

# **22nd International Workshop on Weak Interactions and Neutrinos**

## **Report of Contributions**

Contribution ID: 3

Type: **not specified**

## **Hadro-production measurements for the T2K experiment with the NA61/SHINE detector at the CERN SPS**

*Wednesday, September 16, 2009 6:20 PM (20 minutes)*

In this talk the NA61/SHINE detector will be presented, which is a large acceptance hadron spectrometer at the CERN SPS. It allows for a precise study of the particle production from the interactions of a 31 GeV/c proton beam on a Carbon target in order to predict the neutrino flux of the T2K experiment at J-PARC, Japan. Requirements for the T2K experiment will be discussed together with the ongoing NA61 measurements. In particular preliminary NA61 cross section measurements from the 2007 pilot run will be shown.

**Primary author:** STRABEL, Claudia Christina

**Presenter:** STRABEL, Claudia Christina

**Session Classification:** DG3 - Neutrino Physics

**Track Classification:** Neutrino Physics

Contribution ID: 4

Type: **not specified**

## Search for Muon Neutrino Disappearance in a Short-Baseline Accelerator Neutrino Beam

*Tuesday, September 15, 2009 5:30 PM (20 minutes)*

Neutrino oscillation is a probe for new physics not included in the Standard Model.

We search for muon neutrino disappearance at  $\Delta m^2 \sim 1 \text{ eV}^2$  using the Fermilab Booster Neutrino beamline and two experiments, SciBooNE and MiniBooNE.

The neutrino fluxes are measured at SciBooNE and MiniBooNE detectors, located at 100 m and 540 m downstream from the neutrino production target, respectively.

We took beam data from June 2007 through August 2008 at SciBooNE and MiniBooNE.

A preliminary result of the flux measurement at SciBooNE and SciBooNE-MiniBooNE joint oscillation analysis will be presented.

**Primary author:** NAKAJIMA, Yasuhiro

**Presenter:** NAKAJIMA, Yasuhiro

**Session Classification:** DG3 - Neutrino Physics

**Track Classification:** Neutrino Physics

Contribution ID: 6

Type: **not specified**

## The GERDA experiment

*Thursday, September 17, 2009 9:25 AM (25 minutes)*

Neutrinoless double-beta-decay could be the key to understanding the nature of the neutrino: if observed it would prove its Majorana-nature and the half-life of the decay would be a direct measure of the yet unknown absolute scale of the neutrino mass.

The Germanium Detector Array (GERDA) experiment at the INFN, Gran Sasso Laboratory, Italy, is designed to investigate the double-beta-decay of the isotope Ge-76. Germanium crystals enriched in Ge-76, acting as source and detector simultaneously, will be submerged directly into their ultra pure cooling medium (liquid argon) that also serves as a radiation shield. A further reduction of the external background is achieved by means of a 2m-thick water buffer, which is operated as a Cherenkov detector to veto cosmic-ray muons.

This concept will allow for a background reduction of up to two orders of magnitudes with respect to earlier experiments - a key requirement for further improvement of sensitivity. The design of the GERDA experiment will be introduced and the current status of the experiment will be discussed.

**Primary author:** PANDOLA, Luciano

**Presenter:** PANDOLA, Luciano

**Session Classification:** DG3 - Neutrino Physics

**Track Classification:** Neutrino Physics

Contribution ID: **10**

Type: **not specified**

# **Electro Weak Symmetry Breaking: Theoretical Summary**

*Friday, September 18, 2009 2:00 PM (45 minutes)*

DG1 - Summary and Perspectives

**Presenter:** FALKOWSKI, Adam

**Session Classification:** Plenary Session

Contribution ID: 11

Type: **not specified**

# **Electro Weak Symmetry Breaking: Experimental Summary**

*Friday, September 18, 2009 2:45 PM (45 minutes)*

DG1 - Summary and perspectives

**Presenter:** SIROIS, Yves

**Session Classification:** Plenary Session

Contribution ID: 14

Type: **not specified**

## Neutrino Physics: Theoretical Summary

*Friday, September 18, 2009 5:30 PM (30 minutes)*

DG3 - Summary and perspectives

**Presenter:** NUNOKAWA, Hiroshi

**Session Classification:** Plenary Session

Contribution ID: 15

Type: **not specified**

## **Neutrino Physics: Experimental Summary II**

*Friday, September 18, 2009 6:30 PM (30 minutes)*

DG3 - Summary and perspectives

**Presenter:** CREMONESI, Oliviero

**Session Classification:** Plenary Session



Contribution ID: 18

Type: **not specified**

## Novel Neutrino Beams: R&D and Design Studies in the US

*Wednesday, September 16, 2009 3:30 PM (20 minutes)*

A Neutrino Factory producing intense neutrino beams from muon decays is an intriguing possibility for the next generation of neutrino experiments. Determination of the neutrino mass hierarchy, precision measurements of the neutrino mixing parameters, and observation of CP violation in the neutrino sector are among the many studies possible with a Neutrino Factory. A Neutrino Factory can also be an important step toward the development of a Muon Collider. This talk discusses the current status and plans for Neutrino Factory R&D in the U.S. focusing particularly on accelerator development for generating the high luminosity parent muon beam and development of new neutrino detectors necessary for the higher neutrino intensities.

**Primary author:** HART, Terrence

**Presenter:** HART, Terrence

**Session Classification:** DG3 - Neutrino Physics

**Track Classification:** Neutrino Physics

Contribution ID: 19

Type: **not specified**

## Status of the OPERA experiment

*Tuesday, September 15, 2009 5:50 PM (20 minutes)*

The OPERA experiment is a long baseline neutrino experiment aiming at the first observation of the appearance of a new flavor signal predicted by the neutrino flavor-mixing oscillations hypothesis. The OPERA is designed to detect a tau neutrino appearance in the pure muon neutrino beam from CERN to Gran Sasso (CNGS beam). The target has a modular structure made of units based on Emulsion Cloud Chamber (ECC) technique. ECC is sequence of the nuclear emulsion films interleaved with 1mm-thickness lead plates. Nuclear emulsion films are used as a tracking device with micrometric accuracy for the detection of tau decays. The ECC allows also to perform the kinematical measurements such as the momentum measurement by multiple scattering detection and the electron shower detection. Total target mass of 1.25kton was assembled by more than 150,000 units.

Since 2008 the OPERA experiment has started full data taking in the CNGS beam. Around 1,700 interactions in the detector have been collected in 2008 and the 2009 run is ongoing.

The status of the analysis and some fruitful outcome will be presented. The prospect of the future runs is also to be presented.

**Primary author:** ARIGA, Akitaka

**Presenter:** ARIGA, Akitaka

**Session Classification:** DG3 - Neutrino Physics

**Track Classification:** Neutrino Physics

Contribution ID: 20

Type: **not specified**

## First Results for Electron-Neutrino Appearance in MINOS

*Tuesday, September 15, 2009 4:10 PM (20 minutes)*

MINOS is a long baseline neutrino oscillation experiment designed to make precision measurements of the neutrino mixing parameters associated with the atmospheric neutrino mass splitting. Using a neutrino beam from the Main Injector (NuMI) facility at Fermilab, it compares the neutrino energy spectrum for neutrino interactions observed in two large detectors located at Fermilab and in the Soudan mine in northern Minnesota at a distance of 735km. We describe the first results for electron neutrino appearance in MINOS after two years of data-taking.

**Primary author:** SANCHEZ, Mayly

**Presenter:** SANCHEZ, Mayly

**Session Classification:** DG3 - Neutrino Physics

**Track Classification:** Neutrino Physics

Contribution ID: 21

Type: **not specified**

## Resolving CP Violation by Standard and Nonstandard Interactions in Neutrino Oscillations

Wednesday, September 16, 2009 4:30 PM (20 minutes)

In neutrino oscillation with non-standard interactions (NSI) the system is enriched with CP violation caused by phases due to NSI in addition to the standard lepton Kobayashi-Maskawa phase  $\delta$ . In this paper we show that it is possible to disentangle the two CP violating effects by measurement of muon neutrino appearance by a near-far two detector setting in neutrino factory experiments.

Prior to the quantitative analysis we investigate in detail the various features of the neutrino oscillations with NSI, but under the assumption that only one of the NSI elements,  $\epsilon_{\mu\tau}$  or  $\epsilon_{\tau\mu}$ , is present.

They include synergy between the near and the far detectors, the characteristic differences between the  $\epsilon_{\mu\tau}$  and  $\epsilon_{\tau\mu}$  systems, and in particular, the parameter degeneracy.

Finally, we use a concrete setting of muon energy 50 GeV and two magnetized iron detectors at the two baselines, one at  $L = 3000$  km and the other at  $L = 7000$  km, each having a fiducial mass of 50 kton to study the discovery potential of NSI and its CP violation effects.

We demonstrate by assuming  $4 \times 10^{21}$  useful muon decay for both polarities that one can identify non-standard CP violation down to  $\epsilon_{\mu\tau} \sim 10^{-3}$ ,  $\epsilon_{\tau\mu} \sim 10^{-4}$ , and  $\delta$  at  $3\sigma$  CL for  $\theta_{13}$  down to  $\sin^2 2\theta_{13} = 10^{-4}$  in most of the region of  $\delta$ . The impact of existence of NSI on measurement of  $\delta$  and the mass hierarchy is also worked out.

