Dr. Aleena Chacko

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Career Objective

Seeking a dynamic and challenging professional environment where I can leverage my expertise in teaching and research to the fullest extent. Eager to contribute to an institution that values innovation, intellectual growth, and fosters a collaborative atmosphere for the advancement of knowledge

Education

2012–2023 **Ph.D**, *Indian Institute of Technology Madras*, Chennai, India
CGPA - 8.44 | Area of study : Experimental Neutrino Physics

2008–2010 **M.Sc**, *Loyola College*, Chennai, INDIA
Percentage - 76% | Major: Physics | Electives: Gravitation & Cosmology, Particle Physics | Project: A Study of PT-symmetric Hamiltonian

2005–2008 **B.Sc**, *Christ University*, Bangalore, INDIA
CGPA : 3.51 | Major: Physics, Mathematics, Electronics | Add on Course: Experimental High Temperature Superconductivity

Experience

Work Experience

2024–Present **Guest Lecturer**, *Providence Women's College*, Calicut, India
- Teach established Physics courses for Bachelor's and Master's degree students.
- Conduct laboratory sessions for undergraduates and supervise final year projects.
- Design and grade internal and end-semester examinations, fostering academic excellence.

2011–2012 **Guest Lecturer**, *Malabar Christian College*, Calicut, India
- Taught courses in Physics, enhancing student comprehension.
- Conducted laboratory sessions, guiding students through experimental processes.
- Set and graded mid-level exams, supporting academic integrity.

2012–2017 **Teaching Assisitant(TA)**, *IIT Madras*, Chennai, India
- Assisted in B.Tech Physics laboratory for 1st-year students, facilitating their understanding through practical experiments.
- Troubleshot M.Sc. physics laboratory experiments, ensuring academic progress through clear explanations and grading.
- Assisted faculty in delivering lectures and administering examinations; evaluated and graded student assignments to support academic objectives.

Supervision Experience

2012–2017 **Project Supervision**, *IIT Madras*, Chennai, India
- Assited Dr. Prafulla K. Behera in guiding one postgraduate student in her project thesis on muon reconstruction at INO-ICAL detector.
- Assited Dr. James Libby in guiding one postgraduate student in her project thesis on effect of varying thickness of iron plates in electron reconstruction at INO-ICAL detector.

Research Experience

2012–2022 **Doctoral Research**, *IIT Madras*, Chennai, India

Thesis title: Exploring sensitivity to neutrino oscillation parameters using all trackless events in the INO-ICAL detector.

- Devised an algorithm to reconstruct the direction and energy of electron neutrinos events in the INO-ICAL detector.
- Implemented a selection procedure to separate electron neutrino events from background trackless events in INO-ICAL detector.
- Analyzed the effects of including all trackless events in measuring atmospheric neutrino oscillation parameters.

Other Qualifications

- CSIR UGC National Eligibility Test **(NET)**, 2012
- Graduate Aptitude Test in Engineering **(GATE)**, 2012

Journal Publications

- **Aleena Chacko**, D. Indumathi, James F. Libby, P. K. Behera, "First simulation study of trackless events in the INO-ICAL detector to probe the sensitivity to atmospheric neutrinos oscillation parameters", *Physical Review D.*, **102**, 032005 (2020), https://doi.org/10.1103/PhysRevD.102.032005.
- **Aleena Chacko**, D. Indumathi, James F. Libby, P. K. Behera, "Study of atmospheric neutrino oscillation parameters at the INO-ICAL detector using $\nu_e + N \to e + X$ events." *Springer Proceedings in Physics.*, **261**, 445 (2021), Springer-SPPHY-261.
- A. Kumar, A.M. Vinod Kumar et al., (INO Collaboration), "Invited review: Physics potential of the ICAL detector at the India-based Neutrino Observatory (INO)", *Pramana J Phys.* **88**, 79 (2017), https://doi.org/10.1007/s12043-017-1373-4.

Conferences and Seminars

- XXIII DAE-BRNS High Energy Physics Symposium, IIT Madras, Chennai, India: "Study of atmospheric neutrino oscillation parameters at the INO-ICAL detector using $\nu_e + N \to e + X$ events", December 2018
- Experimental high energy physics journal club, IIT Madras: "First measurement of electron neutrino appearance in NOvA ", August 2016
- INO Collaboration meeting, VECC, Kolkata: "Sensitivity of ICAL@INO for atmospheric neutrino oscillation parameters", April 2014.

Technical Skills

- Programming languages: C, C++.
- Data analysis software: ROOT, MINUIT
- Operating systems: Unix, Windows
- Document preparation: LaTeX

Research-Related Activities

- Gave oral presentation at XXIII DAE-BRNS High Energy Physics Symposium, IIT Madras, Chennai, India, December 2018.
- Presented poster at 4th In-House Symposium, IIT Madras, India, November 2017.

- Attended a crash course on GEANT4 and ICAL simulation package, TIFR, Mumbai, May 2015.
- Participated in International Neutrino Summer School (INSS 2014), St Andrews, Scotland, August 2014.
- Member of the organizing committee for the IX SERC School on Experimental High Energy Physics, IIT Madras, India, December 2013.

Languages

- **English** ●●●●●
- **Malayalam** ●●●●●
- **Hindi** ●●●○○
- **Tamil** ●●○○○