International Workshop on Frontiers in Electroweak Interactions of Leptons and Hadrons

Wednesday 2 November 2016 - Sunday 6 November 2016

Aligarh

Book of Abstracts

Contents

6

Discriminating Dirac and Majorana neutrino CP phases in the light of thermal leptogenesis in type I+II seesaw models.

Author: RUPAM KALITA[1]

[1] *TEZPUR UNIVERSITY*

Corresponding Author: rup@tezu.ernet.in

We study the effects of Dirac and Majorana CP phases in the origin of baryon asymmetry of the Universe through the mechanism of the leptogenesis. In this work we also try to connect neutrino CP phases, lightest neutrino mass and baryogenesis within the framework of a model where both type I and type II seesaw contribute to the neutrino mass. Type I seesaw mass matrix considered as a TBM type neutrino mass matrix which gives zero θ_{13} whereas type II seesaw acts as a correction to generate nonzero θ_{13}. Considering type II seesaw mass matrix as a subleading and equally dominating compared to type I seesaw, we try to constrain all these experimentally undetermined neutrino parameters namely Dirac and Majorana CP phases and lightest neutrino mass from the requirement of producing correct baryon asymmetry of the Universe.

Summary:

7

Search of Standard Model Higgs Boson via WW decay channel using the CMS detector

Author: Ankita Mehta[1]

[1] *Panjab University (IN)*

Corresponding Author: ankita.mehta@cern.ch

The masses of the electroweak vector bosons arise by the spontaneous breaking of electroweak symmetry by the Higgs field within the Standard Model. The CMS experiment at the Large Hadron Collider has reported the discovery of a new boson with a mass of approximately 125 GeV. In this talk we will present the results from the study of Higgs boson decaying to a pair of W bosons using the 13 TeV data collected by the CMS detector.

Summary:

The masses of the electroweak vector bosons arise by the spontaneous breaking of electroweak symmetry by the Higgs field within the Standard Model. The CMS experiment at the Large Hadron Collider has reported the discovery of a new boson with a mass of approximately 125 GeV. In this talk we will present the results from the study of Higgs boson decaying to a pair of W bosons using the 13 TeV data collected by the CMS detector.

8

Search for Supersymmetry with the Vector Boson Fusion tagging in pp collisions using CMS detector at the LHC

Author: Priyanka Kumari[1]

[1] *Panjab University (IN)*

Corresponding Author: priyanka.kumari@cern.ch

A search for Supersymmetry with Vector Boson Fusion (VBF) topology is performed in proton-proton collisions using CMS detector at the LHC. The Vector Boson Fusion processes offer a promising avenue at the LHC to study the non-colored sectors of supersymmetric extensions of the Standard Model where other searches have limited sensitivity. Final states containing at least two leptons are expected in pair production of charginos and neutralinos. The LHC has started its operation at 13 TeV in June 2015, where we repeat the same analysis performed at 8 TeV, but by using a newly implemented VBF-Jet Trigger. This is expected to improve the search sensitivity for compressed-mass spectra in SUSY even in a high-luminosity environment. The presentation will showcase the advancements made towards this search.

Summary:

9

Study of Double Parton Scattering processes using the CMS detector at the Large Hadron Collider

Author: Ramandeep Kumar[1]

Co-author: Ankita Mehta [1]

[1] *Panjab University (IN)*

Corresponding Authors: ankita.mehta@cern.ch, ramandeep.kumar@cern.ch

The possibility of two hard parton-parton scatterings, due to large parton densities at the Large Hadron Collider, in a hadron collision is known as double parton scattering (DPS). The study of DPS processes, being performed using the various final states at different collision energies using the CMS detector at the Large Hadron Collider, has been presented. The study of DPS processes provide information on the parton-parton correlations and parton distributions in a hadron. The DPS processes play an important role in the hadron-hadron collisions as they also act as a background to new physics searches.

Summary:

The possibility of two hard parton-parton scatterings, due to large parton densities at the Large Hadron Collider, in a hadron collision is known as double parton scattering (DPS). The study of DPS processes, being performed using the various final states at different collision energies using the CMS detector at the Large Hadron Collider, has been presented. The study of DPS processes provide information on the parton-parton correlations and parton distributions in a hadron. The DPS processes play an important role in the hadron-hadron collisions as they also act as a background to new physics searches.