**Primary author:** UCHINAMI, Shoichi

**Co-authors:** Prof. GAGO, Alberto (Pontificia Universidad Catolica del Peru); Prof. NUNOKAWA, Hiroshi (Universidade Catolica do Rio de Janeiro); Prof. MINAKATA, Hisakazu (Tokyo Metropolitan University); Prof. ZUKANOVICH FUNCHAL, Renata (Universidade de São Paulo)

**Presenter:** UCHINAMI, Shoichi

**Session Classification:** DG3 - Neutrino Physics

**Track Classification:** Neutrino Physics

Contribution ID: 25

Type: **not specified**

## **Electro Weak Symmetry Breaking: Theoretical Status**

*Monday, September 14, 2009 9:00 AM (45 minutes)*

**Presenter:** BARBIERI, Riccardo

**Session Classification:** Plenary Session

Contribution ID: 26

Type: **not specified**

## **Electro Weak Symmetry Breaking: Experimental Status**

*Monday, September 14, 2009 9:45 AM (45 minutes)*

**Presenter:** TENCHINI, Roberto

**Session Classification:** Plenary Session

Contribution ID: 29

Type: **not specified**

## Neutrino Physics: Experimental Status

*Monday, September 14, 2009 4:15 PM (45 minutes)*

**Presenter:** MCDONALD, Art

**Session Classification:** Plenary Session

Contribution ID: **30**

Type: **not specified**

## **Neutrino Physics: Theoretical Status**

*Monday, September 14, 2009 3:30 PM (45 minutes)*

**Presenter:** CHOUBEY, Sandhya

**Session Classification:** Plenary Session



Contribution ID: 33

Type: **not specified**

## Recent results from the neutrino scattering experiments

*Wednesday, September 16, 2009 6:00 PM (20 minutes)*

Recent experimental studies of neutrino oscillation require more precise knowledge of the neutrino-nucleus scatterings. Therefore, several experiments to study neutrino nucleus-scattering experiments have been performed. In this presentation, I will report the recent results of neutrino scatterings from SciBooNE and MiniBooNE.

**Primary author:** HAYATO, Yoshinari

**Presenter:** HAYATO, Yoshinari

**Session Classification:** DG3 - Neutrino Physics

**Track Classification:** Neutrino Physics

Contribution ID: 34

Type: **not specified**

## Latest Results from the MINOS Experiment

*Tuesday, September 15, 2009 3:50 PM (20 minutes)*

The Main Injector Neutrino Oscillation Search (MINOS) long baseline experiment measures a muon neutrino beam in two locations: a Near detector at Fermilab, close to beam production, and a Far detector, 735 km downstream, in Northern Minnesota. Comparisons of the observed energy spectrum at the Far detector with the expectation derived from the Near detector measurement allow MINOS to study neutrino oscillation processes with high precision. In this talk, the methodology employed in the analysis of charged-current muon neutrino and anti-neutrino interactions is outlined and the most recently obtained results are described. Results from a search for oscillations into sterile neutrinos, derived from the analysis of neutral current interactions in the MINOS detectors, are also presented. A beam exposure of  $3.2 \times 10^{20}$  protons on target is used in the analyses.

**Primary author:** SOUSA, Alexandre

**Presenter:** SOUSA, Alexandre

**Session Classification:** DG3 - Neutrino Physics

**Track Classification:** Neutrino Physics

Contribution ID: 35

Type: **not specified**

## Explaining B $\rightarrow$ K $\pi$ anomaly with non universal Z' boson

We study the effect of non-universal Z' boson in the decay modes B  $\rightarrow$  K  $\pi$ . In the standard model these modes receive dominant contributions from b  $\rightarrow$  s QCD penguins. Therefore, in this limit one expects  $S_{\pi^0 K^0} \approx \sin 2\beta$ ,  $A_{\pi^0 K^0} \approx 0$  and  $A_{\pi^0 K^-} \approx A_{\pi^+ K^-}$ . The corrections due to the presence of small non-penguin contributions is found to yield  $S_{\pi^0 K^0} > \sin 2\beta$  and  $\Delta A_{CP}(K\pi) \simeq 2.5$

**Primary author:** Dr GIRI, Anjan (National Institute of Technology, Rourkela, India)

**Presenter:** Dr GIRI, Anjan (National Institute of Technology, Rourkela, India)

Contribution ID: 36

Type: **not specified**

## B<sub>s</sub> - $\bar{B}_s$ mixing and b $\rightarrow$ s transitions in isosinglet down quark model

The recent observation of the mass difference in B<sub>s</sub> system seems to be not in complete agreement with the corresponding standard model value. We consider the model with an extra vector like down quark to explain this discrepancy and obtain the constraints on the new physics parameters. Thereafter, we show that with these new constraints, this model can successfully explain other observed deviations associated with b  $\rightarrow$  s transitions, namely, B<sub>s</sub>  $\rightarrow$   $\psi$   $\phi$ , B  $\rightarrow$  K  $\pi$  and B  $\rightarrow$   $\phi$  K<sub>s</sub>.

**Primary author:** Dr MOHANTA, Rukmani (University of Hyderabad)

**Presenter:** Dr MOHANTA, Rukmani (University of Hyderabad)

**Track Classification:** Weak Decays, CP violation and CKM

Contribution ID: 37

Type: **not specified**

## Collective Flavor Oscillations For Supernova Neutrinos and r-Process Nucleosynthesis

*Friday, September 18, 2009 9:00 AM (20 minutes)*

The effect of collective flavor oscillations of neutrinos driven by neutrino-neutrino interaction at the very high density region of core collapse supernovae controls the emitted flux of neutrinos of different flavors. In the process one or more swaps of the flavors for both neutrinos and antineutrinos take place depending on the initial neutrino flux and distributions, particularly for the inverted mass hierarchy. We study the effect of this on the possibility of having a neutron-rich region compatible with r-process nucleosynthesis. The minimal requirement for r-process is the electron-to-nucleon ratio  $Y_e < 0.5$ , but a more favorable condition may be  $Y_e < 0.45$ . In this work we consider a two flavor model, with e-type and x-type neutrinos along with their antiparticles and with the oscillation parameters mass squared difference = 0.003 eV<sup>2</sup> in agreement with realistic 1–3 mixing and a small effective mixing angle of 0.00001. As in supernovae the four species, mu and tau type neutrinos and antineutrinos have identical spectra, this study itself may give indications of the real situation. Different models of neutrino energy distributions are used. For each of the distributions initial fluxes of different flavors are varied and exclusion plots for these initial neutrino fluxes show the allowed regions for r-process nucleosynthesis. The electron fraction ( $Y_e$ ) as a function of the radius of the core is calculated and it shows an oscillatory behavior in the bipolar region before saturating to a constant value. This shows that for the allowed fluxes one gets neutron-rich regions for r-process in the neutrino driven wind. But other considerations of baryon density and entropy in these regions need to be studied.

**Primary author:** KAR, Kamales

**Co-authors:** CHOUBEY, Sandhya (Harish-Chandra Research Institute, Allahabad, India); CHAKRABORTY, Sovan (Saha Institute of Nuclear Physics, Calcutta, India); GOSWAMI, Srubabati (Physical Research Laboratory, Ahmedabad, India)

**Presenter:** KAR, Kamales

**Session Classification:** DG3 - Neutrino Physics

**Track Classification:** Neutrino Physics

Contribution ID: 38

Type: **not specified**

## Strong Scaling Ansatz of flavor neutrino mass matrix and normal mass hierarchy

*Tuesday, September 15, 2009 6:10 PM (30 minutes)*

To find hidden structure of flavor neutrino mass matrix, we study properties of flavor neutrino mass satisfying the strong scaling Ansatz (SSA) that predicts non maximal  $\nu_2 - \nu_3$  mixing, vanishing  $U_{e3}$  and inverted mass hierarchy.

However, we find another possibility of SSA that tiny deviation from this Ansatz permits us to realize normal mass hierarchy and tiny value of  $\theta_{13}$  which allows to arise Dirac CP violation.

We can clarify correlations of mass parameter and CP violating phases and compare these dependences of CP violating phases on mass parameters in the case of the normal mass hierarchy with those of the inverted mass hierarchy.

### Summary

We study properties of flavor neutrino mass matrix using strong scaling Ansatz (SSA) which is a scaling law of neutrino mass matrix and which requires that ratios of  $M_{\{i\}\mu}$  divided by  $M_{\{i\}\tau}$  are all equal where  $i = e, \mu, \tau$ .

This Ansatz gives vanishing  $\theta_{13}$ , non maximal  $\theta_{23}$  and their effects will not be affected by renormalization where  $\theta_{ij}$  stand for  $i$ - $j$  mixing angle while  $i, j = e, \mu, \tau$ .

In the manner of original model of SSA, it is also predicts that we can not realize any hierarchy except for inverted mass hierarchy.

However, we find a new possibility of SSA to realize normal mass hierarchy if tiny breakings of SSA are included.

In our model, to create baryon asymmetry in the universe, Majorana type CP violating phases as well as Dirac type can be large.

We compare our model with original model of SSA and make clear how mixing angles and CP violating phases depend on mass parameters.

