

Open Meeting for the Hyper-Kamiokande Project

Report of Contributions

Contribution ID: 0

Type: **not specified**

Registration (1)

Contribution ID: 1

Type: **not specified**

Registration (1)

Tuesday 21 August 2012 17:00 (2 hours)

Session Classification: Registration

Contribution ID: 2

Type: **not specified**

Reception

Tuesday 21 August 2012 17:00 (3 hours)

Session Classification: Social Event

Contribution ID: 3

Type: **not specified**

Registration (2)

Wednesday 22 August 2012 08:00 (1 hour)

Session Classification: Registration

Contribution ID: 4

Type: **not specified**

Party

Wednesday 22 August 2012 19:10 (2 hours)

Session Classification: Social Event

Contribution ID: 6

Type: **not specified**

Automated calibration system for the Daya Bay reactor anti-neutrino experiment

Thursday 23 August 2012 15:55 (15 minutes)

The Daya Bay reactor anti-neutrino experiment has made the most precise measurement of the neutrino mixing angle θ_{13} to date, using six identical gadolinium-loaded liquid scintillator detector modules. A fully automated calibration system was developed to give a comprehensive and robust calibration of detector response with multiple gamma and neutron sources.

In this talk, I will describe the design, construction, and performance of the calibration system.

Primary author: Prof. LIU, Jianglai (Shanghai Jiao Tong University)

Presenter: Prof. LIU, Jianglai (Shanghai Jiao Tong University)

Session Classification: Calibration System

Contribution ID: 7

Type: **not specified**

Mechanical Performance of Large Format Underwater Photo-multiplier

Thursday 23 August 2012 11:10 (15 minutes)

Large, deep, well shielded liquid detectors have become an important technology for the detection of neutrinos over a wide dynamic range of a few MeV to TeV. The critical component of this technology is the large format semi-hemispherical photo-multiplier tube with diameters in the range of 25 to 50cm. The survival of an assembled array of these photo-multiplier tubes under high hydrostatic pressure is the subject of this study. These are the results from an R&D program which is intended to understand the PMT performance under hydrostatic pressure and the modes of failure when a photo-multiplier tube implodes under hydrostatic pressure. Our tests include detailed measurements of the shock wave which results from the implosion of a photo-multiplier tube with different installation enclosure configuration. And we also include a comparison of the test data to modern hydrodynamic simulation codes. Using these results we can extrapolate to other tube geometries and make recommendation on deployment of the photo-multiplier tubes in deep water detectors with a focus on risk mitigation from a tube implosion shock wave causing a chain reaction loss of multiple tubes.

Primary author: Dr LING, Jiajie (Brookhaven National Laboratory)

Co-authors: SEXTON, Ken (BNL); Dr DIWAN, Milind (BNL); SHARMA, Rahul (BNL)

Presenter: Dr LING, Jiajie (Brookhaven National Laboratory)

Session Classification: Photo-sensor Development

Contribution ID: 8

Type: **not specified**

Considerations for Calibration Source Deployment in Hyper-Kamiokande

Thursday 23 August 2012 15:40 (15 minutes)

The in situ deployment of radioactive and light sources is among the most important means of calibrating and understanding the response of large water Cherenkov detectors. Such calibration data are the primary means by which the optical properties of the water and the response of the photomultipliers are understood. Given that the Hyper-Kamiokande design calls for ten optically isolated detector volumes that must be individually calibrated, consideration must be given to automation that may reduce the necessary manpower and deadtime. Inspired by the SNO “Universal Interface”, we propose an automated deployment system that allows the positioning of a source along a plane in the detector volume via pulleys and cables, allowing a large range of source positions to be sampled from a single portal at the top of the detector volume. Control of the manipulator, along with the monitoring of cable tensions, can be automated and computerized to allow remote and automated operation, apart from interchanging sources.

Primary author: Mr TANAKA, Hirohisa A. (University of British Columbia/Institute of Particle Physics)

Presenter: Mr TANAKA, Hirohisa A. (University of British Columbia/Institute of Particle Physics)

Session Classification: Calibration System

Contribution ID: 9

Type: **not specified**

Goals of the meeting

Wednesday 22 August 2012 11:20 (20 minutes)

In the opening session, I'd like to give a kind of guideline of discussions in the meeting. First goal is to form active working groups for each development works including physics potential studies. Proposal for the organization structure and timeline will be given. I'd like to also present future prospect of the project in terms of forming international collaboration, budget request, etc.

