

PhyStat- ν Workshop on Statistical Issues in Experimental Neutrino Physics



Report of Contributions

Contribution ID : 0

Type : **not specified**

Status of global sterile neutrino fits

Tension among short baseline neutrino experiments has pointed toward the possible need for one or more additional mass splittings in the existing neutrino oscillation framework. This would require the addition of at least one sterile (non-interacting) neutrino to the current model. I will introduce models with one or more sterile neutrinos. The parameters of these models can be constrained with fits to global data. I will present the methods which we use in the fitting as well as the results of the latest update to our fitting effort.

Summary

Primary author(s) : Mr COLLIN, Gabriel (Massachusetts Institute of Technology)

Co-author(s) : Prof. CONRAD, Janet (Massachusetts Institute of Technology); Prof. SHAEVITZ, Mike (Columbia University)

Presenter(s) : Mr COLLIN, Gabriel (Massachusetts Institute of Technology)

Contribution ID : 1

Type : **not specified**

Welcome to PhyStat-nu and Logistics

Monday, 30 May 2016 11:00 (15)

Summary

Presenter(s) : Prof. HARTZ, Mark (Kavli IPMU (WPI), The University of Tokyo/TRIUMF)

Session Classification : Opening Session

Contribution ID : 2

Type : **not specified**

Introduction to Statistics for PhyStat-

Monday, 30 May 2016 09:00 (80)

Summary

Presenter(s) : LYONS, Louis (Imperial College London)

Session Classification : Introductory Lecture

Contribution ID : 3

Type : **not specified**

The Current Status of Neutrino Physics

Monday, 30 May 2016 11:25 (45)

Summary

Presenter(s) : PETCOV, Sergey

Session Classification : Opening Session

Contribution ID : 4

Type : **not specified**

Introduction to the Workshop

Monday, 30 May 2016 11:15 (10)

Introduction of the format of the workshop and the invited experts and scientific organisers.

Summary

Presenter(s) : Dr UCHIDA, Yoshi (Imperial College London)

Session Classification : Opening Session

Contribution ID : 5

Type : **not specified**

Long-Baseline Accelerator Oscillation Experiments

Monday, 30 May 2016 13:30 (40)

Summary

Presenter(s) : Dr KABOTH, Asher (RHUL)

Session Classification : Statistical Methods at Current Experiments

Contribution ID : 6

Type : **not specified**

Short- and Medium-Baseline Reactor Oscillation Experiments

Monday, 30 May 2016 14:10 (40)

Summary

Presenter(s) : SEO, Sunny (Seoul National University)

Session Classification : Statistical Methods at Current Experiments

Contribution ID : 7

Type : **not specified**

Direct Neutrino Mass Measurements Using Weak Decays

Monday, 30 May 2016 15:20 (40)

Summary

Observations of neutrino oscillations have unambiguously proven that neutrinos have non-zero masses. Precision measurements of beta-decay kinematics represent the most promising model-independent approach to probing the extremely small absolute neutrino mass scale in a laboratory experiment.

Direct neutrino mass experiments have a long history dating back to the late 40s, and the development of experimental techniques has allowed to push the sensitivity to the level of 2 eV. Given this limit, all direct searches up to now have yielded values for $m\nu^2$ which are compatible with zero. Moreover, with most best-fit estimates for the measured quantity $m\nu^2$ lying in the unphysical range $m\nu^2 < 0 \text{ eV}^2$, the best practice for analysing data and interpreting the results is not always obvious.

This talk will give an introduction to the measurement principle of beta-decay spectroscopy and expand on the statistical peculiarities connected to a physical parameter boundary. A brief review of past experiments and their approach in identifying systematic effects and treating statistical errors is given. Finally, a status update on the Karlsruhe TRitium Neutrino experiment is presented, which aims to push the neutrino mass sensitivity into the sub-eV regime by improving the statistical and systematic sensitivity of this measurement technique by two orders of magnitude.

