Nufact08, 10th International Workshop on Neutrino Factories, Superbeams and Betabeams

Abstracts book

http://indico.ific.uv.es/indico/conferenceDisplay.py?confId=71

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Abstract ID : 4

Adapting and testing PAVICOM facility for treatment of OPERA experimental data

The Completely Automatic Measuring Complex (PAVICOM) was constructed in 2000th year in the Lebedev Physical Institute and started for track-detector data processing in the field of nuclear, high energy and cosmic ray physics. Here an improvement of PAVICOM facility that enabled processing OPERA experiment data is presented. The scanning facility hardware was upgraded as well as new microscope controlling software was developed. Data treatment and reconstruction software was adapted to work with the standard OPERA data on PAVICOM and provides now ability for on-line emulsions detectors treatment. This is what allows using PAVICOM for OPERA emulsion data processing. Also some test processing results of OPERA emulsions are presented.

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Presenter : Mr. VLADYMYROV, Mykhailo S. (Lebedev Physical Institute of Russian Academy of Sciences)

Track classification :

Contribution type : --not specified--

Submitted by : Mr. VLADYMYROV, Mykhailo

Submitted on Monday 31 March 2008

Last modified on : Monday 31 March 2008

Comments :

Status : ACCEPTED

Track judgments :

Abstract ID : 5

Matter Profile Effect revisted - Fourier method and others -

Matter effect with a density profile is discussed.
We expand a matter profile to Fourier modes.
Comparing our method with the method of parametric resonance,
we reveal the relation between these two.
We also show some applications and the advantageous points
of our method.

Primary authors : Prof. SATO, Joe (Saitama University)

Co-authors : Dr. OTA, Toshihiko (Wuerzburg University)

Presenter : Prof. SATO, Joe (Saitama University)

Track classification :

Contribution type : --not specified--

Submitted by : Prof. SATO, Joe

Submitted on Wednesday 09 April 2008

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Comments :

Status : ACCEPTED

Track judgments :

Abstract ID : 6

Predictive Scheme for Neutrino Oscillations and Resonant Leptogenesis

I'll discuss the models of neutrino masses and mixings which lead to the prediction for the leptonic third mixing angle. By construction the right handed neutrino masses are quasi-degenerate in mass, which guarantee resonant leptogenesis. This avoids the generic SUSY gravitino problem. Moreover, the single CP violating phase, responsible for the baryon asymmetry, is directly related to the CP violation in the neutrino oscillations. All this makes the models testable in a near future.

Primary authors : Dr. TAVARTKILADZE, Zurab (Phys Dept, Oklahoma State University)

Co-authors : Prof. BABU, K.s. (Phys Dept, Oklahoma State University) ; Mr. MENG, Y. (Phys Dept, Oklahoma State University)

Presenter : Dr. TAVARTKILADZE, Zurab (Phys Dept, Oklahoma State University)

Track classification :

Contribution type : --not specified--

Submitted by : Dr. TAVARTKILADZE, Zurab

Submitted on Monday 05 May 2008

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Comments :

Status : ACCEPTED

Track judgments :

Abstract ID : 7

Signatures of sterile neutrino mixing in high-energy cosmic neutrino flux

We discuss the possible effects of the (3+1)-scheme, which is constrained by MiniBooNE, on the flavor ratio of high-energy cosmic neutrinos from cosmologically distant astrophysical sources. It is shown that there is still a chance to observe deviation from the standard three flavor scenario in the flavor ratio of the high-energy cosmic neutrinos.

Primary authors : Prof. YASUDA, Osamu (Tokyo Metropolitan University)

Co-authors : Dr. DONINI, Andrea (Universidad Automa de Madrid)

Presenter : Prof. YASUDA, Osamu (Tokyo Metropolitan University)

Track classification :

Contribution type : --not specified--

Submitted by : Prof. YASUDA, Osamu

Submitted on Wednesday 07 May 2008

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Comments :

I need to give a poster presentation (in addition to my plenary talk) to justify my usage of the budget for this trip to nufact08.

Status : SUBMITTED

Track judgments :

Abstract ID : 8

Sterile neutrino oscillation at a neutrino factory

Even after the negative result by the MiniBooNE experiment, we can still have a (3+1)-scheme with one sterile neutrino whose mixing lies within the allowed region by MiniBooNE. In this presentation we discuss the possible effects of the (3+1)-scheme at a neutrino factory by deriving analytical formulae for the oscillation probabilities.