Primary author: Prof. SHIOZAWA, Masato (The University of Tokyo, Institute for Cosmic Ray Research, ICRR)

Presenter: Prof. SHIOZAWA, Masato (The University of Tokyo, Institute for Cosmic Ray Research, ICRR)

Session Classification: Opening Session

Contribution ID: **10**

Type: **not specified**

Excavation of the Hyper-K cavern

Wednesday 22 August 2012 17:35 (20 minutes)

The baseline design of the HK cavern and construction schedule, ongoing optimization works, remaining issues will be explained in this talk.

Primary author: Prof. SHIOZAWA, Masato (The University of Tokyo, Institute for Cosmic Ray Research, ICRR)

Presenter: Prof. SHIOZAWA, Masato (The University of Tokyo, Institute for Cosmic Ray Research, ICRR)

Session Classification: Cavity and Tanks

Contribution ID: 11

Type: **not specified**

Hyper-K liner and PMT support

Wednesday 22 August 2012 18:10 (20 minutes)

The design of liner and related studies will be presented in the meeting. In the baseline design of the PMT support, SUS support like the Super-K is presented in the Letter of Intent. We are investigating a possibility of cost reduction by hanging PMTs by wires.

Primary author: Prof. SHIOZAWA, Masato (The University of Tokyo, Institute for Cosmic Ray Research, ICRR)

Presenter: Prof. SHIOZAWA, Masato (The University of Tokyo, Institute for Cosmic Ray Research, ICRR)

Session Classification: Cavity and Tanks

Contribution ID: **13**

Type: **not specified**

J-PARC upgrade

Wednesday 22 August 2012 13:25 (30 minutes)

J-PARC upgrade.

Primary author: Prof. KOSEKI, Tadashi (KEK)

Presenter: Prof. KOSEKI, Tadashi (KEK)

Session Classification: J-PARC Session

Contribution ID: **14**

Type: **not specified**

J-PARC Status

Wednesday 22 August 2012 13:00 (25 minutes)

J-PARC Status

Primary author: Prof. IKEDA, Yujiro (JAEA)

Presenter: Prof. IKEDA, Yujiro (JAEA)

Session Classification: J-PARC Session

Contribution ID: 15

Type: **not specified**

Benefits of and progress towards massive water-based liquid scintillator detectors

Thursday 23 August 2012 09:45 (20 minutes)

Recent research and development towards Water-based Liquid Scintillator (WbLS) appears to suggest that such materials can be made stable and economical in large quantities. This opens the possibility to detect low energy particles below the Cherenkov threshold that are inaccessible to a water Cherenkov detector. It also enhances the scientific agenda of future large water Cherenkov detectors. Preliminary results of WbLS performance will be presented as well as simulation results for a massive detector. Simulation shows that, based on expected WbLS performance, the sensitivity to proton decay to K^+, ν would be increased by over a factor of six with respect to a water Cherenkov detector. Use of a smaller WbLS-based detector suitable for a near site will be discussed. The viability of filtration at different pore sizes will be reported. Feasibility tests for UV stabilizer, reverse osmosis, and degasifier stages are planned.

Primary author: JAFFE, David (BNL)**Co-authors:** DIWAN, Milind (BNL); YEH, Minfang (BNL)**Presenter:** JAFFE, David (BNL)**Session Classification:** Water System

Contribution ID: 16

Type: **not specified**

Photo-detector development for maximizing the overall photon detection efficiency

Thursday 23 August 2012 13:00 (15 minutes)

The baseline Hyper-K concept relies on 99,000 20" photomultiplier tubes (PMTs) to provide 20% photo-coverage. We are investigating solutions that would enhance the photo-coverage without compromising either contrast or timing resolution. Contrast roughly quantifies the fraction of photons detected that retain the Cerenkov light directional information over the total number of photons detected, including those that have been scattered, reflected or reemitted. Numerous analyses (e.g. low energy neutrino physics) would benefit from enhanced photo-coverage. A large fraction of the photons missing the PMTs could be detected by either using wavelength shifters to guide them towards either the primary PMT or additional PMTs or by using light concentrators to focus the light towards the primary PMTs. Wavelength shifters will worsen the contrast unless the reemitted light can be prevented from entering the active water volume. Dichroic mirrors may do just that by allowing the UV and blue light to be absorbed in the wavelength shifting material and then reflecting the reemitted green light. In general, we are planning to investigate possible applications of interference filters in Hyper-K whether they are used coupled to wavelength shifters, as broadband mirrors for the light collectors, or as anti-reflective films to maximize contrast. We will also describe possible solutions based on similar ideas for the primary PMTs.