Presenter(s) : Dr KLEESIEK, Marco (KIT)

Session Classification : Statistical Methods at Current Experiments

Contribution ID : 8

Type : **not specified**

Double Beta Decay

Tuesday, 31 May 2016 10:50 (40)

Summary

Presenter(s) : Dr SHIMIZU, Itaru (Tohoku University)

Session Classification : Statistical Methods at Current Experiments

Contribution ID : 9

Type : **not specified**

Neutrino Nucleus Cross Section Experiments

Tuesday, 31 May 2016 09:00 (40)

Summary

Presenter(s) : Dr WASCKO, Morgan (Imperial College London)

Session Classification : Statistical Methods at Current Experiments

Contribution ID : **10**

Type : **not specified**

Combination of Current and Historical Cross Section Data

Tuesday, 31 May 2016 11:30 (35)

Summary

Presenter(s) : Dr WILKINSON, Callum (Bern)

Session Classification : Contributed and invited talks and discussions on statistical methods and issues

Contribution ID : 11

Type : **not specified**

Statistical Issues in Neutrino Event Reconstruction

Tuesday, 31 May 2016 12:05 (35)

Summary

Presenter(s) : Dr CALLAND, Richard (IPMU)

Session Classification : Contributed and invited talks and discussions on statistical methods and issues

Contribution ID : 12

Type : **not specified**

Event Classification

Tuesday, 31 May 2016 14:35 (35)

Summary

Presenter(s) : IKEDA, Shiro (Institute of Statistical Mathematics)

Session Classification : Contributed and invited talks and discussions on statistical methods and issues

Contribution ID : 13

Type : **not specified**

Cosmological Constraints on Neutrino Properties

Tuesday, 31 May 2016 16:15 (35)

Summary

Presenter(s) : VILLAESCUSA-NAVARRO, Francisco (INAF-Trieste)

Session Classification : Contributed and invited talks and discussions on statistical methods and issues

Contribution ID : 14

Type : **not specified**

Status of Global Sterile Neutrino Fits

Wednesday, 1 June 2016 09:00 (35)

Summary

Presenter(s) : COLLIN, Gabriel (Massachusetts Institute of Technology)

Session Classification : Contributed and invited talks and discussions on statistical methods and issues

Contribution ID : 15

Type : **not specified**

Three-Neutrino Mixing Fits

Tuesday, 31 May 2016 16:50 (35)

Summary

Presenter(s) : JOHANNES, Bergstrom (Universitat de Barcelona)

Session Classification : Contributed and invited talks and discussions on statistical methods and issues

Contribution ID : 16

Type : **not specified**

Physicist's Summary

Wednesday, 1 June 2016 16:45 (45)

Summary

Presenter(s) : COUSINS, Robert (UCLA)

Session Classification : Closing Session

Contribution ID : 17

Type : **not specified**

Statistician's Summary

Wednesday, 1 June 2016 16:00 (45)

Summary

Presenter(s) : VAN DYK, David (Imperial College London)

Session Classification : Closing Session

Contribution ID : **18**

Type : **not specified**

Closing Statements

Wednesday, 1 June 2016 17:30 (60)

Summary

Session Classification : Closing Session

Contribution ID : **19**

Type : **not specified**

Frequentist & Bayesian Bounds and Data Presentation

Tuesday, 31 May 2016 17:25 (35)

Summary

Presenter(s) : BILLER, Steve (University of Oxford)

Session Classification : Contributed and invited talks and discussions on statistical methods and issues

Contribution ID : **20**

Type : **not specified**

Short Talks from Poster Presenters

Summary

Contribution ID : 21

Type : **not specified**

Computational Aspects of Statistical Methods

Tuesday, 31 May 2016 15:10 (35)

Summary

Presenter(s) : BETANCOURT, Michael (University of Warwick)

Session Classification : Contributed and invited talks and discussions on statistical methods and issues