**Primary author:** Mr BABA, Teppei (Tokai university)

**Presenter:** Mr BABA, Teppei (Tokai university)

**Session Classification:** Poster Session

**Track Classification:** Neutrino Physics

Contribution ID: 39

Type: **not specified**

## KamLAND Results

*Tuesday, September 15, 2009 3:30 PM (20 minutes)*

The KamLAND experiment searched for the oscillation of anti-neutrinos emitted from distant nuclear reactors. We observed the anti-neutrino spectral distortion, which was a piece of evidence of neutrino oscillations. Due to their clear spectral distortion, the neutrino mass difference was determined with 2.8% precision. In the near future, we will have a sensitivity also to the low energy solar neutrinos utilizing the characteristics of high light intensity. The precise measurement of low energy solar neutrinos helps us obtain a better understanding of fusion reactions. I will show the status of the anti-neutrino analysis and the purification of the liquid scintillator.

**Primary author:** SHIMIZU, Itaru

**Presenter:** SHIMIZU, Itaru

**Session Classification:** DG3 - Neutrino Physics

**Track Classification:** Neutrino Physics

Contribution ID: 41

Type: **not specified**

## Search for neutrinoless double beta decay: latest results from NEMO-3 and plans for SuperNEMO

*Thursday, September 17, 2009 9:50 AM (30 minutes)*

The NEMO-3 experiment, located in the Modane Underground Laboratory, is searching for neutrinoless double beta decay since 2003. We will present the latest results for seven isotopes used on NEMO-3:  $^{48}\text{Ca}$ ,  $^{96}\text{Zr}$ ,  $^{82}\text{Se}$ ,  $^{100}\text{Mo}$ ,  $^{116}\text{Cd}$ ,  $^{130}\text{Te}$  and  $^{150}\text{Nd}$ . We observe no evidence for neutrinoless double beta decay and based on  $^{100}\text{Mo}$  data set an upper limit on the effective Majorana neutrino mass to be in the range 0.45 - 0.90 meV, depending on the nuclear matrix element. NEMO-3 data can also be interpreted in terms of alternative transition models, such as weak right-handed currents or Majoron emission.

SuperNEMO is a next-generation experiment exploiting the successful tracking plus calorimetry technology of the NEMO-3 experiment. SuperNEMO will use about 100 kg of  $^{82}\text{Se}$  and is designed to reach sensitivity to a half-life greater  $10^{26}$  years. We will briefly describe main challenges before SuperNEMO and the current status of the project.

**Primary author:** LANG, Karol

**Presenter:** LANG, Karol

**Session Classification:** DG3 - Neutrino Physics

**Track Classification:** Neutrino Physics



Contribution ID: 42

Type: **not specified**

## Measurement of theta13 at Daya Bay

*Wednesday, September 16, 2009 9:20 AM (20 minutes)*

The Daya Bay experiment aims to measure the last unobserved neutrino mixing angle  $\theta_{13}$  with a sensitivity of  $\sin^2(2\theta_{13}) < 0.01$  at 90% C.L. The experiment will measure the flux and energy spectrum of reactor antineutrinos through the inverse beta-decay reaction on protons in eight detectors in three underground sites at different distances from the reactor cores. An overview and the current status of the experiment will be discussed.

### Summary

This talk will provide an overview of the goals and techniques of the Daya Bay experiment and a discussion of the current construction status.

**Primary author:** KETTELL, Steve

**Presenter:** KETTELL, Steve

**Session Classification:** DG3 - Neutrino Physics

**Track Classification:** Neutrino Physics

Contribution ID: 43

Type: **not specified**

## The ANTARES detector: status and first results

*Friday, September 18, 2009 11:50 AM (20 minutes)*

ANTARES is an underwater neutrino telescope, located about 2500 m under the sea, 40 km off the coast of Toulon/France.

Consisting of about 900 optical modules it is currently the largest neutrino detector in the northern hemisphere and has been taking data in its final configuration since May 2008. In this talk the physics potential and the detection technique are described and first results are presented. The future of neutrino astronomy in the Mediterranean Sea is discussed.

**Primary author:** MARGIOTTA, Annarita

**Presenter:** MARGIOTTA, Annarita

**Session Classification:** DG3 - Neutrino Physics

**Track Classification:** Neutrino Physics

Contribution ID: 44

Type: **not specified**

## Results from MiniBooNE

*Tuesday, September 15, 2009 4:30 PM (20 minutes)*

MiniBooNE is a short-baseline experiment located at Fermilab, sensitive to muon (anti)neutrino to electron (anti)neutrino appearance and muon (anti)neutrino disappearance oscillations at high  $\Delta m^2 \sim 1 \text{ eV}^2$ . These oscillation searches have been motivated by the  $3.8\sigma$  excess of electron antineutrino events in a muon antineutrino beam observed by the LSND experiment in 1995. In this talk, recent antineutrino and updated neutrino oscillation results from MiniBooNE will be presented, and implications for the LSND excess will be discussed within the context of sterile neutrino oscillation models.

**Primary author:** KARAGIORGI, Georgia

**Presenter:** KARAGIORGI, Georgia

**Session Classification:** DG3 - Neutrino Physics

**Track Classification:** Neutrino Physics

Contribution ID: 45

Type: **not specified**

## **CKM from semi-leptonic B decays**

*Tuesday, September 15, 2009 11:00 AM (30 minutes)*

**Presenter:** RICCIARDI, Giulia

**Session Classification:** DG2 - Weak Decays, CP violation and CKM

Contribution ID: 48

Type: **not specified**

## Measurements of gamma

*Tuesday, September 15, 2009 3:30 PM (30 minutes)*

**Presenter:** AUSHEV, Tagir

**Session Classification:** DG2 - Weak Decays, CP violation and CKM

Contribution ID: 53

Type: **not specified**

## Physics with Liquid Argon Time Projection Chambers in the U.S.

Liquid Argon Time Projection Chamber (LAr TPC) detectors are well suited to study neutrino interactions, and are an intriguing option for future massive detectors capable of measuring the parameters that characterize neutrino oscillations. These detectors combine fine-grained tracking with calorimetry, allowing for excellent imaging and particle identification ability. The ability of liquid argon detectors to cleanly differentiate electrons from photons gives them unique capabilities in low energy neutrino interaction measurements. In this talk the details of the ArgoNeUT test-beam project, a 175 liter LAr TPC currently exposed to Fermilab's NuMI neutrino beamline, and the MicroBooNE experiment, a 90 ton LAr TPC that will be exposed to Fermilab's Booster neutrino beamline starting in 2011, will be presented. After a brief introduction to these experiments, the physics opportunities presented by each detector will be discussed.

**Primary author:** Dr SODERBERG, Mitchell (Yale University)

**Presenter:** Dr SODERBERG, Mitchell (Yale University)

**Track Classification:** Neutrino Physics

Contribution ID: 54

Type: **not specified**

## Final Results on $K^+ \rightarrow \pi^+ \nu \bar{\nu}$ from BNL E949

*Friday, September 18, 2009 11:00 AM (30 minutes)*

The extremely rare decay  $K^+ \rightarrow \pi^+ \nu \bar{\nu}$  has been studied for the last 20 years with the E787 and E949 experiments and the high-intensity proton beam of the AGS accelerator at Brookhaven

National Laboratory. The E949 experiment previously reported results above the  $K^+ \rightarrow \pi^+ \pi^0$  peak, in the pion momentum region [211,229] MeV/c {Phys.Rev.Lett.93:031801(2004); Phys.Rev.D77:052003(2008)}. E949 has recently reported results below the  $K^+ \rightarrow \pi^+ \pi^0$  peak, in the pion momentum region [140,199] MeV/c, {Phys.Rev.Lett.101:191802(2008);Phys.Rev.D79:092004(2009)}. A total of seven candidates of this very rare process have been identified. This talk will describe the experiment and these results.

**Primary author:** KETTELL, Steve

**Presenter:** KETTELL, Steve

**Session Classification:** DG2 - Weak Decays, CP violation and CKM

**Track Classification:** Weak Decays, CP violation and CKM

Contribution ID: 55

Type: **not specified**

## Solar neutrino results from Borexino and future prospects

*Friday, September 18, 2009 11:00 AM (20 minutes)*

Borexino is a liquid scintillator, solar neutrino detector running underground at the Laboratori Nazionali del Gran Sasso, Italy.

Thanks to the extreme radio-purity achieved throughout its whole set-up Borexino is capable of detecting solar neutrinos below 2 MeV.

Among the main results obtained so far are the first measurement of the  ${}^7\text{Be}$  solar neutrinos flux, whose value is in agreement with the LMA-MSW scenario for neutrino oscillations, and the measurement of the  ${}^8\text{B}$  solar neutrino flux with an energy threshold of 2.8 MeV.

These results are reported here and the future prospects discussed.

**Primary author:** GUARDINCERRI, Elena

**Presenter:** GUARDINCERRI, Elena

**Session Classification:** DG3 - Neutrino Physics

**Track Classification:** Neutrino Physics



Contribution ID: 62

Type: **not specified**

## The magic of four zero neutrino Yukawa textures

*Tuesday, September 15, 2009 12:00 PM (20 minutes)*

Within the type-I seesaw framework with three heavy right chiral neutrinos and in the basis where the latter and the charged leptons are mass diagonal, we investigate the effects of mu-tau symmetry as well as tribimaximal mixing on the maximally allowed four zero neutrino Yukawa textures which had already led to a predictive and highly constrained theoretical scheme. A drastic reduction of the seventy two allowed textures is found, leaving only two allowed forms of the light neutrino mass matrix, one of which is on the margin of being ruled out by the present neutrino oscillation data. The other remains a viable candidate for the actual light neutrino mass matrix chosen by nature and will be crucially tested by future measurements of  $\theta_{13}$ . Implications for leptogenesis and radiative lepton flavor violating decays are also discussed. The stability of these conclusions under running from a high scale, where those symmetries are imposed, to the weak scale is also demonstrated.