Primary author: Dr RETIERE, Fabrice (TRIUMF)

Presenter: Dr RETIERE, Fabrice (TRIUMF)

Session Classification: Photo-sensor Development

Contribution ID: 17

Type: **not specified**

Water containment and PMT deployment designs for the LBNE water detector

Wednesday 22 August 2012 18:30 (20 minutes)

The design considerations for the water containment system and the PMT deployment systems for the LBNE water Cherenkov detector will be presented. Several design alternatives for the membrane liner for the water Cherenkov detector were investigated and a summary of these investigations will be presented. Several alternate designs for the PMT mounting scheme were also investigated as part of the design process. The final design was based on cable deployment. The issues related to this will also be presented.

Primary author: STEWART, Jim (BNL)**Presenter:** STEWART, Jim (BNL)**Session Classification:** Cavity and Tanks

Contribution ID: **18**

Type: **not specified**

HEP and Neutrino Project status (Japan/Asia)

Wednesday 22 August 2012 09:00 (25 minutes)

Status of HEP and Neutrino Project in Japan and Asia.
The KEK status is also reported.

Primary author: Prof. OKADA, Yasuhiro (KEK)

Presenter: Prof. OKADA, Yasuhiro (KEK)

Session Classification: Opening Session

Contribution ID: **19**

Type: **not specified**

Neutrino Project status (USA)

Wednesday 22 August 2012 09:25 (25 minutes)

US neutrino project status

Primary author: SVOBODA, Robert (UC Davis)

Presenter: SVOBODA, Robert (UC Davis)

Session Classification: Opening Session

Contribution ID: 20

Type: **not specified**

Neutrino Project Status (Europe)

Wednesday 22 August 2012 09:50 (25 minutes)

European Neutrino project status

Primary author: Prof. RUBBIA, Andre (ETH Zurich)

Presenter: Prof. RUBBIA, Andre (ETH Zurich)

Session Classification: Opening Session

Contribution ID: **21**

Type: **not specified**

Japan HEP future project subcommittee report

Wednesday 22 August 2012 10:40 (20 minutes)

Japan HEP future project subcommittee report

Primary author: Prof. MORI, Toshinori (ICEPP, Tokyo)

Presenter: Prof. MORI, Toshinori (ICEPP, Tokyo)

Session Classification: Opening Session

Contribution ID: 22

Type: **not specified**

Japan CRC future project subcommittee report

Wednesday 22 August 2012 11:00 (20 minutes)

Japan CRC (Cosmic-Ray-Committee) future project subcommittee report

Primary author: Prof. KANDA, Nobuyuki (Osaka City)

Presenter: Prof. KANDA, Nobuyuki (Osaka City)

Session Classification: Opening Session

Contribution ID: 23

Type: **not specified**

Gd Option for Hyper-K

Thursday 23 August 2012 09:25 (20 minutes)

A water system design which allows the use of dissolved gadolinium sulfate in Hyper-Kamiokande will be discussed, along with the current status of Super-Kamiokande's gadolinium R&D project.

Primary author: Prof. VAGINS, Mark (Kavli IPMU)

Presenter: Prof. VAGINS, Mark (Kavli IPMU)

Session Classification: Water System

Contribution ID: 24

Type: **not specified**

Basic water plan for Hyper-K

Thursday 23 August 2012 09:00 (25 minutes)

The grand design of Hyper-K water and the detail of the pure water system including the flow in the tank will be presented.