Contribution ID : 22

Type : **not specified**

Generative Modelling as a Basis for Statistics

Wednesday, 1 June 2016 11:50 (40)

Summary

Presenter(s) : BETANCOURT, Michael (University of Warwick)

Session Classification : Contributed and invited talks and discussions on statistical methods and issues

Contribution ID : 23

Type : **Talk**

Bayesian Non-Parametric Event Reconstruction in Super-Kamiokande

The Super-Kamiokande collaboration is developing a new water cherenkov reconstruction package that uses a joint charge-time likelihood to reconstruct events. In the case of multiple rings, an optimization method scales poorly. This talk will detail the construction of the joint likelihood, and the application of a Bayesian technique (reversible jump MCMC) to sample the Posterior probability of N discrete ring hypotheses, from which the most likely configuration of rings may be inferred.

Summary

Primary author(s) : Dr CALLAND, Richard (IPMU)

Presenter(s) : Dr CALLAND, Richard (IPMU)

Contribution ID : 24

Type : **Poster**

Statistical techniques used for neutrino oscillation analyses with the VALOR framework

Monday, 30 May 2016 16:46 (6)

VALOR is a well established neutrino fitting group that is leading several neutrino oscillation analyses in T2K, producing world leading results. The analysis framework has been validated and optimised for both a hybrid Bayesian-Frequentist approach to fitting parameters, where the systematic parameters are marginalised, as well as a frequentist analysis, that consists of the likelihood ratio maximisation as a function of all the fit parameters. The VALOR group is involved in many other neutrino oscillation experiments such as DUNE and Hyper-K, which goal is the measurement of δCP , and the Fermilab Short Baseline Neutrino program, a novel experiment aiming to search for sterile neutrinos. In this talk the statistical techniques used in the neutrino oscillation analyses performed by the VALOR group are shown.

Summary

Primary author(s) : SGALABERNA, Davide (University of Geneva)

Co-author(s) : BARRY, Chistopher (University of Liverpool); ANDREOPOULOS, Costas (University of Liverpool, STFC Rutherford Appleton Laboratory); BENCH, Francis (University of liverpool); ESCUDERO, Lorena (University of Cambridge); RODA, Marco (University of Liverpool); GRANT, Nick (University of Warwick); SHAH, Raj (University of Oxford); JONES, Rhiannon (University of Liverpool); DENNIS, Steve (University of Liverpool); DEALTRY, Thomas (Lancaster University)

Presenter(s) : SGALABERNA, Davide (University of Geneva)

Session Classification : Short Poster Talks

Contribution ID : 26

Type : **not specified**

Multiple Hypothesis Testing and Testing One Hypothesis Multiple Times: a unified (re)view

Wednesday, 1 June 2016 12:30 (45)

In statistics, the problem of testing one hypothesis multiple times can be formulated in terms of hypothesis testing when a nuisance parameter is present only under the alternative, also known as “look-elsewhere effect”. Each possible value of the nuisance parameter specifies a different alternative hypothesis and a unique global p-value is provided to summarize the statistical evidence in support (or against) the null hypothesis. From a physics perspective, this scenario occurs quite often in the searches for new signals over an energy or mass spectrum, and in both nested and non-nested frameworks.

An alternative way to search for new emissions is to refer to the classical and widely known multiple hypothesis testing approach. Separate tests of hypothesis are conducted at different locations producing an ensemble of local p-values, the smallest is reported as evidence for the new resonance, once adequately adjusted to control the false detection rate (type I error rate).

The aim of this talk is to review both approaches, and propose a graphical tool to identify recurrent scenarios where a simple multiple hypothesis testing procedure can be used to provide valid inference with respect to stringent significance requirements, without encountering the usual problem of over-conservativeness.