Primary authors : Mr. FUKI, Ken-ichi (Tokyo Metropolitan University)

Co-authors : Dr. DONINI, Andrea (Universidad Autonoma de Madrid) ; Mr. LOPEZ-PAVON, Jacobo (Universidad Autonoma de Madrid) ; Dr. MELONI, Davide (Universita di Roma and INFN Roma) ; Prof. YASUDA, Osamu (Tokyo Metropolitan University)

Presenter : Mr. FUKI, Ken-ichi (Tokyo Metropolitan University)

Track classification :

Contribution type : --not specified--

Submitted by : Mr. FUKI, Ken-ichi

Submitted on Thursday 08 May 2008

Last modified on : Thursday 08 May 2008

Comments :

Status : SUBMITTED

Track judgments :

Abstract ID : 9

Neutrino factory optimization for non-standard interactions

We study the optimization of a neutrino factory with respect to non-standard neutral current neutrino interactions, and compare the results to those obtained without non-standard interactions. We discuss the muon energy, baselines, and oscillation channels as degrees of freedom. Our conclusions are based on both analytical calculations and on a full numerical simulation of the neutrino factory setup proposed by the international design study (IDS-NF). We consider all possible non-standard parameters, and include their complex phases. We identify the impact of the different parameters on the golden, silver, and disappearance channels. We come to the conclusion that, even in the presence of non-standard interactions, the performance of the neutrino factory hardly profits from a silver channel detector, unless the muon energy is significantly increased compared to the IDS-NF setup. Apart from the dispensable silver channel detector, we demonstrate that the IDS-NF setup is close to optimal even if non-standard interactions are considered. We find that one very long baseline is a key component in the search for non-standard interactions, in particular for epsilon-mutau and epsilon-tautau.

Primary authors : Dr. OTA, Toshihiko (Universitaet Wuerzburg)

Co-authors : Mr. KOPP, Joachim (MPI-K Heidelberg) ; Dr. WINTER, Walter (Universitaet Wuerzburg)

Presenter : Dr. OTA, Toshihiko (Universitaet Wuerzburg)

Track classification :

Contribution type : --not specified--

Submitted by : Dr. OTA, Toshihiko

Submitted on Tuesday 13 May 2008

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Comments :

This work is based on the paper arXiv:0804.2261 [hep-ph].

Status : SUBMITTED

Track judgments :

Abstract ID : 11

SPL accumulator and compressor scenarios for NF

"One-bunch proton driver" based on the CERN SPL (Superconducting Proton Linac), which delivers single bunch of 1E14 protons and a few ns r.m.s. length onto a production target at 50 Hz, has been discussed and studied since the last NuFact workshop. The scheme, which is originally discussed and showed for six-bunches proton driver, is using an accumulator ring and a compressor ring after the SPL, the later accelerating H- beam up to 5 GeV. It is difficulty and challenging to accumulate and to compress proton bunches having such a large number of particles, especially due to the load on the injection stripper foil and space charge issues. A design study of accumulator and compressor for one-bunch proton driver will be shown in the poster session.

Primary authors : Dr. AIBA, Masamitsu (CERN)

Co-authors :

Presenter : Dr. AIBA, Masamitsu (CERN)

Track classification :

Contribution type : --not specified--

Submitted by : Dr. AIBA, Masamitsu

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Comments :

Status : SUBMITTED

Track judgments :

Abstract ID : 12

Neutrino-induced one-pion production from nuclei

In the last few years, precision measurements of the
neutrino-oscillation parameters have driven the interest in
medium-energy neutrino physics. The MiniBooNE and K2K collaborations
have recently collected a wealth of neutrino data in the 1-GeV energy
range, where the vast part of the strength can be attributed to
quasi-elastic (QE) processes and Δ-mediated one-pion
production. A thorough understanding of these cross sections is
essential to reduce the systematic uncertainties. In turn, the
high-statistics data from these and future neutrino experiments like
MINERνA and SciBooNE offer the opportunity to address a
variety of topics related to hadronic and nuclear weak physics.\\
We present a fully relativistic formalism for describing
neutrino-induced Δ-mediated single-pion production from nuclei [1].
We assess the ambiguities stemming from the Δ interactions.
Variations in the cross sections of over 10\% are observed, depending
on whether or not magnetic-dipole dominance is assumed to extract the
vector form factors. These uncertainties have a direct impact on the
accuracy with which the axial-vector form factors can be extracted.
Different predictions for $C_5^A(Q^2)$ induce up to 40-50\% effects on the
Δ-production cross sections. To describe the nucleus, we turn
to a relativistic plane-wave impulse approximation (RPWIA) using
realistic bound-state wave functions derived in the Hartree
approximation to the σ-ω Walecka model. For neutrino
energies larger than 1 GeV, we show that a relativistic Fermi-gas
model with appropriate binding-energy correction produces comparable
results as the RPWIA which naturally includes Fermi motion,
nuclear-binding effects and the Pauli exclusion principle. Including
Δ medium modifications yields a 20 to 25\% reduction of the
RPWIA cross section. The model presented in this work can be
naturally extended to include the effect of final-state interactions
in a relativistic and quantum-mechanical way. Guided by recent
neutrino-oscillation experiments, such as MiniBooNE and K2K, and
future efforts like MINERνA, we present Q^2, W, and various
semi-inclusive distributions, both for a free nucleon and carbon,
oxygen and iron targets.\\
[1] C. Praet, O. Lalakulich, N. Jachowicz and J. Ryckebusch, arXiv:0804.2750 [nucl-th]