### Summary

Mu-tau symmetry is found to reduce the seventy two allowed four zero neutrino Yukawa textures in the standard weak basis to only four. These lead to just two different forms of the light neutrino mass matrix, each being characterized by two real constants and one phase which are highly constrained. Further, a required tribimaximal mixing reduces these three constants to just one with a nearly fixed value. Interesting consequences for both flavored and unflavored leptogenesis as well as radiative lepton flavor violating decays are pointed out. These conclusions are found to be stable under RG running from a high to the weak scale.

**Primary author:** ROY, PROBIR

**Co-authors:** Dr GHOSAL, Ambar (Saha Institute of Nuclear Physics); Dr ADHIKARY, Biswajit (Saha Institute of Nuclear Physics)

**Presenter:** ROY, PROBIR

**Session Classification:** DG3 - Neutrino Physics

**Track Classification:** Neutrino Physics

Contribution ID: 63

Type: **not specified**

## T2K General talk(Status and T2K general description)

*Wednesday, September 16, 2009 10:00 AM (20 minutes)*

T2K (Tokai-to-Kamioka) is a second generation long baseline neutrino experiment utilizing a newly built neutrino source with a MW class high energy proton accelerator complex (J-PARC neutrino facility), a near neutrino detector (ND280) to characterize the neutrino beam 280 meters from the source, and Super-Kamiokande as the far detector at 295 km.

The primary motivation for T2K is the discovery of the  $\nu_\mu$  to  $\nu_e$  conversion phenomena and, as a consequence, the finite value of the  $\theta_{13}$  mixing angle. It will also conduct a precise measurement of  $\theta_{23}$  and the mass difference of neutrino mass eigenstate. The ultimate goal for T2K is to establish the lepton flavor mixing structure.

Construction of the J-PARC neutrino facility was completed in March 2009 and engineering operation of the T2K started as scheduled the following month. This talk will provide a general introduction to T2K, and present the current beam commissioning status and the status of preparations towards the start of the experiment.

**Primary author:** KAKUNO, Hidekazu

**Presenter:** KAKUNO, Hidekazu

**Session Classification:** DG3 - Neutrino Physics

**Track Classification:** Neutrino Physics

Contribution ID: 64

Type: **not specified**

## Dark matter and solar neutrinos with DEAP/CLEAN

*Wednesday, September 16, 2009 5:30 PM (25 minutes)*

The large difference between the time constants of the two scintillation pulse components of a noble liquid like liquid Argon or Neon provide a very reliable correlation between pulse shape and type of event. This pulse shape discrimination already provides the power of rejecting a background  $10^8 - 10^9$  times larger than the signal. A 400 kg LAr detector, MiniCLEAN, is currently under construction, and a 3.6 ton detector, DEAP-3600, under development. The projected sensitivities of these two Dark Matter detectors are illustrated. As the DEAP/CLEAN program is also for p-p solar neutrino detection, the sensitivity to these neutrinos expected from future larger upgrades loaded with liquid Neon is also discussed.

**Primary author:** GIULIANI, Franco

**Presenter:** GIULIANI, Franco

**Session Classification:** DG4 - Dark Matter

Contribution ID: 65

Type: **not specified**

## Dark Matter Searches and Fundamental Neutrino Measurements with IceCube-DeepCore

*Wednesday, September 16, 2009 5:55 PM (25 minutes)*

IceCube is a cubic kilometer neutrino telescope under construction at the South Pole, a successor to the first-generation AMANDA telescope designed to the search for astrophysical neutrino sources. IceCube is now three quarters complete with the full detector expected to be operating in early 2011. Data taken with the partially built detector already provides world-leading sensitivity on spin-dependent dark matter scattering cross-sections. The base design of IceCube now includes an infill array known as DeepCore, improving sensitivity to neutrinos at energies below 100 GeV. Plans for DeepCore, as well as estimates for the IceCube-DeepCore sensitivity to dark matter will be presented. Further, the possibility of studying atmospheric neutrino oscillations using will be discussed.

**Primary author:** GRANT, Darren

**Presenter:** GRANT, Darren

**Session Classification:** DG4 - Dark Matter

Contribution ID: 66

Type: **not specified**

## Searching for Double Beta Decay with the Enriched Xenon Observatory

The EXO collaboration aims to measure the regular double beta of  $^{136}\text{Xe}$  and carry out a sensitive search for neutrinoless double beta decay. Discovery of the neutrinoless decay would provide information on the neutrino mass scale and provide the first measurement of a lepton number violating process. The status of the EXO efforts will be provided including the latest update for the 200 kg liquid phase detector efforts and a summary of the gas-phase R&D.

**Primary author:** HAGEMANN, Christina

**Presenter:** HAGEMANN, Christina

**Track Classification:** Neutrino Physics

Contribution ID: 67

Type: **not specified**

## Neutrino cross sections in GeV region

*Wednesday, September 16, 2009 5:30 PM (30 minutes)*

Modern long-baseline neutrino experiments, aiming at precise measurements of the neutrino oscillation parameters require a thorough understanding of neutrino cross sections in medium-energy region. An overview of neutrino-nucleon and neutrino-nucleus cross sections in a few GeV region is presented. Cross section on a nucleon target is expressed as a sum of quasi-elastic, resonance and DIS contributions. For nuclear targets, nuclear corrections are shown to be not negligible, several approaches to estimate them are surveyed.

**Primary author:** LALAKULICH, Olga

**Presenter:** LALAKULICH, Olga

**Session Classification:** DG3 - Neutrino Physics

**Track Classification:** Neutrino Physics

Contribution ID: 70

Type: **not specified**

## Status of the MICE International Muon Ionisation Cooling Experiment

*Wednesday, September 16, 2009 4:10 PM (20 minutes)*

Muon ionization cooling provides the only practical solution to prepare high brilliance beams necessary for a neutrino factory or muon colliders. The muon ionization cooling experiment (MICE)\* is under development at the Rutherford Appleton Laboratory (UK). It comprises a dedicated beam line to generate a range of input emittance and momentum, with time-of-flight and Cherenkov detectors to ensure a pure muon beam. A first measurement of emittance is performed in the upstream magnetic spectrometer with a scintillating fiber tracker. A cooling cell will then follow, alternating energy loss in liquid hydrogen and RF acceleration. A second spectrometer identical to the first one and a particle identification system provide a measurement of the outgoing emittance.

In September 2009 it is expected that the beam and some detectors will be in the final commissioning phase and the time of the first measurement of input beam emittance only months away. The plan of steps of measurements of emittance and cooling, that will follow in the rest of 2009 and later, will be reported.

**Presenter:** PALLADINO, Vittorio

**Session Classification:** DG3 - Neutrino Physics

**Track Classification:** Neutrino Physics

Contribution ID: 71

Type: **not specified**

## R&D and Design work for novel neutrino beams in Europe

*Wednesday, September 16, 2009 3:50 PM (20 minutes)*

“R&D and Design Studies towards novel neutrino beams are advancing well in Europe. International R&D experiments (HARP, MERIT, MICE, EMMA) have been and are successfully being performed. Design studies of high power upgrades of existing (ISIS) or planned (SPL) proton machines, of detector concepts and sites (Laguna) and of high intensity beams (EUROnu) are in progress.

EUROnu aims, in particular, at the design of

- a Neutrino Factory, within its International Design Study
- a Betabeam neutrino facility
- a low energy 4 MW neutrino Superbeam

A dedicated workshop is being prepared for early October at CERN, likely to be followed by statements from the CERN Council on the role that Europe should play in a global accelerator neutrino program.”

**Presenter:** BLONDEL, Alain

**Session Classification:** DG3 - Neutrino Physics

**Track Classification:** Neutrino Physics



Contribution ID: 72

Type: **not specified**

## Non-Standard Higgs Decays

*Friday, September 18, 2009 9:50 AM (35 minutes)*

Theories of natural Electroweak Symmetry Breaking can involve light higgses. These imply significant changes in search strategies at the Tevatron, LHC, and B-factories. I will review some non-standard Higgs scenarios which involve higgs-to-higgs decays, and the experimental signatures thereof.

**Primary author:** MCEL RATH, Robert**Presenter:** MCEL RATH, Robert**Session Classification:** DG1 - Electro Weak Symmetry Breaking**Track Classification:** Electro Weak Symmetry Breaking

Contribution ID: 73

Type: **not specified**

## Status of the J-PARC E14 KOTO Experiment for the KL $\rightarrow$ $\pi^0 \nu \bar{\nu}$

*Friday, September 18, 2009 12:00 PM (30 minutes)*

The purpose of the J-PARC E14 KOTO experiment is to search for new physics beyond the standard model

that enhances the branching ratio of the  $(K_L \rightarrow \pi^0 \nu \bar{\nu})$  decay.

The experiment looks for two and only two photons from the decay that have a finite transverse momentum.

The detector consists of a pure CsI calorimeter and hermetic photon veto counters placed in a vacuum tank.

The beamline has been constructed, and the beam will be tested starting this fall.

New CsI calorimeter will be installed next year, and rest of the detector will be installed in the following year.

The features and status of the experiment will be presented.

