DR. RIJEESH KELOTH

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EDUCATION

Kannur University, Kerala, INDIA *June 2002- March 2005*
B.Sc. in Physics

Calicut University, Kerala, INDIA *June 2005- March 2006*
B.Ed. in Physical Sciences

Mahatma Gandhi University, Kerala, INDIA *June 2006- March 2008*
M.Sc. in Physics

Cochin University of Science and Technology(CUSAT), INDIA *November 2012- Dec. 2014*
Junior research fellow in Experimental Neutrino Physics

Fermilab, USA/ CUSAT, INDIA *January 2015- April 2019*
(As a part of Indian Institutions and Fermilab Consortium)
Ph.D in experimental neutrino physics

Ph.D. Thesis Topic: A search for Anomalous Muon Neutrino Disappearance and Tau Neutrino Appearance using NOvA Near Detector

RESEARCH EXPERIENCE

Research Associate in NOvA Experiment from IIT Hyderabad, India *June 2019- present*

Currently working on the topics related to Muon Removal -tau (MR-tau) studies for finding the selection efficiencies of tau neutrinos in the NOvA near detector. Recently started working on the NSI analysis in NOvA.

NovA Short-baseline Tau neutrino Appearance Analysis

- Expanded new tools to enhance the oscillation framework for short-baseline τ appearance analysis in the NOvA near detector
- Developed particle identifiers for hadronic mode ν_τ CC interactions using Boosted Decision Tree (BDT) Algorithm implemented in Toolkit for Multivariate Data Analysis (TMVA) with ROOT
- Special tau-overlay file production for ν_τ appearance analysis in the NOvA near detector
- Optimization of event selection for $\nu_\mu \rightarrow \nu_\tau$ and $\nu_\mu \rightarrow \nu_\mu$ selections used for a joint fit to the four-flavor oscillation parameters
- Led comprehensive systematics studies for the first NOvA analysis using τ's
- Led sideband studies for the validation of new particle identifiers
- Led sensitivity studies for the joint $\nu_\mu - \nu_\tau$ analysis

Feasibility studies for Short-baseline oscillations using $\nu_\mu \to \nu_e$ oscillation channel

· Conducted the feasibility study of measuring short-baseline oscillations with the NOvA Near Detector
· Performed sensitivity studies to estimate the potential of building additional detectors at different off-axis angles for sensitivity to light sterile neutrinos

Computing and File Production

· Made a significant contribution to the production of data files needed for the various analyses in NOvA including 2016 and 2017 ν_e appearance, ν_μ disappearance and 2017 Neutral Current disappearance analyses

Hardware

· Trained as an APD quality analysis expert in NOvA
· Trained expert in NOvA electronic replacements

CONFERENCE TALKS AND POSTERS

NOvA's Short-baseline Muon-neutrino Disappearance and Tau-neutrino Appearance Search (talk)
DAE-BRNS Symposium, IIT Madras, December 2018.

NOvA's Short-Baseline Tau Neutrino Appearance Search (talk)
New Perspectives, Fermilab, 2018.

NOvA Short-Baseline Tau Neutrino Appearance Search (talk)
New perspectives, Fermilab, 2017.

NOvA Short-Baseline Tau Neutrino Appearance Search (poster)
Meeting of Division of Particles and Fields of American Physical Society, Fermilab 2017.

NOvA Short-Baseline Tau Neutrino Appearance Search (poster)
International Neutrino Summer School, Fermilab, 2017

NOvA Short-Baseline Tau Neutrino Appearance Search (poster)
Young Investigators Meeting, Chicago, 2017.

Searches for Sterile Neutrinos with NOvA (joint poster)
International Conference on HEP, Chicago, 2016

NOvA Short-Baseline Tau Neutrino Appearance Search (talk)
April Meeting of American Physical Society, Washington DC, January 2016

NOvA Short-Baseline Tau Neutrino Appearance Search (joint poster)
Neutrino '16, London, 2016

AWARDS AND COMMITTEES

Best Ph.D. thesis award 2019- Dept. of Physics, Cochin University of Science and Technology.