Primary authors : Mr. PRAET, Christophe (Ghent University)

Co-authors : Dr. LALAKULICH, Olga (Giessen University) ; Dr. JACHOWICZ, Natalie (Ghent University) ; Prof. RYCKEBUSCH, Jan (Ghent University)

Presenter : Mr. PRAET, Christophe (Ghent University)

Track classification :

Contribution type : --not specified--

Submitted by : Mr. PRAET, Christophe

Submitted on Friday 16 May 2008

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Comments :

Status : SUBMITTED

Track judgments :

Abstract ID : 13

Influence of nuclear corrections on the neutrino energy reconstruction in current oscillation experiments

Neutrino oscillation results depend on the neutrino energy - a quantity which can not be measured directly but has to be reconstructed from the hadronic debris coming out of the neutrino-nucleus reaction inside the detector. A good knowledge of these interactions is thus necessary to minimize the systematic uncertainties in neutrino fluxes, backgrounds and detector responses. A reliable reconstruction of the neutrino kinematics and the initial scattering process has to account for in-medium modifications and, in particular, for final state interactions inside the target nucleus. They can, e.g. through intranuclear rescattering, change particle multiplicities and also redistribute their energy. These effects can be simulated with our fully coupled channel GiBUU transport model where the neutrino first interacts with a bound nucleon producing secondary particles which are then transported out of the nucleus. We use a relativistic formalism that incorporates recent form factor parametrizations, and apply, besides Fermi motion, full in-medium kinematics, mean-field potentials and in-medium spectral functions. In this contribution, we compare the reconstructed quantities obtained within our model to the ones obtained by the current experiments, as e.g. MiniBooNE, and discuss the influence of these uncertainties not only on the cross section measurements but also the oscillation results.
Work supported by DFG.

Primary authors : Ms. LEITNER, Tina (Universitaet Giessen)

Co-authors : Dr. ALVAREZ-RUSO, Luis (Universidad de Valencia - CSIC) ; Mr. BUSS, Oliver (Universitaet Giessen) ; Prof. MOSEL, Ulrich (Universitaet Giessen)

Presenter : Ms. LEITNER, Tina (Universitaet Giessen)

Track classification :

Contribution type : --not specified--

Submitted by : Ms. LEITNER, Tina

Submitted on Friday 16 May 2008

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Comments :

Status : WITHDRAWN

Track judgments :

Abstract ID : 14

NEXT, a HPXe TPC for neutrinoless double beta decay searches

The design of the new generation of double beta decay experiments is a major challenge, since the detectors have to fulfill very tough requirements: a) they have to be very massive, but with limited size; b) very sensitive to the signature of the bb processes; and c) very robust against the copious backgrounds.

Xenon is an excellent nuclei to search for bb0nu processes. It has no radioactive, long-lived isotopes and a natural abundance of 136Xe which decays into bb2nu with a very long period of at least 10e21 y (not yet measured). And, of course, it is a noble gas, allowing the construction of massive TPCs.

NEXT stands for Neutrino Experiment with a Xenon TPC. We have recently submitted a proposal to the Canfranc Underground Lab (LSC), Spain, requesting an initial period of 3 years followed by 2 more years for the construction of a 100 kg, high-pressure gas Xenon TPC. The EXO collaboration has built a 200 kg liquid Xenon TPC that will start operation soon with Xenon enriched in the 136Xe isotope. The advantage of the gas phase over the liquid is the availability of a kinematical signature, a technique pioneered by the NEMO/SuperNemo experiments. NEXT can combine it with excellent energy resolution and the capability of scaling to large masses.