Primary author: Dr SEKIYA, Hiroyuki (ICRR)

Presenter: Dr SEKIYA, Hiroyuki (ICRR)

Session Classification: Water System

Contribution ID: 25

Type: **not specified**

Hybrid Photo-Detector study at Kamioka

Thursday 23 August 2012 10:05 (25 minutes)

Hybrid Photo-Detector (HPD) with an avalanche diode is one of the photo-sensor candidates for Hyper-K. It is considered to have a better performance in lower price than PMT in Super-K. We started a study of an 8-inch HPD developed by Hamamatsu Photonics and that of a 20-inch diameter will be provided within a few years. In Kamioka mine we have a plan to test the HPD in a 200-ton water Cherenkov detector loaded with Gadolinium. Before the installation into the tank, we calibrate the 8-inch HPD and measure its performance in this year. The plan and details of the project, as well as the property of HPD will be presented.

Primary author: Dr NISHIMURA, Yasuhiro (ICRR)

Co-author: Ms HIROTA, Seiko (Kyoto University)

Presenter: Dr NISHIMURA, Yasuhiro (ICRR)

Session Classification: Photo-sensor Development

Contribution ID: 26

Type: **not specified**

SK calibration overview

Thursday 23 August 2012 15:15 (25 minutes)

Super-Kamiokande (SK) is a 50kton water Cherenkov detector. Since starting the experiment, many kinds of calibration has been doing. In this presentation, the calibration in SK will be summarized, and discuss about what is a critical point for water Cherenkov detector calibration. From that point of view, a requirement for HK will also be discussed.

Primary author: Dr KOSHIO, Yusuke (Kamioka observatory, ICRR, Univ. of Tokyo)

Presenter: Dr KOSHIO, Yusuke (Kamioka observatory, ICRR, Univ. of Tokyo)

Session Classification: Calibration System

Contribution ID: 27

Type: **not specified**

Towards Reduced Neutrino Flux & Interaction Uncertainties for a J-PARC to Hyper-K Experiment

Wednesday 22 August 2012 14:40 (20 minutes)

The Hyper-K letter of intent discusses the physics potential to measure δ_{CP} by a J-PARC to Hyper-K long baseline experiment assuming systematic errors for the signal and background that are controlled at the 5% level. Reducing uncertainties in neutrino flux and interaction modeling will be crucial to achieve 5% uncertainties. The T2K experiment, which uses the J-PARC neutrino beam, an off-axis near detector at the J-PARC site and the off-axis Super-K water cherenkov far detector, has achieved neutrino flux and interaction uncertainties that are controlled at the 10-12% level. In this talk I will present details of the T2K efforts to reduce the uncertainties on the neutrino flux and interaction modeling using hadron production data, neutrino cross section data, and measurements from the T2K near detectors. I will also discuss the prospects for further reduction of the uncertainties towards the level necessary for a J-PARC to Hyper-K long baseline experiment.

Primary author: Dr HARTZ, Mark (University of Toronto/York University)

Presenter: Dr HARTZ, Mark (University of Toronto/York University)

Session Classification: Hyper-K Physics Potential

Contribution ID: 28

Type: **not specified**

Long baseline experiment and proton decay search using Hyper-K

Wednesday 22 August 2012 13:55 (30 minutes)

I will review the physics potential of a long baseline experiment using J-PARC neutrino beam and Hyper-K, and proton decay search in Hyper-K.

Primary author: Prof. YOKOYAMA, Masashi (University of Tokyo)

Presenter: Prof. YOKOYAMA, Masashi (University of Tokyo)

Session Classification: Hyper-K Physics Potential

Contribution ID: 29

Type: **not specified**

Supernova neutrino astronomy with Hyper-Kamiokande

Wednesday 22 August 2012 16:50 (25 minutes)

The diffuse supernova neutrino background (DSNB) is the faint glow of MeV neutrinos from distant core-collapse supernovae. It has not been detected yet, but the Super-K upper limit on the flux of electron antineutrino is very close to modern predictions. Hyper-K is expected to detect dozens of DSNB neutrinos yearly. In addition, Hyper-K will open a new window of neutrinos from core collapses occurring in nearby galaxies. Combined, these provide a tantalizing set of new probes to study the fate of core collapses, the supernova neutrino emission, and the cosmic core-collapse rate.

