22nd International Workshop on Weak Interactions and Neutrinos

Monday, 14 September 2009 - Saturday, 19 September 2009

Strada Passo dell'Acqua, 34 - 06134 Bosco PERUGIA, Italy

Book of Abstracts

Contents

DG3 - Neutrino Physics / 3

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

Author: Claudia Christina Strabel[None]

Corresponding Author: claudia.strabel@cern.ch

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.

DG3 - Neutrino Physics / 4

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

Author: Yasuhiro Nakajima[None]

Corresponding Author: nakajima@scphys.kyoto-u.ac.jp

Neutrino oscillation is a probe for new physics not included in the Standard Model.
We search for muon neutrino disappearance at \Delta m^2 ~ 1 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.

DG3 - Neutrino Physics / 6

The GERDA experiment

Author: Luciano Pandola[None]

Corresponding Author: luciano.pandola@lngs.infn.it

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.

Plenary Session / **10**

Electro Weak Symmetry Breaking: Theoretical Summary

Corresponding Author: adam.falkowski@cern.ch

DG1 - Summary and Perspectives

Plenary Session / **11**

Electro Weak Symmetry Breaking: Experimental Summary

Corresponding Author: yves.sirois@cern.ch

DG1 - Summary and perspectives

Plenary Session / **14**

Neutrino Physics: Theoretical Summary

Corresponding Author: nunokawa@fis.puc-rio.br

DG3 - Summary and perspectives

Plenary Session / **15**

Neutrino Physics: Experimental Summary II

Corresponding Author: oliviero.cremonesi@mib.infn.it

DG3 - Summary and perspectives

DG3 - Neutrino Physics / **18**

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

Author: Terrence Hart[None]

Corresponding Author: tlh@fnal.gov

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.

DG3 - Neutrino Physics / **19**

Status of the OPERA experiment

Author: Akitaka Ariga[None]

Corresponding Author: akitaka.ariga@lhep.unibe.ch

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-thinkness 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.

DG3 - Neutrino Physics / **20**

First Results for Electron-Neutrino Appearance in MINOS

Author: Mayly Sanchez[None]

Corresponding Author: mayly.sanchez@anl.gov

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.

DG3 - Neutrino Physics / **21**

Resolving CP Violation by Standard and Nonstandard Interactions in Neutrino Oscillations

Author: Shoichi Uchinami[None]

Co-authors: Alberto Gago [1]; Hiroshi Nunokawa [2]; Hisakazu Minakata [3]; Renata Zukanovich Funchal [4]

[1] *Pontificia Universidad Catolica del Peru*

[2] *Universidade Catolica do Rio de Janeiro*

[3] *Tokyo Metropolitan University*

[4] *Universidade de S˜ao Paulo*

Corresponding Author: uchinami@phys.metro-u.ac.jp

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, ¥$varepsilon_{e¥mu}$ or ¥$varepsilon_{e¥tau}$, is present.
They include synergy between the near and the far detectors, the characteristic differences between the ¥$varepsilon_{e¥mu}$ and ¥$varepsilon_{e¥tau}$ 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 $4¥times10^{21}$ useful muon decay for both polarities that one can identify non-standard CP violation down to ¥$vert¥varepsilon_{e¥mu}¥vert¥simeq¥textafew¥times10^{-3}$, % ¥$vert¥varepsilon_{e¥mu}¥vert¥simeq¥textseveral¥times10^{-4}$, and ¥$vert¥varepsilon_{e¥tau}¥vert¥simeq10^{-2}$ at 3¥$sigma$ CL for ¥$theta_{13}$ down to ¥$sin^22¥theta_{13} = 10^{-4}$ 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.

Plenary Session / **25**

Electro Weak Symmetry Breaking: Theoretical Status

Corresponding Author: barbierr@cibs.sns.it

Plenary Session / **26**

Electro Weak Symmetry Breaking: Experimental Status

Corresponding Author: roberto.tenchini@cern.ch

Plenary Session / **29**

Neutrino Physics: Experimental Status

Corresponding Author: art@snolab.ca

Plenary Session / **30**

Neutrino Physics: Theoretical Status

Corresponding Author: sandhya@hri.res.in

DG3 - Neutrino Physics / 33

Recent results from the neutrino scattering experiments

Author: Yoshinari Hayato[None]

Corresponding Author: hayato@icrr.u-tokyo.ac.jp

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.