Primary authors : MARTIN-ALBO SIMON, Justo (IFIC (CSIC - U. Valencia))

Co-authors : MONRABAL, Francesc (IFIC (CSIC - U. Valencia))

Presenter : MARTIN-ALBO SIMON, Justo (IFIC (CSIC - U. Valencia)) ; MONRABAL, Francesc (IFIC (CSIC - U. Valencia))

Track classification :

Contribution type : --not specified--

Submitted by : MARTIN-ALBO SIMON, Justo

Submitted on Tuesday 20 May 2008

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Comments :

Status : SUBMITTED

Track judgments :

Abstract ID : 15

Quasi-elastic neutrino-nucleus scattering

We present calculations for quasi-elastic neutrino-nucleus cross sections in the few GeV regime, using various approaches.
In view of recent and expected experimental efforts, we show cross sections as a function of ejectile energies as well as Q^2 distributions.
Our study includes a discussion of the influence of various nuclear effects such as form factor parameterizations, final state interactions, the influence of binding energies and momentum distributions of the nucleons, the strangeness content of the nucleon, and RPA correlations at low energies.
Our findings are illustrated with results for neutrino scattering off ^{12}C and ^{56}Fe.

Primary authors : Dr. JACHOWICZ, Natalie (Ghent University, Department of Subatomic and Radiation Physics)

Co-authors : Mr. PRAET, Christophe (Ghent University, Department of Subatomic and Radiation Physics) ; Prof. RYCKEBUSCH, Jan (Ghent University, Department of Subatomic and Radiation Physics)

Presenter : Dr. JACHOWICZ, Natalie (Ghent University, Department of Subatomic and Radiation Physics)

Track classification :

Contribution type : --not specified--

Submitted by : Dr. JACHOWICZ, Natalie

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Comments :

Status : SUBMITTED

Track judgments :

Abstract ID : 17

The Daya Bay reactor neutrino experiment

The goal of the Daya Bay reactor neutrino experiment is to measure θ_{13}, the last unknown mixing angle, with a sensitivity in $\sin^2 (2\theta_{13})$ of 0.01 at the 90% confidence level. Daya Bay will search for the disappearance of reactor antineutrinos from the Daya Bay nuclear power complex located near Shenzhen, China by measuring the antineutrino rates and energy spectrums with identical detectors located at different baselines. An overview of the experiment and the current status is presented.

Primary authors : Dr. WHITEHEAD, Lisa (Brookhaven National Laboratory)

Co-authors :

Presenter : Dr. WHITEHEAD, Lisa (Brookhaven National Laboratory)

Track classification :

Contribution type : --not specified--

Submitted by : Dr. WHITEHEAD, Lisa

Submitted on Tuesday 20 May 2008

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Comments :

Status : SUBMITTED

Track judgments :

Abstract ID : 18

Spectral function of argon and calcium

To improve the description of lepton-nucleus interactions in the sub-GeV energy range we construct approximate spectral function for calcium and argon. The obtained quasielastic cross section of argon is reduced by 10.9% with respect to the cross section of the Fermi gas model. Our approach is verified using a broad spectrum of the precise electron scattering data for calcium target, i.e. for the nucleus which is most similar to argon's. Some of the these data lie in the kinematical region which is most important for neutrino scattering. It allows us to expect that we model neutrino interactions at a similar level of accuracy as achieved in the case of electron scattering.

Primary authors : Mr. ANKOWSKI, Artur (University of Wroclaw)

Co-authors :

Presenter : Mr. ANKOWSKI, Artur (University of Wroclaw)

Track classification :

Contribution type : --not specified--

Submitted by : Mr. ANKOWSKI, Artur

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Comments :
For more details see Phys. Rev. C 77, 044311 (2008)

Status : SUBMITTED

Track judgments :

Abstract ID : 19

Oscillation probability fits using Near Detector data at a Neutrino Factory

The neutrino oscillation probability fits in a long baseline neutrino experiment at a Neutrino Factory depend on the accurate determination of the neutrino flux. A low mass, high resolution Near Detector in the high flux region within 1 km of the muon decay ring at a Neutrino Factory can be used to extrapolate the neutrino spectrum to a Far Detector many thousands of kilometres away. A matrix method has already been proposed [1] to make a prediction of the oscillation probability based on the measurement of the Near and Far detector spectra. In this poster we present an update to simulations of the golden channel oscillations using a Near Detector in conjunction with a Magnetised Iron Neutrino Detector (MIND). Using these data we determine the unoscillated flux error that can be attained at the MIND far detector and we determine theta_13 and the CP phase delta using a simultaneous two parameter fit.