Primary author: Dr HORIUCHI, Shunsaku (CCAPP, Ohio State University)

Presenter: Dr HORIUCHI, Shunsaku (CCAPP, Ohio State University)

Session Classification: Hyper-K Physics Potential

Contribution ID: **30**

Type: **not specified**

LBNE photosensor R & D including light collection options

Thursday 23 August 2012 10:55 (15 minutes)

LBNE photosensor R&D including light collection options

Primary author: SVOBODA, Robert (UC Davis)

Presenter: SVOBODA, Robert (UC Davis)

Session Classification: Photo-sensor Development

Contribution ID: **32**

Type: **not specified**

Current baseline design of HK DAQ system

Thursday 23 August 2012 13:30 (25 minutes)

Report the current idea of the HK DAQ system

Primary author: Dr HAYATO, Yoshinari (Kamioka obs., ICRR, Univ. of Tokyo)

Presenter: Dr HAYATO, Yoshinari (Kamioka obs., ICRR, Univ. of Tokyo)

Session Classification: DAQ System

Contribution ID: 34

Type: **not specified**

Photomultiplier Tube Glass Failure in Neutrino Detection: Challenges and Opportunities

Thursday 23 August 2012 11:25 (15 minutes)

We have undertaken a detailed investigation of photomultiplier tube (PMT) glass fracture at Alfred University, in support of Brookhaven National Laboratory's Long Baseline Neutrino Experiment (LBNE). The strength and lifetime prediction of the PMT glass are crucial to the success of the neutrino detection. Glass fracture is statistical in nature. Glasses are generally under constant state of stress and are susceptible to subcritical crack growth in the presence of water vapor. The crack size increases until the stress intensity at the crack tip exceeds the fracture toughness or critical stress intensity factor and failure occurs. Major challenges include lack of fracture mechanics data on the PMT glasses, predictive model of their failure, and fundamental understanding of the processes and mechanisms of their failure under the neutrino detection environments. With systematic static fatigue testing and accelerated testing in the laboratory, a database can be assembled. Additionally, relationship between glass chemistry and PMT failure can be also developed. With proof-testing data, we can develop and validate a predictive model. We will present our preliminary crack growth results on PMT glasses from vendors.

Primary author: Prof. SUNDARAM, S. K. (Kazuo Inamori School of Engineering, Alfred University)

Co-author: Prof. DIWAN, Milind (Brookhaven National Laboratory)

Presenter: Prof. SUNDARAM, S. K. (Kazuo Inamori School of Engineering, Alfred University)

Session Classification: Photo-sensor Development

Contribution ID: 35

Type: **not specified**

A New Method for Event Reconstruction in Large Water Cherenkov Detectors

Thursday 23 August 2012 14:05 (20 minutes)

In the Hyper-K detector, all information about a given set of final state particles is encoded in a charge and a time for each photomultiplier tube. This new reconstruction algorithm, based on the method used by MiniBooNE (NIM A608, 206 (2009)), calculates time and charge probability distribution functions for every tube at each stage of a likelihood fit minimization. The particle light emission profiles, tank and water properties, and the response of the electronics are all treated separately, which makes it straightforward to incorporate any Cherenkov-emitting particle hypothesis, extend the algorithm to many different detector geometries, and reconstruct multi-particle final states within a common likelihood fit framework. A first version of the algorithm has been implemented for the Super-K detector, and preliminary performance comparisons to previously existing Super-K reconstructions algorithms will be presented. In addition, possible applications to future CP violation and proton decay measurements at Hyper-K will be discussed.

Primary author: Dr WILKING, Michael (TRIUMF)**Presenter:** Dr WILKING, Michael (TRIUMF)**Session Classification:** Software Development

Contribution ID: 39

Type: **not specified**

Overview of software development towards Hyper-K

Thursday 23 August 2012 13:55 (10 minutes)

In this talk, a prospect for software development will be discussed.

Primary author: Dr MIURA, Makoto (Kamioka Observatory, ICRR, University of Tokyo)

Presenter: Dr MIURA, Makoto (Kamioka Observatory, ICRR, University of Tokyo)

Session Classification: Software Development

Contribution ID: 41

Type: **not specified**

Studies of a "thin" veto for LBNE

Wednesday 22 August 2012 18:50 (15 minutes)

A prototype veto system was designed and built for LBNE that used a veto system only 85 cm thick with minimal PMT coverage. The design and efficiency measurements are presented.