Second place poster award- 11th International Neutrino Summer School 2017 (INSS), Fermilab (17th August 2017)

Qualified National Eligibility Test (NET) for Lecturership conducted by University Grants Commission and Council for Scientific and Industrial Research(UGC-CSIR), INDIA (December 2010)

Neutrino Social Organizing Committee (NSOC) member at Fermilab (4th April 2017 - current)

LEADERSHIP AND OUTREACH

Author of two books about 'Light' and 'Basic electronics' for high school students in local language (Malayalam) published by Haritham Publications, Calicut. India.

Invited speaker in a workshop titled *Theory Thoughts* conducted by Dept. of Physics, St. Paul's College, Kalamassery, Kerala, India on National Science Day (Feb 28, 2018) on the topic *Neutrino Oscillations*.

Represented Indian Institutions and Fermilab collaboration as a speaker at the NOvA, MINOS, and MINERVA detectors surface building during the visit of Rick Perry (US Energy Secretary)

NuMI underground tour guide for the visit of Arun Srivastava (Secretary, AEC and Head Institutional Collaboration and Programs Division, India) on July 28, 2016

NuMI underground tour guide for the visit of Ranjit Kumar (The Dept. of Atomic Energy, India) on Nov 17, 2016.

3rd year B.Sc. physics students group-project mentor of 4 students at MCC, Calicut

Science club organizing committee member at MCC, Calicut

Member in Kerala Sastra Sahitya Parishad (People's Science Movement of Kerala, India) 2003-05

TEACHING EXPERIENCE

Malabar Christian College(MCC), Calicut, INDIA October 2009 - March 2012

· Teaching(B.Sc. level)- Electronics, mechanics, electrodynamics and quantum physics (24 hrs./week)

Cochin University of Science and Technology, INDIA November 2013 - March 2014

· Teaching- Mathematical Physics for 1st year M.Sc. students (6 hrs./week)

TECHNICAL SKILLS

Computer Languages	C++, bash scripting, python
Software	File production, Neutrino oscillation framework
Data analysis	Neutrino Oscillation Analysis
Hardware	Avalanche Photo Diode (APD) quality analysis
	Electronic circuit board installation and replacement

LIST OF PUBLICATIONS

M.A. Acero et al., (NOvA Collaboration), *First measurements of neutrino oscillation parameters using neutrinos and antineutrinos by NOvA*, Published in Phys. Rev. Lett. 123, 151803 (2019).

M.A. Acero et al., (NOvA Collaboration), *Observation of seasonal variation of atmospheric multiple-muon events in the NOvA Near Detector*, Published in Phys. Rev. D 99, 122004

M. A. Acero et al., (NOvA Collaboration), *New constraints on oscillation parameters fromν_e appearance and ν_μ disappearance in the NOvA experiment* , Published in Phys. Rev. D 98, 032012 (2018)

P. Adamson et al., (NOvA Collaboration), *Search for active-sterile neutrino mixing using neutral- current interactions in NOvA* , Published in Phys. Rev. D 96, 072006

P. Adamson et al., (NOvA Collaboration), *Constraints on Oscillation Parameters from ν_e Appearance and ν_μ Disappearance in NOvA* , Published in Phys.Rev.Lett. 118 (2017) no.23, 231801

P. Adamson et al., (NOvA Collaboration), *Measurement of the neutrino mixing angle θ_{23} in NOvA* , Published in Phys.Rev.Lett. 118 (2017) no.15, 151802

G.S. Davies et al., *Searches for Sterile Neutrinos with NOvA*, Published in Proceedings of Science: International Conference on HEP, 972 (2016)

Rijeesh Keloth et al., *NOvA Short-Baseline Tau Neutrino Appearance Search*, Published in Conference proceedings, DPF 2017, Fermilab

A. Aurisano and R. Keloth, *NOvA Short-Baseline Tau Neutrino Appearance Search*, Published in J. Phys.: Conf. Ser. 888 012143(2017)