[1] A Laing, FJP Soler, Proceedings NUFACT07, Okayama, August 2007; AIP Conference Proceedings 981, 166-168 (2008).

Primary authors : Mr. LAING, Andrew (University of Glasgow)

Co-authors : Dr. SOLER, F.j.p. (University of Glasgow)

Presenter : Mr. LAING, Andrew (University of Glasgow)

Track classification :

Contribution type : --not specified--

Submitted by : Mr. LAING, Andrew

Submitted on Thursday 22 May 2008

Last modified on : Thursday 22 May 2008

Comments :

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Track judgments :

Abstract ID : 20

Monte Carlo simulation of the performance of the particle identification (PID) system of the MICE (Muon Ionization Cooling Experiment)

GEANT4 based simulation of the beam channel and the upstream PID system of the MICE experiment is presented. Results of the analysis of particle separation capabilities exploiting the time of flight system are discussed. Comparison of the performance for different settings of the magnetic elements of the beam channel and for different intrinsic resolutions of the TOF counters is made.

Primary authors : Mr. KARADZHOV, Yordan (St. Kliment Ohridski University of Sofia, Faculty of Physics)

Co-authors :

Presenter : Mr. KARADZHOV, Yordan (St. Kliment Ohridski University of Sofia, Faculty of Physics)

Track classification :

Contribution type : --not specified--

Submitted by : Mr. KARADZHOV, Yordan

Submitted on Thursday 22 May 2008

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Comments :

Status : SUBMITTED

Track judgments :

Abstract ID : 21

Could Frictional Cooling Have a Role to Play in a Neutrino Factory or Muon Collider?

Frictional cooling, a possible alternative or adjunct to ionization cooling that can cool a ~500-keV/c-momentum muon beam by passage through a low-density absorber, is appealing due to an over 100-times-larger dE/dx compared to ionization cooling. Initial G4beamline studies and simulations of frictional cooling are presented, and possible applications for muon-beam preparation discussed.

Primary authors : Prof. KAPLAN, Daniel (Illinois Institute of Technology) ; Dr. HART, Terrence (Illinois Institute of Technology)

Co-authors :

Presenter : Prof. KAPLAN, Daniel (Illinois Institute of Technology)

Track classification :

Contribution type : --not specified--

Submitted by : Prof. KAPLAN, Daniel

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Comments :

Status : SUBMITTED

Track judgments :

Abstract ID : 22

R&D activities toward a HPXe TPC (NEXT)

Our Research and Development (R&D) activities are dedicated to explore the prospects of a neutrinoless double beta experiment called: Neutrino Experiment with Xenon TPC (NEXT). The basic ideas of a Xenon based TPC will be proposed in the poster Justo Martin-Albo.

At the Instituto de Fisica Corpuscular (IFIC) we want to investigate the influence of outgassing materials on the primary as well as the amplified charges. Strong electronegative outgassing materials could spoil the energy resolution, which is crucial for the identification of possible neutrino-less double beta candidates. An outgassing test-setup is currently build up at our Institute and will be used for long term monitoring of the specific materials used in the TPC.

Our second research line will be also dedicated to achieve the best energy resolution for our application. We want to explore the possibility of reading out the primary charge by the detection of the electro-luminiscent light produced during the gas amplification process. Wires, GEM and maybe THGEM gas amplification systems will be tested.

Primary authors : Mr. BALL, Markus (Instituto di Fisico Corpuscular (IFIC))

Co-authors : Prof. GOMEZ-CADENAS, Juan Jose (Instituto di Fisico Corpuscular (IFIC)) ; Dr. YAHLALI, Nadia (Instituto di Fisico Corpuscular (IFIC)) ; Mr. MARTIN ALBO-SIMON, Justo (Instituto di Fisico Corpuscular (IFIC)) ; Mr. MONRABAL, Francesc (Instituto di Fisico Corpuscular (IFIC))

Presenter : Mr. BALL, Markus (Instituto di Fisico Corpuscular (IFIC))

Track classification :

Contribution type : --not specified--

Submitted by : Mr. BALL, Markus

Submitted on Wednesday 28 May 2008

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Comments :

Status : SUBMITTED

Track judgments :

Abstract ID : 23

Design and Operational Experience of the MICE Target

The MICE experiment requires a beam of low energy muons to test muon cooling. This beam will be derived parasitically from the ISIS synchrotron. A novel target mechanism has been developed which allows the insertion of a small titanium target into the proton beam halo on demand. The target must remain outside of the beam envelope during acceleration, and then overtake the beam during the last 2ms before extraction.