Primary author: SVOBODA, Robert (UC Davis)

Presenter: SVOBODA, Robert (UC Davis)

Session Classification: Cavity and Tanks

Contribution ID: 42

Type: **not specified**

Solar neutrinos and supernova burst neutrinos at Hyper-Kamiokande

Wednesday 22 August 2012 16:25 (25 minutes)

n this presentation, the sensitivity of solar neutrinos is discussed. In the case of shallow place, the most serious background will be spallation products induced from cosmic ray muons. How much reduce background by improving an analysis method will be estimated. Using this result, the requirement for the solar neutrino physics, such as the constraint to Δm^2_{21} , is discussed. The expectation event rate from the SuperNova burst is also discussed.

Primary author: Dr KOSHIO, Yusuke (Kamioka observatory, ICRR, Univ. of Tokyo)

Presenter: Dr KOSHIO, Yusuke (Kamioka observatory, ICRR, Univ. of Tokyo)

Session Classification: Hyper-K Physics Potential

Contribution ID: 43

Type: **not specified**

LBNE WCD calibration system design and energy calibration requirements for large water Cherenkov detectors

Thursday 23 August 2012 16:25 (20 minutes)

[SINNIS, Gus (Los Alamos National Laboratory)]

The Long Baseline Neutrino Experiment in the US was developing two far detector concepts in parallel. While a liquid Argon time projection chamber was ultimately selected as the far detector technology, we have performed a conceptual design of the calibration requirements and systems needed for a large (200 kTon) water Cherenkov detector. In this talk I will discuss the requirements and design concepts for the calibration systems of the water Cherenkov detector design for LBNE.

[KUTTER, Thomas (LSU)]

A 200kt water Cherenkov detector was considered for the Long Baseline Neutrino Experiment (LBNE). Calibration requirements were defined based on past experience with water Cherenkov detectors and dedicated physics sensitivity studies. A calibration strategy and program were developed to characterize relevant properties of the detector. These include the optical calibration of the detector (water transparency, PMT properties), energy response, particle identification, vertex and angular resolution and environmental monitoring. The derived oscillation probability depends directly on the measured energy of detected neutrino candidate events. Effects of energy resolution and energy scale and respective uncertainties on the sensitivity to measure the CP phase delta and the mass hierarchy were studied. These studies were performed within the GLoBES framework and with an independent analysis approach. Results of these studies will be presented.

Primary authors: Dr SINNIS, Gus (Los Alamos National Laboratory); KUTTER, Thomas (LSU)

Co-author: INSLEER, Jonathan (LSU)

Presenters: Dr SINNIS, Gus (Los Alamos National Laboratory); KUTTER, Thomas (LSU)

Session Classification: Calibration System

Contribution ID: 44

Type: **not specified**

Development of a Large Area Photodetector with a Fast Phosphor Anode

Thursday 23 August 2012 13:15 (15 minutes)

The next generation neutrino experiments like the Hyper-Kamiokande requires cost-effective ways to instrument large volumes with $O(10^{4-5})$ pieces of photodetectors. Such photodetectors are required to have good effective quantum efficiency, large active area, high gain to allow use of simple and cheap electronics, and good time resolution to reconstruct the wave front of the Cherenkov cone.

A concept of the hybrid photodetector with luminescent anode has been developed as one of ways to meet the above goals. The large advantage of the concept is the simplicity in the structure, where there is no active component, such as dynode complex or photo-diode inside the vacuum, that would lead to significant reduction of cost in the mass production.

We are developing a large area photodetector with a fast phosphor “J9758”, which has a decay time constant of 500 ps, and the emission peak at around 420nm. In this talk, we will present the results of performance tests, using a 8-inch prototype photodetector.

Primary author: Prof. IJIMA, Toru (Nagoya University)

Presenter: Prof. IJIMA, Toru (Nagoya University)

Session Classification: Photo-sensor Development

Contribution ID: 45

Type: **not specified**

Dark Matter Sensitivity Studies

Wednesday 22 August 2012 17:15 (20 minutes)

Hyper-Kamiokande will have a tremendous potential for the detection of neutrino signals from dark matter annihilations. The talk will give an overview of analysis methods and dark matter detection channels relevant for Hyper-K. The talk will conclude by giving dark matter sensitivities and by pointing out specific instrumental details that will help to optimize the physics potential for Hyper-K.