**Primary author:** YAMANAKA, Taku

**Presenter:** YAMANAKA, Taku

**Session Classification:** DG2 - Weak Decays, CP violation and CKM

Contribution ID: 74

Type: **not specified**

## Current Status of RENO

*Wednesday, September 16, 2009 9:00 AM (20 minutes)*

RENO(Reactor Experiment for Neutrino Oscillation), is under construction to measure the smallest neutrino mixing angle  $\theta_{13}$  using antineutrinos emitted from the Yonggwang power plant in Korea with world-second largest thermal power output of 16.4 GW.

A high precision measurement of reactor neutrino oscillation can be achieved by two identical detectors.

Each detector consists 16-ton Gadolinium loaded liquid scintillator as a neutrino target. The near and far detectors are placed roughly 290 m and 1.4 m from the center of the reactor array. The near detector is constructed at underground of a 70 m high hill and the far detector at underground of a 260 m high mountain.

The identical detector setup will reduce systematic uncertainties to less than 1%.

The experiment is planned to start data-taking in mid 2010.

In this talk the current status of detector construction will be presented.

**Primary author:** PARK, Kang Soon

**Presenter:** PARK, Kang Soon

**Session Classification:** DG3 - Neutrino Physics

**Track Classification:** Neutrino Physics

Contribution ID: 75

Type: **not specified**

## DAMA/LIBRA and leptonically interacting Dark Matter

*Thursday, September 17, 2009 9:00 AM (25 minutes)*

We consider the hypothesis that Dark Matter (DM) has tree-level interactions only with leptons. Such a framework, where DM recoils against electrons bound in atoms, has been proposed as an explanation for the annually modulated scintillation signal in DAMA/LIBRA versus the absence of a signal for nuclear recoils in experiments like CDMS or XENON10. However, even in such a leptophilic DM scenario there are loop induced DM-hadron interactions, where the photons emitted from virtual leptons couple to the charge of a nucleus. Using a general effective field theory approach we show that, if such an interaction is induced at one or two-loop level, then DM-nucleus scattering dominates over DM-electron scattering. This is because the latter is suppressed by the bound state wave function. One obtains a situation similar to standard DM-nucleus scattering analyses with considerable tension between the results of DAMA and CDMS/XENON10. This conclusion does not apply in the case of pseudoscalar or axial vector coupling between DM and leptons, where the loop diagrams vanish. In this case the explanation of the DAMA signal in terms of DM-electron scattering is strongly disfavored by the spectral shape of the signal. Furthermore, if DM can annihilate into neutrinos or tau leptons, the required cross sections are excluded by many orders of magnitude using the Super-Kamiokande bound on neutrinos from DM annihilations in the Sun.

**Primary author:** ZUPAN, Jure

**Presenter:** ZUPAN, Jure

**Session Classification:** DG4 - Dark Matter

Contribution ID: 76

Type: **not specified**

## Direct Standard Model Higgs Searches at the Tevatron

*Wednesday, September 16, 2009 9:00 AM (35 minutes)*

Since the beginning of Run II the Fermilab Tevatron has delivered 6.9 fb<sup>-1</sup> of proton-antiproton collisions at a center of mass energy of 1.96 TeV. Using the collected dataset the CDF and D0 experiments are pursuing extensive Physics programs which have as a main goal the search for a Standard Model Higgs boson. The contribution will review the CDF and D0 results on the direct Standard Model Higgs searches over a wide mass range, from 100 to 200 GeV/c<sup>2</sup>, including the golden channels, HW→lvbb in the lower mass region and H→WW→lvlv in the higher mass region, and a series of additional channels, ZH→llbb, ZH→vvbb, HW→WWW, and modes with tau leptons in the final state, which improve sensitively the experiments' reach. Particular prominence will be given to the recently updated measurements that analyze up to 5 fb<sup>-1</sup> of data. The combined upper limit of CDF and D0 measurements and the projections on the production cross section limits for the final dataset of Tevatron Run II will also be shown.

**Primary author:** CASARSA, Massimo

**Presenter:** CASARSA, Massimo

**Session Classification:** DG1 - Electro Weak Symmetry Breaking

**Track Classification:** Electro Weak Symmetry Breaking

Contribution ID: 77

Type: **not specified**

## The Double Chooz Experiment

*Wednesday, September 16, 2009 9:40 AM (20 minutes)*

The Double Chooz neutrino oscillation experiment will perform a highly sensitive measurement of the neutrino mixing angle  $\theta_{13}$ . The Double Chooz project will utilize two detectors, a near one providing the unoscillated neutrino flux coming from the two reactor cores of the Chooz nuclear plant (France), and a far detector measuring the neutrino flux after oscillation. The signal comparison between the two detectors will allow to push down the  $\theta_{13}$  limit at very low values. Double CHOOZ far detector under construction will start taking data beginning of next year and in about 1.5 years will be able to set the limit  $\sin^2(2\theta_{13}) < 0.06$ , the present limit being  $\sin^2(2\theta_{13}) < 0.2$ . At that moment, the near detector will also be ready and help to set this limit at  $\sin^2(2\theta_{13}) < 0.03$  in less than 3 years. The mixing angle  $\theta_{13}$  is the last non-measured oscillation parameter of the neutrino mixing matrix. The possibility of measuring the  $\sin^2(2\theta_{13})$  or lowering the existing limit to a few percent would also allow selection of the best means to search for the CP-phase in the lepton sector. In this presentation a detailed description of the Double Chooz experiment will be done.

**Primary author:** DRACOS, Marcos

**Presenter:** DRACOS, Marcos

**Session Classification:** DG3 - Neutrino Physics

**Track Classification:** Neutrino Physics

Contribution ID: 78

Type: **not specified**

## **Weak Decays, CP violation and CKM: Theoretical Status**

*Monday, September 14, 2009 11:00 AM (45 minutes)*

**Presenter:** ISIDORI, Gino

**Session Classification:** Plenary Session

Contribution ID: 79

Type: **not specified**

## **Weak Decays, CP violation and CKM: Experimental Status**

*Monday, September 14, 2009 11:45 AM (45 minutes)*

**Presenter:** GERSHON, Tim

**Session Classification:** Plenary Session



Contribution ID: **80**

Type: **not specified**

## **Dark Matter: Theoretical Status**

*Monday, September 14, 2009 5:30 PM (45 minutes)*

**Presenter:** WEINER, Neal

**Session Classification:** Plenary Session

Contribution ID: **82**

Type: **not specified**

## **Dark Matter: Experimental Status**

*Monday, September 14, 2009 6:15 PM (45 minutes)*

**Presenter:** SERFASS, Bruno

**Session Classification:** Plenary Session

Contribution ID: **83**

Type: **not specified**

## **Weak Decays, CP violation and CKM: Theoretical Summary**

*Friday, September 18, 2009 3:30 PM (45 minutes)*

**Presenter:** BUCHALLA, Gerhard

**Session Classification:** Plenary Session

Contribution ID: **84**

Type: **not specified**

## **Weak Decays, CP violation and CKM: Experimental Summary**

*Friday, September 18, 2009 4:15 PM (45 minutes)*

**Presenter:** SOZZI, Marco

**Session Classification:** Plenary Session

Contribution ID: 85

Type: **not specified**

## **Dark Matter: Theoretical Summary**

*Saturday, September 19, 2009 9:00 AM (45 minutes)*

**Presenter:** FALKOWSKI, Adam

**Session Classification:** Plenary Session

Contribution ID: **86**

Type: **not specified**

## **Dark Matter: Experimental Summary**

*Saturday, September 19, 2009 9:45 AM (45 minutes)*

**Presenter:** MCKINSEY, Daniel

**Session Classification:** Plenary Session

Contribution ID: 87

Type: **not specified**

## Search for Dark Matter with the CDMS experiment

*Wednesday, September 16, 2009 11:25 AM (25 minutes)*

The Cryogenic Dark Matter Search Experiment (CDMS) employs a total of 30 Germanium and Silicon Detectors at the Soudan Underground Laboratory to detect weakly interacting massive particles (WIMPs) via their elastic scattering from the target nuclei. Previous CDMS results, released in February 2008, yielded a world-leading limit for spin-independent WIMP-nucleon cross sections for WIMP masses above  $44 \text{ GeV}/c^2$ , restricting significant parts of the parameter space favored by supersymmetric models. Data taken between July 2007 and October 2008 increase the exposure by a factor of 2.5. Latest results of the experiment will be presented.