The technical specifications are demanding, and require large accelerations and precise and reproducible location of the target in each cycle. The mechanism must also operate in a high radiation environment, and the moving parts and materials must be compatible with the stringent requirements of operating in a working accelerator.

The design, and the commissioning and operational experience using this system during the first operating periods in 2008 is described.

Primary authors : Dr. BOOTH, Christopher (University of Sheffield)

Co-authors :

Presenter : Dr. BOOTH, Christopher (University of Sheffield)

Track classification :

Contribution type : --not specified--

Submitted by : Dr. BOOTH, Christopher

Submitted on Thursday 29 May 2008

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Comments :

Status : SUBMITTED

Track judgments :

Abstract ID : 24

Alignment Errors on Emittance Measurements for G4MICE

The MICE experiment will measure muon ionization cooling by determining the difference between the beam emittance of a muon beam from the ISIS accelerator at the Rutherford Appleton Laboratory (RAL) before and after a cooling channel. The cooling channel will consist of three liquid hydrogen absorbers and two RF cavities that produce cooling in the muon beam. The measurement of emittance will be carried out by a scintillating fibre spectrometer before and after the cooling channel. Particle identification detectors ensure that the cooling will be measured for a pure beam of muons. This poster will describe simulations that determine the constraints for the alignment of the MICE spectrometer to enable the absolute emittance to be measured with an accuracy of 0.1% and the emittance difference to be measured to a precision of 1%. Results on the emittance measurements from simulations of misaligned spectrometer components are used to quantify the stringent alignment requirements for MICE.

Primary authors : Mr. FORREST, David (University of Glasgow)

Co-authors : Dr. SOLER, Paul (University of Glasgow)

Presenter : Mr. FORREST, David (University of Glasgow)

Track classification :

Contribution type : --not specified--

Submitted by : Mr. FORREST, David

Submitted on Thursday 29 May 2008

Last modified on : Thursday 29 May 2008

Comments :

Status : SUBMITTED

Track judgments :

Abstract ID : 25

GLoBES - General Long Baseline Experiment Simulator

We present the basic concepts of the GLoBES (General Long Baseline Experiment Simulator) software, both for the experiment defintion and for phenomenological studies. In addition, we show some applications which have been computed with GLoBES.

Primary authors : Dr. WINTER, Walter (Universitaet Wuerzburg)

Co-authors : Dr. HUBER, Patrick (CERN) ; Mr. KOPP, Joachim (MPIK Heidelberg) ; Prof. LINDNER, Manfred (MPIK Heidelberg)

Presenter : Dr. WINTER, Walter (Universitaet Wuerzburg)

Track classification :

Contribution type : --not specified--

Submitted by : Dr. WINTER, Walter

Submitted on Friday 30 May 2008

Last modified on : Friday 30 May 2008

Comments :

Status : SUBMITTED

Track judgments :

Abstract ID : 27

Resolving oscillation degeneracies with a single neutrino polarity

We study the capability that a single neutrino run alone could resolve some of the degeneracies inherent in future long baseline oscillation experiments. We demonstrate that it possible to fully resolve the degeneracies in a large part of the parameter space by exploiting the oscillatory nature of the neutrino signal. We take the specific case of a beta-beam aimed along the CERN-Boulby baseline (1050 km) at a detector with low energy threshold and find a very good overall physics reach, competitive with other setups explored in the literature.

Primary authors : Mr. ORME, Christopher (IPPP, Durham)

Co-authors : Dr. MELONI, Davide (Universita di Roma Tre and INFN) ; Dr. MENA, Olga (Institut de Ciencies de l'Espai) ; Dr. PALOMARES-RUIZ, Sergio (IPPP, Durham) ; Dr. PASCOLI, Silvia (IPPP, Durham)

Presenter : Mr. ORME, Christopher (IPPP, Durham)

Track classification :

Contribution type : --not specified--

Submitted by : Mr. ORME, Christopher

Submitted on Monday 02 June 2008

Last modified on : Monday 02 June 2008

Comments :

Status : SUBMITTED

Track judgments :

Abstract ID : 28

The Angra Neutrino Project

We will present the status of the Angra Neutrino project, describing the development of an antineutrino detector aimed to monitor nuclear reactor activity. The experiment will take place at the Brazilian nuclear power plant located in Angra dos Reis. The Angra II reactor, with 4GW of thermal power, will be used as a source of antineutrinos. We expect to observe about one thousand events per day with a detector of one ton scale, placed at about 60 meters of the reactor core. We intend, in a first step, to use the measured neutrino event rate to monitor, with a few per cent accuracy, the thermal power delivered by the reactor. In a second step we intend to determine the fuel isotopic composition through a precise neutrino energy spectrum measurement. In addition to the safeguards issues the project will provide an alternative tool to have an independent control of the reactor delivered thermal power.

