Nov, 2019 – April, 2020
Under Dr. Sujay K Ashok, Professor, Theoretical Physics, Institute of Mathematical Science.
Quantisation of Constrained Systems - Particle on a N Dimensional Sphere

- The project primarily focused on determining the eigenvalues of a constrained system using quantization rules.
- To Achieve this, concepts like Principle of least action, Poisson bracket and Dirac bracket have been used.

INTERNSHIPS

Tamilnadu Science and Technology Center Chennai, India
Theory about Cosmic rays and LEGO models May, 2019 – Jun, 2019

- The project mainly focused on the high energy charged particles originating from outer space that travel at nearly the speed of light and strike Earth from all directions - Cosmic rays especially muons, which are useful for demonstrating principles of special relativity.
- The concepts of UHECRs, OMG particles, and Cosmic Microwave Background radiation have been understood.

WORK EXPERIENCE

Citicorp Services India Private Limited Chennai, India
Operation Support Specialists Sep, 2021– Present

The company committed to India for over 120 years, Citi takes pride in being a premier locally embedded financial institution, backed by an unmatched global network.

- Received multiple awards in recognition of being a supportive team member, a dedicated hard worker, and consistently delivering high productivity.
- Proposed and implemented automation ideas to optimize workflows and minimize manual effort.
- Skilled in Microsoft Excel and the full suite of Microsoft Office applications.

Tata Consultancy Services Chennai, India
Associate Oct, 2017 – Jun, 2018

TCS is a digital transformation and technology partner of choice for industry-leading organizations worldwide. Since its inception in 1968, TCS has upheld the highest standards of innovation, engineering excellence and customer service.

- Acknowledged for high-speed performance and significantly reducing workload volumes while maintaining a high level of accuracy.
- Skilled in Microsoft Excel and the full suite of Microsoft Office applications.

SKILLS

- Relativity: Mathematica, Tensor, Differential geometry, Lorentz transformation, Einstein's equation.
- Quantum Mechanics: Linear Algebra, Differential equation, Superposition, Entanglement, Uncertainty principle.
- Astrophysics: Spectroscopy, Interferometry, Data Analysis.
- Mathematical Methods - Algebra, Differential equation, Integration, Vector Calculus, Tensor.
- Scientific Computing: Mathematica.
- LaTeX for Scientific Writing.
- MS Office applications.

AWARDS

The Graduate Aptitude Test in Engineering (GATE)- All India Rank 2879 out of 19375 March, 2021
Joint Entrance Screening Test (JEST) - Percentile 89.07 March, 2022

CERTIFICATION & MAJOR ONLINE COURSES

Geospatial inputs for enabling master plan formulation certified by IIRS - ISRO May, 2020
Evolution of Quantum certified by Amity University Jun, 2020
Experimental Skills certified by Spectra Event - Madras Christian College - 2nd place in 2019 & 3rd place in 2020

CONFERENCES

Neutron Stars: The celestial clocks that probe extreme physics by The Institute of Mathematical Science Aug, 2023

- Attended 2 presentations in the field of Astrophysics.

REFEREES

- Dr. Sujay K Ashok, Professor, Institute of Mathematical Science.
  sashok@imsc.res.in
- Dr. Alison Christina Fernandez, Assistant Professor, Women's Christian College.
  afernandez@wcc.edu.in
- Dr. Meera K, Head & Assistant Professor, Women's Christian College.
  meera@wcc.edu.in