DG3 - Neutrino Physics / 34

Latest Results from the MINOS Experiment

Author: Alexandre Sousa[None]

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 3.2x10^20 protons on target is used in the analyses.

35

Explaining B -> K pi anomaly with non universal Z' boson

Author: Anjan Giri[1]

[1] *National Institute of Technology, Rourkela, India*

Corresponding Author: anjan98@gmail.com

We study the effect of non-universal Z' boson in the decay modes B -> K pi. In the standard model these modes receive dominant contributions from b -> 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 $\Delta A_{CP}(K\pi) \simeq 2.5$

36

B_s - \bar B_s mixing and b -> s transitions in isosinglet down quark model

Author: Rukmani Mohanta[1]

[1] *University of Hyderabad*

Corresponding Author: rmsp@uohyd.ernet.in

The recent observation of the mass difference in B_s 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 -> s transitions, namely, B_s -> psi phi, B -> K pi and B -> phi K_s.

DG3 - Neutrino Physics / **37**

Collective Flavor Oscillations For Supernova Neutrinos and r-Process Nucleosynthesis

Author: Kamales Kar[None]

Co-authors: Sandhya Choubey [1]; Sovan Chakraborty [2]; Srubabati Goswami [3]

[1] *Harish-Chandra Research Institute, Allahabad, India*

[2] *Saha Institute of Nuclear Physics, Calcutta, India*

[3] *Physical Research Laboratory, Ahmedabad, India*

Corresponding Author: kamales.kar@saha.ac.in

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 Ye < 0.5, but a more favorable condition may be Ye < 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^2 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(Ye) 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.

Poster Session / **38**

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

Author: Teppei Baba[1]

[1] *Tokai university*

Corresponding Author: 7atrd014@keyaki.cc.u-tokai.ac.jp

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 θ_{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.

DG3 - Neutrino Physics / **39**

KamLAND Results

Author: Itaru Shimizu[None]

Corresponding Author: shimizu@awa.tohoku.ac.jp

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.

DG3 - Neutrino Physics / **41**

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

Author: Karol Lang[None]

Corresponding Author: lang@hep.utexas.edu

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: 48Ca, 96Zr, 82Se, 100Mo, 116Cd, 130Te and 150Nd. We observe no evidence for neutrinoless double beta decay and based on 100Mo 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 82Se 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.

DG3 - Neutrino Physics / **42**

Measurement of theta13 at Daya Bay

Author: Steve kettell[None]

Corresponding Author: kettell@bnl.gov

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.

DG3 - Neutrino Physics / **43**

The ANTARES detector: status and first results

Author: Annarita Margiotta[None]

Corresponding Author: margiotta@bo.infn.it

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.

DG3 - Neutrino Physics / 44

Results from MiniBooNE

Author: Georgia Karagiorgi[None]

Corresponding Author: georgiak@mit.edu

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 Δm^2 1 eV^2. These oscillation searches have been motivated by the 3.8σ 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.

DG2 - Weak Decays, CP violation and CKM / 45

CKM from semi-leptonic B decays

Corresponding Author: ricciardi@na.infn.it

DG2 - Weak Decays, CP violation and CKM / 48

Measurements of gamma

Corresponding Author: aushev@itep.ru

53

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

Author: Mitchell Soderberg[1]

[1] *Yale University*

Corresponding Author: mitchell.soderberg@yale.edu

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.

DG2 - Weak Decays, CP violation and CKM / 54

Final Results on K+ -> pi+ nu nu_bar from BNL E949

Author: Steve kettell[None]

Corresponding Author: kettell@bnl.gov

The extremely rare decay K+ -> pi+ neutrino anti-neutrino 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+ -> pi+pi0 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+ -> pi+pi0 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.