Primary authors : Dr. ANJOS, Joao (CBPF - Centro Brasileiro de Pesquisas Fisicas)

Co-authors :

Presenter : Dr. ANJOS, Joao (CBPF - Centro Brasileiro de Pesquisas Fisicas)

Track classification :

Contribution type : --not specified--

Submitted by : Dr. ANJOS, Joao

Submitted on Tuesday 03 June 2008

Last modified on : Tuesday 03 June 2008

Comments :
on behalf of the ANGRA Collaboration

Status : SUBMITTED

Track judgments :

Abstract ID : 30

Recent Progress for Muon Collider

A muon collider is needed to make precision measurements of the characteristics of new particles discovered at the
LHC and eventually to explore high energy physics at the energy frontier. To achieve high luminosity (> 10^34
cm^-2 s^-1), an enormous phase space reduction is required and the acceleration of the beams must be fast to
overcome the short muon lifetime. In this presentation, we will describe the current status of muon collider studies,
including muon beam capture and phase space cooling, required phase space manipulations, acceleration, and
collider ring designs.

Primary authors : YONEHARA, Katsuya (Fermilab)

Co-authors :

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Track classification :

Contribution type : --not specified--

Submitted by : YONEHARA, Katsuya

Submitted on Wednesday 04 June 2008

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Comments :

Status : SUBMITTED

Track judgments :

Abstract ID : 31

Status of RACCAM FFAG project

A 180 MeV proton assembly based on an FFAG ring and a variable energy H- cyclotron injector, for medical application, has been designed in the frame of the RACCAM ANR project. Status of the design will be reported.

Primary authors : Dr. MEOT, Francois (CEA & IN2P3)

Co-authors :

Presenter : Dr. MEOT, Francois (CEA & IN2P3)

Track classification :

Contribution type : --not specified--

Submitted by : Dr. MEOT, Francois

Submitted on Thursday 05 June 2008

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Comments :

Status : SUBMITTED

Track judgments :

Abstract ID : 32

Applicability of the formulae of Bardin and Dokuchaeva for the radiative corrections analysis in the NuTeV experiment

The NuTeV collaboration has made a precise determination of the weak mixing angle by measuring charged and neutral-current cross sections from neutrino and antineutrino deep-inelastic scattering on iron. Their value differs by 3 standard deviations from that obtained from measurements at the Z pole. One-loop EW corrected cross sections, including QED hard photonic corrections, from Bardin and Dokuchaeva (1986) are the basis in the NuTeV radiative corrections analysis. We point out that the NuTeV data analysis of deep-inelastic neutrino and antineutrino scattering is based on the kinematical variables from the measurements of the hadrons and muons in the final states, so-called, hadronic and mixed variables while the important part of the EW radiative corrections, the QED corrections, are derived by Bardin and Dokuchaeva for the leptonic variables and, in principle, could not be applied in the NuTeV experiment.

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Abstract ID : 33

Probing Neutrino Parameters with a Two-Baseline Beta-Beam Set-up

We study the reach of a Beta-beam experiment with two detectors at carefully chosen baselines for
exploring neutrino mass parameters. Locating the source at CERN, the two detectors and baselines are: (a) a 50 kton iron calorimeter (ICAL) at a baseline of around 7150 km which is roughly the magic baseline, e.g., ICAL@INO, and (b) a 50 kton Totally Active Scintillator Detector at a distance of 730 km, e.g., at Gran Sasso. We consider 8B and 8Li source ions with a boost factor γ of 650 for the magic baseline while for the closer detector we consider 18Ne and 6He ions with a range of Lorentz boosts. With $\gamma=650$ for 8B/8Li and $\gamma=575$
for 18Ne/6He and total luminosity corresponding to $5\times (1.1\times 10^{18})$ and $5\times (2.9\times 10^{18})$ useful ion decays in neutrino and antineutrino modes respectively, we find that the two-detector set-up can probe maximal CP violation and establish the neutrino mass ordering if $\sin^22\theta_{13}$ is 1.4×10^{-4} and 2.7×10^{-4}, respectively, or more. The sensitivity reach for $\sin^22\theta_{13}$ itself is 5.5×10^{-4}. With a factor of 10 higher luminosity, the corresponding $\sin^22\theta_{13}$ reach of this set-up would be 1.8×10^{-5}, 4.6×10^{-5} and 5.3×10^{-5} respectively for the above three performance indicators. CP violation can be discovered for 64\% of the possible δ_{CP} values for $\sin^22\theta_{13} \geq 10^{-3}$ ($\geq 8\times 10^{-5}$), for the standard luminosity (10 times enhanced luminosity).