Summary

Primary author(s) : Ms ALGERI, Sara (Imperial College London)

Co-author(s) : Prof. VAN DYK, David (Imperial College London); Prof. CONRAD, Jan (The Oskar Klein Centre for Cosmoparticle Physics)

Presenter(s) : Ms ALGERI, Sara (Imperial College London)

Session Classification : Contributed and invited talks and discussions on statistical methods and issues

Contribution ID : 27

Type : **not specified**

Sensitivity to the Neutrino Mass Hierarchy

Wednesday, 1 June 2016 10:40 (35)

Precisely one neutrino mass hierarchy is realized in nature. How can this crucial fact be incorporated into a statistical analysis of the mass hierarchy? It implies that the problem is not hypothesis testing, but rather model selection. The corresponding tools are standard, but different. We will discuss some statistical issues that will be relevant in this kind of experiment, present a simple formula for the corresponding sensitivity and confront it with simulations of the experiment JUNO.

Summary

Presenter(s) : CIUFFOLI, Emilio (IMP, CAS)

Session Classification : Contributed and invited talks and discussions on statistical methods and issues

Contribution ID : 28

Type : **Poster**

Anti- $\bar{\nu}_e$ Appearance at T2K using VALOR

Monday, 30 May 2016 16:52 (6)

VALOR is a well established neutrino fitting group that is leading several neutrino oscillation analyses in T2K, producing world leading results. The analysis framework has been validated and optimised for both a hybrid Bayesian-Frequentist approach to fitting parameters, where the systematic parameters are marginalised, as well as a frequentist analysis, that consists of the likelihood ratio maximisation as a function of all the fit parameters. The VALOR group is involved in many other neutrino oscillation experiments such as DUNE and Hyper-K, which goal is the measurement of δCP , and the Fermilab Short Baseline Neutrino program, a novel experiment aiming to search for sterile neutrinos. In this talk the statistical techniques used in the neutrino oscillation analyses performed by the VALOR group are shown.

Summary

Primary author(s) : Mr SHAH, raj (STFC, UK)

Co-author(s) : Mr BARRY, Christopher (Univeristy of Liverpool); Prof. ANDREOPOULOS, Costas (University of Liverpool/STFC); Dr SGALABERNA, Davide (University of Geneva); Dr BENCH, Francis (University of Liverpool); Dr ESCUDERO, Lorena (University of Cambridge); Dr RODA, Macro (University of Liverpool); Dr GRANT, Nick (Univeristy of Warwick); Dr JONES, Rhiannon (University of Liverpool); Dr DENNIS, Steve (University of Liverpool); Dr DEALTRY, Thomas (Lancaster University)

Presenter(s) : Mr SHAH, raj (STFC, UK)

Session Classification : Short Poster Talks

Contribution ID : 29

Type : **Talk**

The KM3NeT/ORCA detector

Wednesday, 1 June 2016 11:15 (35)

The ORCA detector is the low-energy branch of the new generation neutrino telescope KM3NeT which is currently being constructed in the Mediterranean Sea. Interactions of neutrinos that are created in cosmic ray interactions travel and through the Earth can be observed in the detector. By measuring the matter-induced oscillation effects on this flux, KM3NeT/ORCA aims at settling the question on the neutrino mass ordering and to constrain other oscillation parameters. In this contribution an introduction to the ORCA detector will be given, together with the Monte-Carlo simulation efforts and statistical methods used to estimate the sensitivity to determine whether the neutrino mass hierarchy is normal or inverted.

Summary

Primary author(s) : Dr BRUIJN, Ronald (University of Amsterdam/Nikhef)

Presenter(s) : Dr BRUIJN, Ronald (University of Amsterdam/Nikhef)

Session Classification : Contributed and invited talks and discussions on statistical methods and issues

Contribution ID : 30

Type : **Poster**

Tuning generators to the global neutrino cross-section dataset.