**Primary author:** ARRENERG, Sebastian

**Presenter:** ARRENERG, Sebastian

**Session Classification:** DG4 - Dark Matter

Contribution ID: **88**Type: **not specified**

## The ZEPLIN-III Dark Matter Search

The results from the first science run of ZEPLIN-III will be presented which have resulted in an upper limit to the WIMP-nucleon spin-independent elastic scattering cross-section of  $8.1 \times 10^{-8}$  pb. The instrument performance characteristics and behaviour will be reviewed. The status of preparations for the second science run will be given

**Primary author:** EDWARDS, Blair

**Co-author:** COLLABORATION, ZEPLIN-III (Imperial/RAL/Edinburgh/ITEP/LIP)

**Presenter:** EDWARDS, Blair



Contribution ID: **89**

Type: **not specified**

## Measurements of alpha

*Tuesday, September 15, 2009 11:30 AM (30 minutes)*

**Presenter:** VASSEUR, Georges

**Session Classification:** DG2 - Weak Decays, CP violation and CKM

**Track Classification:** Weak Decays, CP violation and CKM

Contribution ID: **90**

Type: **not specified**

## Measurements of beta

*Tuesday, September 15, 2009 12:00 PM (30 minutes)*

**Presenter:** CHENG, Chih-Hsiang

**Session Classification:** DG2 - Weak Decays, CP violation and CKM

**Track Classification:** Weak Decays, CP violation and CKM

Contribution ID: **91**

Type: **not specified**

## **Lattice results - overview and perspectives**

*Wednesday, September 16, 2009 9:00 AM (30 minutes)*

**Presenter:** BECIREVIC, Damir

**Session Classification:** DG2 - Weak Decays, CP violation and CKM

**Track Classification:** Weak Decays, CP violation and CKM

Contribution ID: 92

Type: **not specified**

## Chiral perturbation theory

*Wednesday, September 16, 2009 9:30 AM (30 minutes)*

**Presenter:** ECKER, Gerhard

**Session Classification:** DG2 - Weak Decays, CP violation and CKM

**Track Classification:** Weak Decays, CP violation and CKM

Contribution ID: 93

Type: **not specified**

## **Rare K decays - theory**

*Wednesday, September 16, 2009 10:00 AM (30 minutes)*

**Presenter:** D'AMBROSIO, Giancarlo

**Session Classification:** DG2 - Weak Decays, CP violation and CKM

**Track Classification:** Weak Decays, CP violation and CKM

Contribution ID: **94**

Type: **not specified**

## **New physics models**

*Wednesday, September 16, 2009 11:00 AM (40 minutes)*

**Presenter:** DULING, Bjoren

**Session Classification:** DG2 - Weak Decays, CP violation and CKM

**Track Classification:** Weak Decays, CP violation and CKM

Contribution ID: 95

Type: **not specified**

## Annual Modulation Effects Observable in a Noble Liquid Detector.

*Thursday, September 17, 2009 12:15 PM (15 minutes)*

The use of liquid noble gas detectors in the search for Dark Matter is quickly becoming more widespread and they are already playing one of the major parts in the field. One of the possible signatures of the presence of Dark Matter is the so called annual modulation effect, possibly already observed by the DAMA collaboration. The liquid noble gas detectors are generally tailored to observe single WIMP interactions. Despite this, it might be interesting to investigate whether the annual modulation effect will be observable in these detectors. Another effect that is interesting is the possible influence of the Sagittarius Stream on these observations. The prospects for observing the annual modulation effect and those of the Sagittarius Stream in liquid noble gas detectors will be discussed, as well as some speculations as to what kind information can be gained by these observations.

**Primary author:** SZELC, Andrzej

**Presenter:** SZELC, Andrzej

**Session Classification:** DG4 - Dark Matter

Contribution ID: 97

Type: **not specified**

## **Cabibbo angle review**

*Tuesday, September 15, 2009 4:00 PM (30 minutes)*

**Presenter:** MOULSON, Matthew

**Session Classification:** DG2 - Weak Decays, CP violation and CKM

**Track Classification:** Weak Decays, CP violation and CKM



Contribution ID: 99

Type: **not specified**

## Top measurements at hadronic machines

*Tuesday, September 15, 2009 5:30 PM (30 minutes)*

**Presenter:** LEONE, Sandra

**Session Classification:** DG2 - Weak Decays, CP violation and CKM

**Track Classification:** Weak Decays, CP violation and CKM

Contribution ID: **100**

Type: **not specified**

## **D0 mixing measurements**

*Tuesday, September 15, 2009 6:00 PM (30 minutes)*

**Presenter:** ZUPANC, Anze

**Session Classification:** DG2 - Weak Decays, CP violation and CKM

**Track Classification:** Weak Decays, CP violation and CKM

Contribution ID: **101**

Type: **not specified**

## **Non-LFV tau decays**

*Tuesday, September 15, 2009 6:30 PM (30 minutes)*

**Presenter:** LEE, MyeongJae

**Session Classification:** DG2 - Weak Decays, CP violation and CKM

**Track Classification:** Weak Decays, CP violation and CKM

Contribution ID: **102**

Type: **not specified**

## **Radiative B decays**

*Wednesday, September 16, 2009 3:30 PM (30 minutes)*

**Presenter:** LIMOSANI, Antonio

**Session Classification:** DG2 - Weak Decays, CP violation and CKM

**Track Classification:** Weak Decays, CP violation and CKM

Contribution ID: **103**

Type: **not specified**

## **Leptonic B decays**

*Wednesday, September 16, 2009 4:00 PM (30 minutes)*

**Presenter:** NELSON, Silke

**Session Classification:** DG2 - Weak Decays, CP violation and CKM

**Track Classification:** Weak Decays, CP violation and CKM

Contribution ID: **104**

Type: **not specified**

## **Rare K decays**

*Wednesday, September 16, 2009 5:30 PM (30 minutes)*

**Presenter:** WANKE, Rainer

**Session Classification:** DG2 - Weak Decays, CP violation and CKM

**Track Classification:** Weak Decays, CP violation and CKM

Contribution ID: **105**

Type: **not specified**

## **QCD from K decays**

*Wednesday, September 16, 2009 6:00 PM (30 minutes)*

**Presenter:** PICCINI, Mauro

**Session Classification:** DG2 - Weak Decays, CP violation and CKM

**Track Classification:** Weak Decays, CP violation and CKM

Contribution ID: **106**

Type: **not specified**

## **LFV & EDM**

*Thursday, September 17, 2009 9:00 AM (40 minutes)*

**Presenter:** IBARRA, Alejandro

**Session Classification:** DG2 - Weak Decays, CP violation and CKM

**Track Classification:** Weak Decays, CP violation and CKM



Contribution ID: **107**

Type: **not specified**

## **MEG experiment**

*Thursday, September 17, 2009 9:40 AM (30 minutes)*

**Presenter:** BALDINI, Alessandro

**Session Classification:** DG2 - Weak Decays, CP violation and CKM

**Track Classification:** Weak Decays, CP violation and CKM

Contribution ID: **108**

Type: **not specified**

## **LFV in tau decays**

*Thursday, September 17, 2009 11:00 AM (30 minutes)*

**Presenter:** CENCI, Riccardo

**Session Classification:** DG2 - Weak Decays, CP violation and CKM

**Track Classification:** Weak Decays, CP violation and CKM

Contribution ID: **109**

Type: **not specified**

## **EDM review**

*Thursday, September 17, 2009 11:30 AM (30 minutes)*

**Presenter:** FIERLINGER, Peter

**Session Classification:** DG2 - Weak Decays, CP violation and CKM

**Track Classification:** Weak Decays, CP violation and CKM

Contribution ID: **110**

Type: **not specified**

## **M2E experiment**

**Track Classification:** Weak Decays, CP violation and CKM

Contribution ID: 111

Type: **not specified**

## Flavour physics at LHC

*Friday, September 18, 2009 9:00 AM (30 minutes)*

**Presenter:** PANMAN, Jaap

**Session Classification:** DG2 - Weak Decays, CP violation and CKM

**Track Classification:** Weak Decays, CP violation and CKM

Contribution ID: **112**

Type: **not specified**

## **Super-B in Italy**

*Friday, September 18, 2009 9:30 AM (30 minutes)*

**Presenter:** GIORGI, Marcello

**Session Classification:** DG2 - Weak Decays, CP violation and CKM

**Track Classification:** Weak Decays, CP violation and CKM

Contribution ID: **113**

Type: **not specified**

## **Super-B in Japan**

*Friday, September 18, 2009 10:00 AM (30 minutes)*

**Presenter:** YAMAUCHI, Masanori

**Session Classification:** DG2 - Weak Decays, CP violation and CKM

**Track Classification:** Weak Decays, CP violation and CKM

Contribution ID: **114**

Type: **not specified**

## **NA62 at CERN**

*Friday, September 18, 2009 11:30 AM (30 minutes)*

**Presenter:** CECCUCCI, Augusto

**Session Classification:** DG2 - Weak Decays, CP violation and CKM

**Track Classification:** Weak Decays, CP violation and CKM



Contribution ID: **116**

Type: **not specified**

## **Future Direct Dark Matter Searches: An Outlook**

*Tuesday, September 15, 2009 10:00 AM (30 minutes)*

**Presenter:** GALBIATI, Cristiano

**Session Classification:** Plenary Session

Contribution ID: 117

Type: **not specified**

## **Review of Current and Future Neutrino Cross-Section Experiments**

*Tuesday, September 15, 2009 9:30 AM (30 minutes)*

**Presenter:** SCHMITZ, David

**Session Classification:** Plenary Session

Contribution ID: **118**

Type: **not specified**

## **Muon Collider**

*Tuesday, September 15, 2009 9:00 AM (30 minutes)*

**Presenter:** ODDONE, Pier

**Session Classification:** Plenary Session

Contribution ID: 119

Type: **not specified**

## The ArDM experiment, a double phase liquid argon TPC for direct detection of Dark Matter

*Thursday, September 17, 2009 11:00 AM (25 minutes)*

The goal of the ArDM experiment is a direct detection of weakly interacting massive particles (WIMP) in the universe using a double phase argon TPC. This detector has a fiducial volume of about 1 ton of liquid argon and the detection is done independently by collecting the scintillation light as also by the ionization charge. The Argon scintillation light has to be converted with wave-length

shifters and collected by PMT, instead the electrons produced by ionization are extracted from the liquid into the gas phase of the detector, amplified and read out with Large Electron Multipliers detectors.