DG3 - Neutrino Physics / 55

Solar neutrino results from Borexino and future prospects

Author: Elena Guardincerri[None]

Corresponding Author: elena.guardincerri@ge.infn.it

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 7Be solar neutrinos flux, whose value is in agreement with the LMA-MSW scenario for neutrino oscillations, and the measurement of the 8B solar neutrino flux with an energy threshold of 2.8 MeV.
These results are reported here and the future prospects discussed.

DG3 - Neutrino Physics / 62

The magic of four zero neutrino Yukawa textures

Author: PROBIR ROY[None]

Co-authors: Ambar Ghosal [1]; Biswajit Adhikary [1]

[1] *Saha Institute of Nuclear Physics*

Corresponding Author: probirr@gmail.com

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 trbimaximal mixing on the maximally allowed four zero neutrino Yukawa textures which had already led to a predicitve 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 stabilty 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 ttwo 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.

DG3 - Neutrino Physics / **63**

T2K General talk(Status and T2K general description)

Author: Hidekazu Kakuno[None]

Corresponding Author: kakuno@hep.phys.s.u-tokyo.ac.jp

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.

DG4 - Dark Matter / **64**

Dark matter and solar neutrinos with DEAP/CLEAN

Author: Franco Giuliani[None]

Corresponding Author: fgiulian@unm.edu

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 pro jected 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.

DG4 - Dark Matter / **65**

Dark Matter Searches and Fundamental Neutrino Measurements with IceCube-DeepCore

Author: Darren Grant[None]

Corresponding Author: drg19@psu.edu

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.

66

Searching for Double Beta Decay with the Enriched Xenon Observatory

Author: Christina Hagemann[None]

Corresponding Author: chageman@physics.carleton.ca

The EXO collaboration aims to measure the
regular double beta of 136Xe 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.

DG3 - Neutrino Physics / 67

Neutrino cross sections in GeV region

Author: Olga Lalakulich[None]

Corresponding Author: olga.lalakulich@theo.physik.uni-giessen.de

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.

DG3 - Neutrino Physics / 70

Status of the MICE International Muon Ionisation Cooling Experiment

Corresponding Author: vittorio.palladino@cern.ch

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.

DG3 - Neutrino Physics / **71**

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

Corresponding Author: alain.blondel@cern.ch

“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 succesfully 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.”

DG1 - Electro Weak Symmetry Breaking / **72**

Non-Standard Higgs Decays

Author: Robert McElrath[None]

Corresponding Author: bob.mcelrath@cern.ch

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.

DG2 - Weak Decays, CP violation and CKM / 73

Status of the J-PARC E14 KOTO Experiment for the KL –> pi0 nu nu-bar

Author: Taku Yamanaka[None]

Corresponding Author: taku@hep.sci.osaka-u.ac.jp

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 \(K_L \to \pi^0 \nu \bar{\nu}\) 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.

DG3 - Neutrino Physics / 74

Current Status of RENO

Author: Kang Soon Park[None]

Corresponding Author: heppark@gmail.com

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.

DG4 - Dark Matter / 75

DAMA/LIBRA and leptonically interacting Dark Matter

Author: Jure Zupan[None]

Corresponding Author: jure.zupan@cern.ch

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.

DG1 - Electro Weak Symmetry Breaking / **76**

Direct Standard Model Higgs Searches at the Tevatron

Author: Massimo Casarsa[None]

Corresponding Author: casarsa@fnal.gov

Since the beginning of Run II the Fermilab Tevatron has delivered 6.9 fb-1 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/c2, 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-1 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.

DG3 - Neutrino Physics / **77**

The Double Chooz Experiment

Author: Marcos Dracos[None]

Corresponding Author: marcos.dracos@ires.in2p3.fr

The Double Chooz neutrino oscillation experiment will perform a highly sensitive measurement of the neutrino mixing angle θ13. 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 θ13 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 sin2(2θ13)<0.06, the present limit being sin2(2θ13)<0.2. At that moment, the near detector will also be ready and help to set this limit at sin2(2θ13)<0.03 in less than 3 years. The mixing angle θ13 is the last non-measured oscillation parameter of the neutrino mixing matrix. The possibility of measuring the sin2(2θ13) 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.