Monday, 30 May 2016 16:58 (6)

The T2K Neutrino Oscillation Experiment uses a prior estimation of a scattering cross-section model when generating nominal Monte-Carlo (MC) neutrino interaction events. A selection of the available models in the NEUT MC generator are fit to a range of historical neutrino interaction cross-section measurements made external to T2K. A nominal model is then chosen which is capable of finding the best agreement with the fitted data.

One difficulty that must be overcome when performing these fits is the need to include datasets where only limited information on the observed event kinematics and associated systematic uncertainties are provided.

In this poster we review the current efforts to produce tighter constraints on the neutrino interaction cross-section model. We also highlight recent attempts to use multiple kinematic distributions from a single experiment when performing likelihood fits, whilst using the MC model to approximate the true correlations between the different kinematic variables.

Summary

Primary author(s) : Mr WRET, Clarence (Imperial College London); Mr STOWELL, John (University of Sheffield)

Presenter(s) : Mr STOWELL, John (University of Sheffield)

Session Classification : Short Poster Talks

Contribution ID : 32

Type : **Talk**

Sensitivity to the Neutrino Mass Hierarchy

Precisely one neutrino mass hierarchy is realized in nature. How can this crucial fact be incorporated into a statistical analysis of the mass hierarchy? It implies that the problem is not hypothesis testing, but rather model selection. The corresponding tools are standard, but different. We will discuss some statistical issues that will be relevant in this kind of experiment, present a simple formula for the corresponding sensitivity and confront it with simulations of the experiment JUNO.

Summary

Primary author(s) : Prof. CIUFFOLI, Emilio (IMP, CAS)

Presenter(s) : Prof. CIUFFOLI, Emilio (IMP, CAS)

Contribution ID : 33

Type : **Poster**

Neutrino Oscillation on Epicycles

Monday, 30 May 2016 17:10 (6)

Global fit of neutrino oscillations is shown to be equivalent to Fourier transformation in a complex plane. Adding new sterile neutrinos or new oscillation modes is equivalent to adding Fourier components. Therefore new sterile neutrinos should be introduced with physics motivations beyond phenomenology.

Summary

Primary author(s) : XU, Benda (RCNS, Tohoku Univ., Japan); Mr XU, Benda (IPMU, University of Tokyo, Japan)

Presenter(s) : XU, Benda (RCNS, Tohoku Univ., Japan)

Session Classification : Short Poster Talks

Contribution ID : 34

Type : **not specified**

Atmospheric Neutrinos

Tuesday, 31 May 2016 09:40 (40)

Summary

Presenter(s) : DE ANDRE, Joao Pedro (Michigan State University)

Session Classification : Statistical Methods at Current Experiments

Contribution ID : 35

Type : **not specified**

Solar Neutrinos

Monday, 30 May 2016 16:00 (40)

Summary

Presenter(s) : Dr SMY, Michael (University of California, Irvine)

Session Classification : Statistical Methods at Current Experiments

Contribution ID : 36

Type : **not specified**

Panel Discussion

Wednesday, 1 June 2016 14:15 (75)

Summary

Presenter(s): KARLEN, Dean (University of Victoria); Dr WORCESTER, Elizabeth (BNL); BETAN-COURT, Michael (University of Warwick); Ms ALGERI, Sara (Imperial College London); Dr UCHIDA, Yoshi (Imperial College London)

Session Classification : Panel Discussion

Contribution ID : 37

Type : **Talk**

Direct neutrino mass measurements using weak decays

Observations of neutrino oscillations have unambiguously proven that neutrinos have non-zero masses. Precision measurements of beta-decay kinematics represent the most promising model-independent approach to probing the extremely small absolute neutrino mass scale in a laboratory experiment.

Direct neutrino mass experiments have a long history dating back to the late 40s, and the development of experimental techniques has allowed to push the sensitivity to the level of 2 eV. Given this limit, all direct searches up to now have yielded values for m_ν^2 which are compatible with zero. However, with most best-fit estimates for the measured quantity m_ν^2 lying in the unphysical range $m_\nu^2 < 0 \text{ eV}^2$, the best practice for analysing data and interpreting the results is not always obvious.