The talk will give an overview of the design of the detector, and of the R&D of the different components, and it will describe the first light readout test with liquid argon with different gamma and neutron sources.

**Primary author:** LAZZARO, Claudia

**Presenter:** LAZZARO, Claudia

**Session Classification:** DG4 - Dark Matter

Contribution ID: 120

Type: **not specified**

## **Future long baseline experiments: options for Europe**

*Wednesday, September 16, 2009 11:40 AM (20 minutes)*

The LAGUNA design study is presently assessing the feasibility of a new large underground infrastructure in Europe for next generation neutrino and proton decay search experiment I will describe the status of LAGUNA and discuss possible options for future long baseline experiments coupled to a potential future program at CERN.

**Primary author:** RUBBIA, Andre

**Presenter:** RUBBIA, Andre

**Session Classification:** DG3 - Neutrino Physics

**Track Classification:** Neutrino Physics

Contribution ID: 121

Type: **not specified**

## Future long baseline experiments: options for Japan

*Wednesday, September 16, 2009 11:20 AM (20 minutes)*

As the first phase experiment utilizes J-PARC(Japan Proton Accelerator Research Complex) neutrino facility, T2K(Tokai to Kamioka Long Baseline Neutrino Experiment) starts operation. T2K is supposed to give critical information, which guides the future direction of the neutrino physics. I will discuss possible future discovery experiment next to T2K. Talk will focus especially on describing J-PARC neutrino beam upgrade plan and discussion on far detector options to maximize potential of the research.

**Primary author:** HASEGAWA, Takuya

**Presenter:** HASEGAWA, Takuya

**Session Classification:** DG3 - Neutrino Physics

**Track Classification:** Neutrino Physics

Contribution ID: 122

Type: **not specified**

## **Electroweak physics and proton structure measurements at HERA**

*Tuesday, September 15, 2009 11:00 AM (25 minutes)*

**Presenter:** NIKIFOROV, Andrei

**Session Classification:** DG1 - Electro Weak Symmetry Breaking

Contribution ID: 123

Type: **not specified**

## **Prospects for Z/W Physics at the LHC**

*Tuesday, September 15, 2009 11:25 AM (25 minutes)*

**Presenter:** BONA, Marcella

**Session Classification:** DG1 - Electro Weak Symmetry Breaking

**Track Classification:** Electro Weak Symmetry Breaking



Contribution ID: 124

Type: **not specified**

## **Minimal $Z'$ models : present bounds and early LHC Reach**

*Tuesday, September 15, 2009 11:50 AM (25 minutes)*

**Presenter:** SALVIONI, Ennio

**Session Classification:** DG1 - Electro Weak Symmetry Breaking

Contribution ID: 125

Type: **not specified**

## **Top Experimental Prospects at start-up LHC**

*Tuesday, September 15, 2009 3:30 PM (25 minutes)*

**Presenter:** MEHLHASE, Sascha

**Session Classification:** DG1 - Electro Weak Symmetry Breaking

**Track Classification:** Electro Weak Symmetry Breaking

Contribution ID: 126

Type: **not specified**

## **Boosted Top at the LHC**

*Tuesday, September 15, 2009 3:55 PM (25 minutes)*

**Presenter:** LEE, Seung

**Session Classification:** DG1 - Electro Weak Symmetry Breaking

Contribution ID: 127

Type: **not specified**

## Top Quark Physics at the LHC (Theory)

*Tuesday, September 15, 2009 4:20 PM (35 minutes)*

**Presenter:** PEREZ, Gilad

**Session Classification:** DG1 - Electro Weak Symmetry Breaking

**Track Classification:** Electro Weak Symmetry Breaking

Contribution ID: 128

Type: **not specified**

## Prospects for SM Higgs at the LHC

*Wednesday, September 16, 2009 9:35 AM (25 minutes)*

**Presenter:** GRAZIANO, Alberto

**Session Classification:** DG1 - Electro Weak Symmetry Breaking

**Track Classification:** Electro Weak Symmetry Breaking

Contribution ID: **129**

Type: **not specified**

## **QCD effects in Higgs production (Theory)**

**Presenter:** GRAZZINI, Massimiliano

**Track Classification:** Electro Weak Symmetry Breaking

Contribution ID: **130**

Type: **not specified**

## **Prospects for BSM Higgs at the LHC**

*Friday, September 18, 2009 9:00 AM (25 minutes)*

**Presenter:** SCHUMACHER, Jan

**Session Classification:** DG1 - Electro Weak Symmetry Breaking

Contribution ID: **131**

Type: **not specified**

## **SUSY Searches at the LHC**

*Friday, September 18, 2009 9:25 AM (25 minutes)*

**Presenter:** URQUIJO, Phillip

**Session Classification:** DG1 - Electro Weak Symmetry Breaking



Contribution ID: 133

Type: **not specified**

## Exotica Searches at the LHC

Contribution ID: 134

Type: **not specified**

## Higgsless models (Theory)

*Friday, September 18, 2009 11:25 AM (25 minutes)*

**Presenter:** ISIDORI, Gino

**Session Classification:** DG1 - Electro Weak Symmetry Breaking

Contribution ID: 135

Type: **not specified**

## Searches for New Physics at HERA

*Friday, September 18, 2009 11:50 AM (25 minutes)*

**Presenter:** CIESIELSKI, Robert

**Session Classification:** DG1 - Electro Weak Symmetry Breaking

**Track Classification:** Electro Weak Symmetry Breaking

Contribution ID: 136

Type: **not specified**

## The High Energy Cosmic Ray Electron Spectrum measured with the Fermi Space Telescope: some possible interpretations

*Wednesday, September 16, 2009 3:30 PM (25 minutes)*

The Fermi Large Area Telescope (LAT) has recently provided the measurement of the high energy (20 GeV to 1 TeV) cosmic ray electrons plus positrons (CRE) spectrum with unprecedented accuracy. The spectrum shows no prominent features and it is significantly harder than that inferred from several previous experiments. While the reported Fermi-LAT data alone can be interpreted in terms of a single (electron dominated) Galactic component, when combined with other complementary experimental results, specifically the CRE spectrum measured by H.E.S.S., and especially the positron fraction measured by PAMELA, an additional electron and positron component has to be invoked. We will show that electron-positron pairs acceleration in Galactic pulsars offer a natural interpretation of all these results and briefly mention other viable scenarios including secondary electron and positron production in supernova remnants and dark matter annihilation/decay. We also briefly discuss the possibility of discriminating among those interpretations by means of other independent measurements.

**Primary author:** GRASSO, Dario

**Presenter:** GRASSO, Dario

**Session Classification:** DG1 + DG4 - Combined Session

Contribution ID: 137

Type: **not specified**

## Depleted Argon for Future Direct Dark Matter Searches with Argon

*Thursday, September 17, 2009 11:50 AM (25 minutes)*

I will discuss progress on procurement of large quantities of depleted argon from underground sources in the US, and the how this could improve future dark matter searches with argon detector. I will also discuss results from R&D efforts on two-phase argon detectors in the US and future plans.

**Primary author:** GALBIATI, Cristiano

**Presenter:** GALBIATI, Cristiano

**Session Classification:** DG4 - Dark Matter

Contribution ID: **139**

Type: **not specified**

# CRESST

Contribution ID: 140

Type: **not specified**

## **Dark Matter and Antimatter Searches in the Cosmic Radiation and the PAMELA experiment**

*Wednesday, September 16, 2009 3:55 PM (25 minutes)*

**Presenter:** PAPINI, Paolo

**Session Classification:** DG1 + DG4 - Combined Session

Contribution ID: **141**

Type: **not specified**

## **GeV scale hidden sector at colliders**

*Wednesday, September 16, 2009 4:20 PM (25 minutes)*

**Presenter:** REECE, Matthew

**Session Classification:** DG1 + DG4 - Combined Session



Contribution ID: **142**

Type: **not specified**

## **Mirror Dark Matter**

*Wednesday, September 16, 2009 6:20 PM (25 minutes)*

**Presenter:** BEREZHIANI, Zurab

**Session Classification:** DG4 - Dark Matter

Contribution ID: 143

Type: **not specified**

## The WArP Experiment

*Thursday, September 17, 2009 9:50 AM (25 minutes)*

**Presenter:** SEGRETO, Ettore

**Session Classification:** DG4 - Dark Matter

Contribution ID: 145

Type: **not specified**

## COUPP

**Presenter:** SONNENSCHNEIN, Andrew

**Track Classification:** Dark Matter

Contribution ID: **146**

Type: **not specified**

## **DRIFT - TBC**

Contribution ID: 147

Type: **not specified**

## Signals from the Universe: the DAMA/LIBRA results

*Wednesday, September 16, 2009 11:00 AM (25 minutes)*

The highly radiopure about 250 kg NaI(Tl) DAMA/LIBRA set-up is running at the Gran Sasso National Laboratory of the I.N.F.N.. Results exploiting the model independent annual modulation signature for Dark Matter particles in the galactic halo are presented (exposure of 0.53 ton x yr). The DAMA/LIBRA data confirm the evidence for the presence of Dark Matter particles in the galactic halo as observed by the former DAMA/NaI experiment. The combined analysis of the data of the two experiments (total exposure 0.82 ton x yr) gives a C.L. at 8.2 sigma.