Plenary Session / **78**

Weak Decays, CP violation and CKM: Theoretical Status

Corresponding Author: gino.isidori@lnf.infn.it

Plenary Session / **79**

Weak Decays, CP violation and CKM: Experimental Status

Corresponding Author: tim.gershon@cern.ch

Plenary Session / **80**

Dark Matter: Theoretical Status

Corresponding Author: neal.weiner.nyu@gmail.com

Plenary Session / **82**

Dark Matter: Experimental Status

Corresponding Author: serfass@berkeley.edu

Plenary Session / **83**

Weak Decays, CP violation and CKM: Theoretical Summary

Corresponding Author: gerhard.buchalla@physik.uni-muenchen.de

Plenary Session / **84**

Weak Decays, CP violation and CKM: Experimental Summary

Corresponding Author: marco.sozzi@cern.ch

Plenary Session / 85

Dark Matter: Theoretical Summary

Corresponding Author: adam.falkowski@cern.ch

Plenary Session / 86

Dark Matter: Experimental Summary

Corresponding Author: daniel.mckinsey@yale.edu

DG4 - Dark Matter / 87

Search for Dark Matter with the CDMS experiment

Author: Sebastian Arrenberg[None]

Corresponding Author: arrenberg@physik.uzh.ch

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 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.

88

The ZEPLIN-III Dark Matter Search

Author: Blair Edwards[None]

Co-author: ZEPLIN-III Collaboration [1]

[1] *Imperial/RAL/Edinburgh/ITEP/LIP*

Corresponding Author: blair.edwards05@imperial.ac.uk

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 8.1x10(-8)pb. The instrument performance charateristics and behaviour will be reviewed. The status of preparations for the second science run will be given

DG2 - Weak Decays, CP violation and CKM / 89

Measurements of alpha

Corresponding Author: georges.vasseur@cea.fr

DG2 - Weak Decays, CP violation and CKM / 90

Measurements of beta

Corresponding Author: chcheng@slac.stanford.edu

DG2 - Weak Decays, CP violation and CKM / 91

Lattice results - overview and perspectives

Corresponding Author: damir.becirevic@th.u-psud.fr

DG2 - Weak Decays, CP violation and CKM / 92

Chiral perturbation theory

Corresponding Author: gerhard.ecker@univie.ac.at

DG2 - Weak Decays, CP violation and CKM / 93

Rare K decays - theory

Corresponding Author: giancarlo.dambrosio@na.infn.it

DG2 - Weak Decays, CP violation and CKM / 94

New physics models

Corresponding Author: bduling@ph.tum.de

DG4 - Dark Matter / 95

Annual Modulation Effects Observable in a Noble Liquid Detector.

Author: Andrzej Szelc[None]

Corresponding Author: szelc@lngs.infn.it

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.