This talk will give an introduction to the measurement principle of beta-decay spectroscopy and expand on the statistical peculiarities connected to a physical parameter boundary. A brief review of past experiments and their approach in identifying systematic effects and treating statistical errors is given. Finally, a status update on the KARlsruhe TRitium Neutrino experiment is presented, which aims to push the neutrino mass sensitivity into the sub-eV regime by improving the statistical and systematic sensitivity of this measurement technique by two orders of magnitude.

Summary

Primary author(s) : Dr KLEESIEK, Marco (KIT)

Presenter(s) : Dr KLEESIEK, Marco (KIT)

Contribution ID : 38

Type : **Poster**

Boosted Decision Tree Approach to Track Finding in the COMET Experiment

Monday, 30 May 2016 17:28 (6)

The Coherent Muon to Electron Transition (COMET) experiment is designed to search for muon to electron conversion, a process which has very good sensitivity to Beyond the Standard Model physics.

The first phase of the experiment is currently under construction at J-PARC. This phase is designed to probe muon to electron conversion 100 times better than the current limit. The experiment will achieve this sensitivity by directing a high intensity muon beam at a stopping target. The detectors probe the resulting events for the signal 105 MeV electron from muon to electron conversion.

A boosted decision tree (BDT) algorithm has been developed to find this signal track. This BDT is used

to combine energy deposition and timing information with a reweighted inverse hough transform to filter out background hits. The resulting hits are fit using a RANdom Sample Consensus (RANSAC)

fit, which chooses the best fit parameters for an optimized selection of the filtered hits. These hits are then passed to the track fitting algorithm.

Summary

Primary author(s) : Mr GILLIES, Ewen (Imperial College London)

Presenter(s) : Mr GILLIES, Ewen (Imperial College London)

Session Classification : Short Poster Talks

Contribution ID : 39

Type : **Talk**

Searching for PeV neutrinos with IceCube

Tuesday, 31 May 2016 14:00 (35)

The IceCube Neutrino Observatory at the geographic South Pole has been taking high-quality data in the deep-ice since 2010. Extremely high energy neutrinos that carry energies above 1 PeV have been observed. The most constraining limits on the flux of ultra-high energy neutrinos, which could come from cosmogenic origins have been obtained based on a binned Poisson-likelihood-ratio method. In this talk, we will discuss the implementation of this statistical tool in light of an extremely rare event scenario.

Summary

Primary author(s) : Dr LU, Lu (Chiba University)

Presenter(s) : Dr LU, Lu (Chiba University)

Session Classification : Contributed and invited talks and discussions on statistical methods and issues

Track Classification : PhyStat-nu

Contribution ID : 40

Type : **Poster**

Study of the Neutrino Oscillation at Very Short Baseline

Monday, 30 May 2016 17:16 (6)

Verification of neutrino oscillations at a very short baseline of a nuclear reactor is one way to check the possible existence of the sterile neutrinos.

Challenging features of this short baseline experiment come from: the high muon rates at shallow depth of overburden, the escaping gamma energy due to the small size of the detector in a limited space, and the inaccurate predictions of the reactor anti-neutrino flux. The oscillation parameters of the sterile neutrino have been studied using the energy spectrum from the NEOS (Neutrino Experiment for Oscillation at Short baseline) data collected for 6 months at 24 m baseline of a 3 GW_{th} commercial reactor.