**Primary author:** BELLI, Pierluigi

**Co-author:** DAMA, Collaboration (-)

**Presenter:** BELLI, Pierluigi

**Session Classification:** DG4 - Dark Matter

Contribution ID: **148**

Type: **not specified**

## Welcome

*Monday, September 14, 2009 8:45 AM (5 minutes)*

**Presenter:** PALAMARA, Ornella (WIN09 Chair)

**Session Classification:** Welcome - O. Palamara, L. Votano, P. Oddone, H. Pietschmann

Contribution ID: **149**

Type: **not specified**

# Welcome

**Presenter:** VOTANO, Lucia (LNGS Director)

Contribution ID: **150**

Type: **not specified**

# Welcome

**Presenter:** ODDONE, Pier (Fermilab Director)



Contribution ID: **152**

Type: **not specified**

## **Geo-Neutrinos**

*Friday, September 18, 2009 9:20 AM (30 minutes)*

**Presenter:** FIORENTINI, Giovanni

**Session Classification:** DG3 - Neutrino Physics

Contribution ID: 153

Type: **not specified**

## **SK status and perspectives (low-energy neutrinos)**

*Friday, September 18, 2009 9:50 AM (20 minutes)*

**Presenter:** TAKEUCHI, Yasuo

**Session Classification:** DG3 - Neutrino Physics

**Track Classification:** Neutrino Physics

Contribution ID: 154

Type: **not specified**

## **High energy neutrino astronomy: towards a km<sup>3</sup> neutrino telescope in the Mediterranean Sea**

*Friday, September 18, 2009 11:20 AM (30 minutes)*

**Presenter:** MIGNECO, Emilio

**Session Classification:** DG3 - Neutrino Physics

Contribution ID: 157

Type: **not specified**

## **Direct neutrino Mass Measurements**

*Thursday, September 17, 2009 11:00 AM (30 minutes)*

**Presenter:** SISTI, Monica

**Session Classification:** DG3 - Neutrino Physics

Contribution ID: **158**

Type: **not specified**

## **SNO & SNO+**

*Thursday, September 17, 2009 11:30 AM (30 minutes)*

**Presenter:** BILLER, Steven

**Session Classification:** DG3 - Neutrino Physics

Contribution ID: 159

Type: **not specified**

## Theory Predictions for Neutrino Masses and Mixing Angles

*Tuesday, September 15, 2009 11:00 AM (30 minutes)*

I will review recent developments in theoretical models for neutrino masses and mixing. Emphases are given to models based on finite group family symmetries in which Tri-bimaximal neutrino mixing pattern is generated. In particular, I will describe one recent model based on grand unification, in which both the Tri-bimaximal neutrino mixing and realistic CKM matrix are generated. The prediction for  $\theta_{13}$  is given in terms of the Cabibbo angle and it is within the reach of Daya Bay experiment. CP violation in this model is purely geometrical in origin. Since the only non-vanishing leptonic CP phase is the Dirac phase, the model predicts a connection between the leptogenesis and CP violation in neutrino oscillation.

**Primary author:** CHEN, Mu-Chun

**Presenter:** CHEN, Mu-Chun

**Session Classification:** DG3 - Neutrino Physics

**Track Classification:** Neutrino Physics

Contribution ID: **160**Type: **not specified**

## The LUX Dark Matter Experiment

*Thursday, September 17, 2009 11:25 AM (25 minutes)*

The LUX dark matter experiment is a 350 kg two-phase xenon time projection chamber. There are several advantages of liquid xenon for WIMP detection: high scintillation yield, high ionization yield, low intrinsic radioactivity, easy purification, effective gamma-ray self-shielding, and significant  $A^2$  enhancement of the spin-independent WIMP cross-section. LUX is currently under construction and will be installed in Fall 2009 at the SUSEL lab in South Dakota. I will review the design features of LUX, give an update on its current status, and describe our conception of the future LUX-ZEPLIN dark matter program.

**Primary author:** MCKINSEY, Daniel**Presenter:** MCKINSEY, Daniel**Session Classification:** DG4 - Dark Matter**Track Classification:** Dark Matter

Contribution ID: **161**

Type: **not specified**

## **SK status and perspectives (atmospheric neutrinos)**

*Friday, September 18, 2009 10:10 AM (20 minutes)*

**Presenter:** DUFOUR, Fanny

**Session Classification:** DG3 - Neutrino Physics



Contribution ID: **162**Type: **not specified**

## Testing neutrino mass models at LHC

*Tuesday, September 15, 2009 11:30 AM (30 minutes)*

Majorana neutrino masses can be generated in a variety of ways. They could be due to some variant of the seesaw mechanism or be generated radiatively. Also within supersymmetric models neutrino masses can be non-zero if R-parity is broken. This talk discusses different signals of various neutrino mass models one can expect for the LHC experiments.

**Primary author:** HIRSCH, Martin

**Presenter:** HIRSCH, Martin

**Session Classification:** DG3 - Neutrino Physics

**Track Classification:** Neutrino Physics

Contribution ID: **163**

Type: **not specified**

## **Kamland: double beta decay perspectives**

*Thursday, September 17, 2009 12:00 PM (15 minutes)*

**Presenter:** SHIMIZU, Itaru

**Session Classification:** DG3 - Neutrino Physics

Contribution ID: **165**

Type: **not specified**

## **Future long baseline experiments: options for US**

*Wednesday, September 16, 2009 12:00 PM (20 minutes)*

**Presenter:** SODERBERG, Mitchell

**Session Classification:** DG3 - Neutrino Physics

Contribution ID: **167**

Type: **not specified**

## **T2K Cross Section Measurements**

*Wednesday, September 16, 2009 6:40 PM (20 minutes)*

**Presenter:** BOYD, Steve

**Session Classification:** DG3 - Neutrino Physics

Contribution ID: **168**

Type: **not specified**

# Neutrino Physics: Experimental Summary I

*Friday, September 18, 2009 6:00 PM (30 minutes)*

**Presenter:** FLEMING, Bonnie

**Session Classification:** Plenary Session

Contribution ID: **169**

Type: **not specified**

## **WIN11 Announcement**

*Saturday, September 19, 2009 10:30 AM (10 minutes)*

**Presenter:** PIETSCHMANN, Herbert

Contribution ID: 171

Type: **not specified**

## **End of Workshop**

*Saturday, September 19, 2009 10:40 AM (10 minutes)*

**Presenter:** PALAMARA, Ornella

Contribution ID: 172

Type: **not specified**

## The NOvA Experiment: Status and Prospects

*Wednesday, September 16, 2009 11:00 AM (20 minutes)*

NOvA is a next generation long baseline neutrino experiment. It has been designed to study electron neutrino appearance in a muon neutrino beam using a totally active, segmented, liquid scintillator detector located off the Fermilab NuMI beam axis. Construction of a prototype Near detector will commence this year and will be placed in the existing NuMI beam during 2010. The Far Detector will begin construction shortly thereafter and will be completed in 2014. The project will upgrade the NuMI facility from 400 kW to 700 kW. NOvA will push the search for electron neutrino appearance beyond the current limits by more than an order of magnitude. It will also have sensitivity to the neutrino mass hierarchy and by running both neutrinos and anti-neutrinos NOvA will begin the search for CP violation in the lepton sector.

**Primary author:** SANCHEZ, Mayly (Argonne National Laboratory)

**Presenter:** SANCHEZ, Mayly (Argonne National Laboratory)

**Session Classification:** DG3 - Neutrino Physics

**Track Classification:** Neutrino Physics



Contribution ID: 173

Type: **not specified**

## CUORE: the near future of neutrinoless double beta decay searches

*Thursday, September 17, 2009 9:00 AM (25 minutes)*

Neutrinoless double beta decay is a powerful tool to investigate the fundamental nature of neutrinos and to determine the absolute neutrino mass scale. To date, CUORE is the only fully approved next generation 1-ton size experiment with the goal of exploring the inverted hierarchy region for the neutrino masses.

CUORE is an array of 988 TeO<sub>2</sub> cryogenic detectors containing 200 kg of Te-130 - the neutrinoless double beta decay candidate - and it is presently being built in Gran Sasso Underground Laboratory. Data taking is due to start in 2012. The feasibility of the project has been proved by CUORICINO, the pilot experiment that took data until 2008, for about five years, with 62 TeO<sub>2</sub> cryogenic detectors in Gran Sasso Laboratory. CUORICINO will be replaced in 2010 by CUORE-0, the first CUORE tower to be installed in the CUORICINO cryogenic facility. CUORE-0 will take data until CUORE start. In this talk I will report on the final results of CUORICINO, and discuss CUORE-0 and CUORE potential and state of the art.

**Primary author:** NUCCIOTTI, Angelo (Dip. Fisica, Univ. di Milano-Bicocca and INFN Sez. di Milano-Bicocca)

**Presenter:** NUCCIOTTI, Angelo (Dip. Fisica, Univ. di Milano-Bicocca and INFN Sez. di Milano-Bicocca)

**Session Classification:** DG3 - Neutrino Physics

**Track Classification:** Neutrino Physics

Contribution ID: 175

Type: **not specified**

## **Characterization of a Nd-loaded organic liquid scintillator for neutrinoless double beta decay search of $^{150}\text{Nd}$ with a 10-ton scale detector**

*Thursday, September 17, 2009 12:15 PM (15 minutes)*

**Presenter:** IANNI, Aldo

**Session Classification:** DG3 - Neutrino Physics