DG2 - Weak Decays, CP violation and CKM / 97

Cabibbo angle review

Corresponding Author: moulson@lnf.infn.it

DG2 - Weak Decays, CP violation and CKM / 99

Top measurements at hadronic machines

Corresponding Author: sandra.leone@pi.infn.it

DG2 - Weak Decays, CP violation and CKM / 100

D0 mixing measurements

Corresponding Author: anze.zupanc@ekp.uni-karlsruhe.de

DG2 - Weak Decays, CP violation and CKM / 101

Non-LFV tau decays

Corresponding Author: mjlee@hep1.snu.ac.kr

DG2 - Weak Decays, CP violation and CKM / 102

Radiative B decays

Corresponding Author: antonio.limosani@cern.ch

DG2 - Weak Decays, CP violation and CKM / 103

Leptonic B decays

Corresponding Author: snelson@slac.stanford.edu

DG2 - Weak Decays, CP violation and CKM / 104

Rare K decays

Corresponding Author: rainer.wanke@uni-mainz.de

DG2 - Weak Decays, CP violation and CKM / 105

QCD from K decays

Corresponding Author: mauro.piccini@cern.ch

DG2 - Weak Decays, CP violation and CKM / 106

LFV & EDM

Corresponding Author: alejandro.ibarra@ph.tum.de

DG2 - Weak Decays, CP violation and CKM / 107

MEG experiment

Corresponding Author: alessandro.baldini@pi.infn.it

DG2 - Weak Decays, CP violation and CKM / 108

LFV in tau decays

Corresponding Author: riccardo.cenci@pi.infn.it

DG2 - Weak Decays, CP violation and CKM / 109

EDM review

Corresponding Author: peter.fierlinger@ph.tum.de

110

M2E experiment

DG2 - Weak Decays, CP violation and CKM / 111

Flavour physics at LHC

Corresponding Author: jaap.panman@cern.ch

DG2 - Weak Decays, CP violation and CKM / 112

Super-B in Italy

Corresponding Author: marcello.giorgi@pi.infn.it

DG2 - Weak Decays, CP violation and CKM / 113

Super-B in Japan

DG2 - Weak Decays, CP violation and CKM / 114

NA62 at CERN

Corresponding Author: augusto.ceccucci@cern.ch

Plenary Session / 116

Future Direct Dark Matter Searches: An Outlook

Corresponding Author: galbiati@princeton.edu

Plenary Session / 117

Review of Current and Future Neutrino Cross-Section Experiments

Corresponding Author: dschmitz@fnal.gov

Plenary Session / 118

Muon Collider

Corresponding Author: pjoddone@fnal.gov

DG4 - Dark Matter / 119

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

Author: Claudia Lazzaro[None]

Corresponding Author: claudia.lazzaro@cern.ch

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 wavelength 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.

DG3 - Neutrino Physics / 120

Future long baseline experiments: options for Europe

Author: Andre Rubbia[None]

Corresponding Author: andre.rubbia@cern.ch

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.

DG3 - Neutrino Physics / 121

Future long baseline experiments: options for Japan

Author: Takuya Hasegawa[None]

Corresponding Author: takuya.hasegawa@kek.jp

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.

DG1 - Electro Weak Symmetry Breaking / 122

Electroweak physics and proton structure measurements at HERA

Corresponding Author: nikifor@mail.desy.de

DG1 - Electro Weak Symmetry Breaking / 123

Prospects for Z/W Physics at the LHC

Corresponding Author: marcella.bona@cern.ch

DG1 - Electro Weak Symmetry Breaking / 124

Minimal Z' models : present bounds and early LHC Reach

Corresponding Author: ennio.salvioni@pd.infn.it

DG1 - Electro Weak Symmetry Breaking / 125

Top Experimental Prospects at start-up LHC

Corresponding Author: sascha.mehlhase@cern.ch

DG1 - Electro Weak Symmetry Breaking / 126

Boosted Top at the LHC

Corresponding Author: s.jj.lee@gmail.com

DG1 - Electro Weak Symmetry Breaking / 127

Top Quark Physics at the LHC (Theory)

Corresponding Author: gilad.perez@weizmann.ac.il

DG1 - Electro Weak Symmetry Breaking / 128

Prospects for SM Higgs at the LHC

Corresponding Author: alberto.graziano@cern.ch

129

QCD effects in Higgs production (Theory)

Corresponding Author: massimiliano.grazzini@cern.ch

DG1 - Electro Weak Symmetry Breaking / 130

Prospects for BSM Higgs at the LHC

DG1 - Electro Weak Symmetry Breaking / 131

SUSY Searches at the LHC

Corresponding Author: phillip.urquijo@cern.ch

133

Exotica Searches at the LHC

DG1 - Electro Weak Symmetry Breaking / 134

Higgsless models (Theory)

Corresponding Author: gino.isidori@lnf.infn.it

DG1 - Electro Weak Symmetry Breaking / 135

Searches for New Physics at HERA

Corresponding Author: rciesielsk@rockefeller.edu

DG1 + DG4 - Combined Session / 136

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

Author: Dario Grasso[None]

Corresponding Author: dario.grasso@pi.infn.it

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.

DG4 - Dark Matter / **137**

Depleted Argon for Future Direct Dark Matter Searches with Argon

Author: Cristiano Galbiati[None]

Corresponding Author: galbiati@princeton.edu

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.