Summary

Primary author(s) : Dr OH, Yoomin (Institute for Basic Science); Mr KO, Youngju (Chung-Ang University)

Presenter(s) : Mr KO, Youngju (Chung-Ang University)

Session Classification : Short Poster Talks

Contribution ID : 41

Type : **not specified**

Neutrino Mass Hierarchy at JUNO and Related Statistical Issues

Wednesday, 1 June 2016 09:35 (35)

Summary

Presenter(s) : LI, Yufeng (Institute of High Energy Physics)

Session Classification : Contributed and invited talks and discussions on statistical methods and issues

Contribution ID : 42

Type : **Poster**

Empirical Parametrisations of Neutrino Oscillations

Monday, 30 May 2016 17:04 (6)

The discovery of neutrino oscillations driven by the U_{e3} element of the PMNS mixing matrix has prompted a step change in the way neutrino oscillation experiments are analysed, commonly described by the shorthand of “switching from a 2-neutrino to 3-neutrino picture”. The difference is less clear cut than this. On the one hand, some older measurements used parametrisations that implicitly assumed at least three neutrino flavours (and less commonly required 2 independent mass splittings). The more interesting change relates to the way oscillations are parametrised for fitting and inference. “Two flavour” analyses used parameters that – regardless of how they were named – directly described the shape of the observed data (the location and depth of a ‘dip’), whereas newer analyses are explicitly concerned with mixing angles that are not direct observables and only related to the data through mathematical transformations. This has non-trivial consequences for inferences from the data. This poster highlights some of these unintended consequences and considers whether alternative formulations for analysing and presenting data are possible.

Summary

Primary author(s) : Dr LITCHFIELD, Phillip (Imperial College London)

Presenter(s) : Dr LITCHFIELD, Phillip (Imperial College London); Dr LITCHFIELD, Phillip (Imperial College London)

Session Classification : Short Poster Talks

Contribution ID : 43

Type : **Poster**

Estimation of neutrino oscillation parameters with Markov Chain Monte Carlo

Monday, 30 May 2016 16:40 (6)

The T2K experiment is a long-baseline accelerator neutrino experiment with the ability to measure Δm_{32}^2 , θ_{23} , θ_{13} and δ_{CP} from (anti-) ν_{μ} disappearance as well as (anti-) ν_e appearance. In this poster we show a Bayesian framework using the Metropolis-Hastings algorithm to estimate the oscillation parameters. The advantage of Markov Chain Monte Carlo is its ability to scan a multidimensional parameter space, allowing to evaluate at the same time the oscillation parameters and the systematic uncertainties on the neutrino interaction model, accelerator flux model and detector reconstruction. We present the results obtained for a simultaneous fit of ν_{μ} disappearance and ν_e appearance, and a probability of anti- ν_e appearance.

Summary

Primary author(s) : Ms HAEGEL, Leïla (Université de Genève)

Presenter(s) : Ms HAEGEL, Leïla (Université de Genève)

Session Classification : Short Poster Talks

Track Classification : PhyStat-nu

Contribution ID : 44

Type : **Poster**

Optimization of detector design of NuPRISM, a new water-Cherenkov neutrino near-detector

Monday, 30 May 2016 17:22 (6)

NuPRISM is a proposed novel water Cherenkov detector in the J-PARC neutrino beam line that will make neutrino cross section measurements critical to both T2K and T2HK as well as searches for short baseline neutrino oscillations. By observing neutrino interactions over off-axis angles ranging from 1 to 4 degrees with NuPRISM detector, systematic uncertainties for T2K and T2HK oscillation measurements can be significantly reduced. Evaluation of the sensitivity to neutrino interaction and oscillation physics with the NuPRISM detector is ongoing. In this poster, the event reconstruction performance for different configurations of photosensor sizes and photocathode coverages are shown.

Summary

Primary author(s) : YOSHIDA, Tomoyo (Tokyo Institute of Technology)

Presenter(s) : YOSHIDA, Tomoyo (Tokyo Institute of Technology)

Session Classification : Short Poster Talks

Track Classification : PhyStat-nu

Contribution ID : 45

Type : **not specified**

Welcome from the Director

Monday, 30 May 2016 17:40 (20)

Summary

Presenter(s) : MURAYAMA, Hitoshi (Kavli IPMU)

Session Classification : Pre-Reception Talk