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Abstract ID : 34

Status of the Super-Omega Muon Beamline at J-PARC

The Materials and Life Science Facility (MLF) is currently under construction at J-PARC in Tokai, Japan. The muon section of the facility will house the muon production target and four secondary beamlines used to transport the muons into two experimental halls. One of the beamlines is a large acceptance beamline (the so called Super Omega Muon beamline) which, when completed, will produce the largest intensity pulsed muon beam in the world. The beamline is designed to capture both surface (positive) and cloud (negative) muons for simultaneous use in a variety of experiments such as probing surface/interface phenomenon through surface mSR, standard model tests through muonium-anti-muonium conversion, and muon catalyzed fusion. The expected rate of surface muons for this beamline is 4x10^8 /s, and 10^7 /s for cloud muons.
The beamline consists of the normal-conducting capture solenoids, the superconducting curved transport solenoids, an axial focusing magnet, and a beam separator to separate the positive and negative muons. At the moment, the construction of the capture solenoids have been completed, and the transport solenoids are under design with tests coils being constructed for testing during the summer. The calculation of the beamline optics involving the axial focusing magnet and the beam separator are underway with particular care to ensure their compatibility with the transport solenoids.

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Abstract ID : 35

NuWro - Monte Carlo generator of neutrino interactions

The performance of NuWro - MC generator of neutrino interactions is presented. The distinguished features of NuWro are: effective hadronization model and inclusion of more sophisticated nuclear effects beyond Fermi gas model.

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Breakdown of the impulse approximation and its consequences

When interacting lepton delivers momentum q to a nucleus, it penetrates region of the order ~1/|q|. For low values of |q|, the region covers more than one nucleon and, inevitably, a few particles are involved in the scattering. It means that the cross section cannot be calculated using the impulse approximation. We show that in neutrino scattering, the contribution of the low-|q| interactions is almost constant in the 1-GeV energy region, so it introduces additional uncertainty to predictions of commonly used models.

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The T2K experiment and its time projection chambers

The Tokai to Kamiokande (T2K) experiment is a long baseline neutrino oscillation experiment located in Japan and its goal is to gain a more complete understanding of the neutrino oscillation parameters. A highly pure muon neutrino beam is directed from the accelerator center JPARC towards the Super-Kamiokande detector, which is 295 km away. The main physics goal of T2K is to measure the mixing angle θ13 in an appearance experiment. An improved measurement of the atmospheric parameters Δm232 and θ23 using the νμ disappearance channel will be also possible. For both of these
physic goals the measurements in the far detector are not sufficient and a second detector, close to the production point, is required. The near detector (ND280) will be located 280 m away from the target and its purpose is to measure the neutrino beam properties and the neutrino interaction cross section and kinematics before the oscillation. The main tracking device of ND280 consists of a sandwich of three TPCs and two fine grain detectors, which provide also the target material. The MicroMegas technology is used for the readout of the T2K ND280 TPCs to achieve the design criteria of compactness and high segmentation, necessary to have the requested momentum resolution.

In this poster we introduce the T2K experiment and its physics goals. We also present some results from the tests done at CERN to study the performance of the TPC readout modules. Finally we present an overview of the TPC calibration methods and some preliminary results.

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Vector and axial resonance contribution in single pion production in neutrino nucleon scattering.

Single pion production in neutrino-nucleon scattering is analyzed in the framework of Rein-Sehgal approach. Vector and axial form factors are discussed with a combination of theoretical and phenomenological arguments. New form of form factors is proposed based on D(1232) excitation models and available data. The vector part is shown to agree with electron-proton inclusive F2 data. The axial part is obtained by finding a simultaneous fit to ANL and BNL ds/dQ2 neutrino scattering data.

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