Primary author: Dr ROTT, Carsten (CCAPP / Ohio State University)

Co-authors: Prof. ITOW, Yoshitaka (STEL/KMI Nagoya University); Ms CHOI, koun (nagoya university)

Presenter: Dr ROTT, Carsten (CCAPP / Ohio State University)

Session Classification: Hyper-K Physics Potential

Contribution ID: 46

Type: **not specified**

Irreducible Cross-Section Uncertainties for Electron Neutrino Appearance?

Wednesday 22 August 2012 15:00 (20 minutes)

The usual strategy for controlling systematic uncertainties due to neutrino interactions in oscillation experiments is to use the same beam, or data from other experiments, to constrain those uncertainties. In this brief discussion, I point out a few limitations in this technique that may be problematic for oscillation physics in the high precision era, and I will suggest some possible remedies.

Primary author: MCFARLAND, Kevin (University of Rochester)

Presenter: MCFARLAND, Kevin (University of Rochester)

Session Classification: Hyper-K Physics Potential

Contribution ID: 48

Type: **not specified**

Systematics in CPV measurement

Wednesday 22 August 2012 14:25 (15 minutes)

Discuss about important systematic errors for the CPV measurement

Primary author: Dr NAKAYAMA, Shoei (Kamioka Observatory, ICRR, University of Tokyo)

Presenter: Dr NAKAYAMA, Shoei (Kamioka Observatory, ICRR, University of Tokyo)

Session Classification: Hyper-K Physics Potential

Contribution ID: 49

Type: **not specified**

Atmospheric Neutrino Oscillations at Hyper-Kamiokande

Wednesday 22 August 2012 15:20 (25 minutes)

Recently experimental measurements of reactor, atmospheric, and solar neutrinos have provided an increasingly clear picture of neutrino oscillations. However, several open issues including the nature of the neutrino mass hierarchy, the octant of θ_{23} , and whether or not neutrinos are CP-violating, remain. Atmospheric neutrinos are capable of addressing these questions due to the sizeable matter effects they experience as they traverse the Earth. With 25 times the fiducial volume of the Super-Kamiokande detector, Hyper-Kamiokande will have unprecedented access to these oscillations. This talk will focus on the sensitivity of atmospheric neutrinos at Hyper-Kamiokande to open questions in oscillation physics, particularly in the era of large θ_{13} now favored by reactor experiments.

Primary author: Dr WENDELL, Roger (ICRR)**Presenter:** Dr WENDELL, Roger (ICRR)**Session Classification:** Hyper-K Physics Potential

Contribution ID: 50

Type: **not specified**

The LAGUNA Feasibility Study for the LSC to Host a Next-Generation Mega-ton type Neutrino and Nucleon Decay Experiment

Wednesday 22 August 2012 17:55 (15 minutes)

A very detailed feasibility study for the “Canfranc Underground Laboratory” (LSC) to host a Next-Generation Mega-ton type Neutrino and Nucleon Decay Experiment was carried out within the EU funded LAGUNA program (E.U. Grant Agreement No. 212343 FP7-INFRA-2007-1). All fundamental aspects were covered: geological, geotechnic, environmental, socio-economical etc. A pre-design of the the main caverns, auxiliary caverns, access tunnels for the construction and running phases, all type of services, emergency routes end equipment, etc. was made. For each of the main caverns a rather realistic elasto-plastic model calculation was performed to validate the pre-design of the excavation and reinforcement of the main cavern. Also the full cost was estimated rather accurately. Here we emphasize the geological, geotechnic and pre-design aspects of the study that might be of some help in the design of the Hyper-Kamiokande project.

Primary author: Prof. LABARGA, Luis (Departamento de Física Teórica, Universidad Autónoma de Madrid)

Presenter: Prof. LABARGA, Luis (Departamento de Física Teórica, Universidad Autónoma de Madrid)

Session Classification: Cavity and Tanks

Contribution ID: 51

Type: **not specified**

Development of GEANT4 based water Cherenkov detector simulation, WCSim

Thursday 23 August 2012 14:25 (25 minutes)

WCSim is a Geant4 based water Cherenkov detector simulation originally developed to test the physics potential of a 1 kton water detector located 2 km away from the T2K beam target. Recently, its code has been updated to accommodate the needs of the LBNE water Cherenkov detector option by allowing the simulation of large cylindrical tank configurations with an adjustable number of PMTs. Moreover, the optical properties have been tuned at about the 3% level to the Geant3 based Super-Kamiokande simulation that is finely tuned to data. I will describe WCSim and its interface to the Super-K tool suite.