139

CRESST

DG1 + DG4 - Combined Session / **140**

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

Corresponding Author: papini@fi.infn.it

DG1 + DG4 - Combined Session / **141**

GeV scale hidden sector at colliders

Corresponding Author: mreece@princeton.edu

DG4 - Dark Matter / **142**

Mirror Dark Matter

Corresponding Author: zurab.berezhiani@aquila.infn.it

DG4 - Dark Matter / **143**

The WArP Experiment

Corresponding Author: ettore.segreto@lngs.infn.it

145

COUPP

Corresponding Author: sonnensn@fnal.gov

146

DRIFT - TBC

DG4 - Dark Matter / **147**

Signals from the Universe: the DAMA/LIBRA results

Author: Pierluigi Belli[None]

Co-author: Collaboration DAMA [1]

[1] _

Corresponding Author: pierluigi.belli@roma2.infn.it

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.

Welcome - O. Palamara, L. Votano, P. Oddone, H. Pietschmann / **148**

Welcome

Corresponding Author: palamara@lngs.infn.it

149

Welcome

Corresponding Author: lucia.votano@lnf.infn.it

150

Welcome

Corresponding Author: pjoddone@fnal.gov

DG3 - Neutrino Physics / **152**

Geo-Neutrinos

Corresponding Author: fiorentini@fe.infn.it

DG3 - Neutrino Physics / **153**

SK status and perspectives (low-energy neutrinos)

Corresponding Author: takeuchi@icrr.u-tokyo.ac.jp

DG3 - Neutrino Physics / **154**

High energy neutrino astronomy: towards a km3 neutrino telescope in the Mediterranean Sea

DG3 - Neutrino Physics / **157**

Direct neutrino Mass Measurementes

Corresponding Author: monica.sisti@mib.infn.it

DG3 - Neutrino Physics / **158**

SNO & SNO+

Corresponding Author: steven.biller@physics.ox.ac.uk

DG3 - Neutrino Physics / **159**

Theory Predictions for Neutrino Masses and Mixing Angles

Author: Mu-Chun Chen[None]

Corresponding Author: muchunc@uci.edu

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 theta13 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.

DG4 - Dark Matter / **160**

The LUX Dark Matter Experiment

Author: Daniel McKinsey[None]

Corresponding Author: daniel.mckinsey@yale.edu

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.

DG3 - Neutrino Physics / **161**

SK status and perspectives (atmospheric neutrinos)

Corresponding Author: fanny.dufour@unige.ch

DG3 - Neutrino Physics / **162**

Testing neutrino mass models at LHC

Author: Martin HIRSCH[None]

Corresponding Author: mahirsch@ific.uv.es

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.

DG3 - Neutrino Physics / **163**

Kamland: double beta decay perspectives

Corresponding Author: shimizu@awa.tohoku.ac.jp

DG3 - Neutrino Physics / **165**

Future long baseline experiments: options for US

Corresponding Author: mitchell.soderberg@yale.edu

DG3 - Neutrino Physics / **167**

T2K Cross Section Measurements

Plenary Session / **168**

Neutrino Physics: Experimental Summary I

Corresponding Author: bonnie.fleming@yale.edu

169

WIN11 Announcement

Corresponding Author: herbert.pietschmann@univie.ac.at

171

End of Workshop

DG3 - Neutrino Physics / **172**

The NOvA Experiment: Status and Prospects

Author: Mayly Sanchez[1]

[1] *Argonne National Laboratory*

Corresponding Author: mayly.sanchez@anl.gov

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 mangnitude. 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.

DG3 - Neutrino Physics / **173**

CUORE: the near future of neutrinoless double beta decay searches

Author: Angelo Nucciotti[1]

[1] *Dip. Fisica, Univ. di Milano-Bicocca and INFN Sez. di Milano-Bicocca*

Corresponding Author: angelo.nucciotti@mib.infn.it

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 TeO2 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 TeO2 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.

DG3 - Neutrino Physics / **175**

Characterization of a Nd-loaded organic liquid scintillator for neutrinoless double beta decay search of 150Nd with a 10-ton scale detector

Corresponding Author: aldo.ianni@cern.ch