Primary author: Prof. WALTER, Chris (Duke University)

Presenter: Prof. WALTER, Chris (Duke University)

Session Classification: Software Development

Contribution ID: 52

Type: **not specified**

Cosmic background study for atm. nu and proton decay

Wednesday 22 August 2012 15:45 (15 minutes)

Effect of cosmic background for atm. nu and proton decay will be discussed.

Primary author: Prof. OKUMURA, Kimihiro (ICRR)

Presenter: Prof. OKUMURA, Kimihiro (ICRR)

Session Classification: Hyper-K Physics Potential

Contribution ID: 53

Type: **not specified**

Borexino calibration system

Thursday 23 August 2012 16:10 (15 minutes)

The specific egg-shape geometry of Hyper-Kamiokande poses firstly difficulties for the future calibration campaigns performed in the detector. In contrast to Super-K, the vertical walls would be curved which would limit access to certain regions of the active volume causing unnecessary reduction in the number of calibration locations. As a result, there is a strong urge to develop new, 3-dimensional tools that would help to improve the performance and the results of the calibrations. VirginiaTech, with Dr. Camillo Mariani and Szymon Manecki, would like to join efforts in the development and construction of such hardware. VirginiaTech has previously been responsible for the construction and leadership over a very successful series of calibration campaigns of the Borexino detector. In 4 calibrations, some 295 positions were covered in 35 days of DAQ time. Various radioactive and laser sources were used, most of which were developed and constructed at VT. One of the most effective tools used was the source location system based on 7 consumer-grade digital cameras that turned out to be precise to within 0.6\,cm throughout the volume of the detector. At the same time, in its ultra-pure environment, the cleanliness of the system was of major concern. But also in this case, no long-term contamination has been identified. The team at VirginiaTech has proven in multiple categories its proficiency and expertise in the field, and would like to now demonstrate the same level of capability as a Hyper-Kamiokande collaborator.

Primary author: Dr MANECKI, Szymon (VirginiaTech)

Presenter: Dr MANECKI, Szymon (VirginiaTech)

Session Classification: Calibration System

Contribution ID: 56

Type: **not specified**

Discussion for Physics Potentials

Thursday 23 August 2012 17:45 (1 hour)

Session Classification: Discussion for Physics Potentials

Contribution ID: 57

Type: **not specified**

Final Discussion Session

Thursday 23 August 2012 18:45 (1 hour)

Session Classification: Final Discussion Session

Contribution ID: 58

Type: **not specified**

Cavity and Tanks

Thursday 23 August 2012 16:45 (1 hour)

Presenter: Prof. SHIOZAWA, Masato (The University of Tokyo, Institute for Cosmic Ray Research, ICRR)

Session Classification: Parallel Discussions

Contribution ID: 59

Type: **not specified**

Water System

Thursday 23 August 2012 16:45 (1 hour)

Presenters: Dr SEKIYA, Hiroyuki (ICRR/IPMU); Prof. VAGINS, Mark (IPMU)

Session Classification: Parallel Discussions

Contribution ID: **60**

Type: **not specified**

Photo-sensor

Thursday 23 August 2012 16:45 (1 hour)

Presenters: Dr NAKAYAMA, Shoei (Kamioka Observatory, ICRR, University of Tokyo); Dr NISHIMURA, Yasuhiro (ICRR)

Session Classification: Parallel Discussions

Contribution ID: **61**

Type: **not specified**

DAQ system

Thursday 23 August 2012 16:45 (1 hour)

Presenter: Dr HAYATO, Yoshinari (Kamioka obs., ICRR, Univ. of Tokyo)

Session Classification: Parallel Discussions

Contribution ID: **62**

Type: **not specified**

Software

Thursday 23 August 2012 16:45 (1 hour)

Presenter: Dr MIURA, Makoto (Kamioka Observatory, ICRR, University of Tokyo)

Session Classification: Parallel Discussions

Contribution ID: **63**

Type: **not specified**

Calibration

Thursday 23 August 2012 16:45 (1 hour)

Presenter: Dr TANAKA, Hide-Kazu (ICRR, University of Tokyo)

Session Classification: Parallel Discussions