10

Study of Multiple Partonic Interactions at the Large Hadron Collider

Authors: Monika Bansal[1]; Ramandeep Kumar[2]

[1] *University of Antwerp (BE)*

[2] *Panjab University (IN)*

Corresponding Authors: ramandeep.kumar@cern.ch, monika.jindal@cern.ch

The large parton densities, at the Large Hadron Collider, lead to probability of occurence of two or more parton-parton scatterings within a hadron collision, known as multiple partonic interactions (MPI). The study of MPI play a vital role in the hadron collisions. The sudy of MPI has been performed experimentally at different scale of the interactions using different final states and different collision energies. The hard MPI measurements are being performed using the correlation observables sensitive to MPI, the small sensitivity of these observables leads to large systmatic uncertainties. The study of MPI, using the new observables and phase space with enhanced sensitivity, has been presented using the simulations. The enhanced sensitivity will lead to reduced systematic uncertainties, which will be helpful to understand the collision energy dependence of the MPI measurements.

Summary:

The large parton densities, at the Large Hadron Collider, lead to probability of occurence of two or more parton-parton scatterings within a hadron collision, known as multiple partonic interactions (MPI). The study of MPI play a vital role in the hadron collisions. The sudy of MPI has been performed experimentally at different scale of the interactions using different final states and different collision energies. The hard MPI measurements are being performed using the correlation observables sensitive to MPI, the small sensitivity of these observables leads to large systmatic uncertainties. The study of MPI, using the new observables and phase space with enhanced sensitivity, has been presented using the simulations. The enhanced sensitivity will lead to reduced systematic uncertainties, which will be helpful to understand the collision energy dependence of the MPI measurements.

11

Recent UE measurements @ 13 TeV

Author: Rajat Gupta[1]

Co-authors: Ankita Mehta [1]; Ramandeep Kumar [1]

[1] *Panjab University (IN)*

Corresponding Authors: ankita.mehta@cern.ch, ramandeep.kumar@cern.ch, rajat.gupta@cern.ch

Underlying event (UE) in proton-proton collision is defined as any hadronic activity that can not be attributed to the particles originating from the hard-scattering. UE basically consist of Multiple-parton Interactions (MPIs) and contribution from beam-beam remnants (BBR) .Understanding of UE is important for better modeling of MC programs that are used in precise measurement of Standard Model process and new physics searches. Recent measurement of underlying events at 13 TeV is presented.

Summary:

Underlying event (UE) in proton-proton collision is defined as any hadronic activity that can not be attributed to the particles originating from the hard-scattering. UE basically consist of Multiple-parton Interactions (MPIs) and contribution from beam-beam remnants (BBR) .Understanding of UE is important for better modeling of MC programs that are used in precise measurement of Standard Model process and new physics searches. Recent measurement of underlying events at 13 TeV is presented.

13

Effect of magnetic field on photon production in massive nuclear collision

Author: Pradyumna Kumar Sethy[1]

[1] *Delhi university*

Corresponding Author: psethy@gmail.com

Abstract:
The coherent magnetic field exists mostly at the early stages of the heavy-ion collision. The matter produced at the initial stage of the collision contribute noticeably to photon production. We study the effect of magnetic field on photon production using a simple phenomenological model. We compute the photon yield through the magnetic field and compare the result with the recently reported results.

Summary:

Abstract:
The coherent magnetic field exists mostly at the early stages of the heavy-ion collision. The matter produced at the initial stage of the collision contribute noticeably to photon production. We study the effect of magnetic field on photon production using a simple phenomenological model. We compute the photon yield through the magnetic field and compare the result with the recently reported results.

14

A quasiparticle approach to dilepton emission from QGP in heavy-ion collision

Author: Pradyumna Kumar Sethy[1]

Co-author: Yogesh Kumar [2]

[1] *Delhi University*

[2] *Deshbandhu colleg,Delhi university*

Corresponding Authors: yogesh.du.81@gmail.com, psethy@gmail.com

We compute the dilepton production rate from the deconfined phase of the quark-gluon plasma using the statistical and dynamical quasiparticle model (DQPM). We find that the effect of the quark mass dependent on temperature and chemical potential leads to modest enhancement in the dilepton production rate.The study further finds that the emission rate of dilepton through the chemical potential is a productive function depending on the increasing value of chemical potential.A comparative result elucidates the enhancement of dilepton production in low invariant mass region.

Summary:

Abstract:-We compute the dilepton production rate from the deconfined phase of the quark-gluon plasma using the statistical and dynamical quasiparticle model (DQPM). We find that the effect of the quark mass dependent on temperature and chemical potential leads to modest enhancement in the dilepton production rate.The study further finds that the emission rate of dilepton through the chemical potential is a productive function depending on the increasing value of chemical potential.A comparative result elucidates the enhancement of dilepton production in low invariant mass region.

15

The effect of chemical potential on QGP equation of state in relativistic heavy ion collisions

Author: Yogesh Kumar[1]

[1] *Deshbandhu College, University of Delhi, Delhi-110007, india*

Corresponding Author: yogesh.du81@gmail.com

We work on QGP equation of state (EoS) in relativistic heavy ion collisions with the effect of chemical potential using a simple phenomenological model. In this model, a dynamical quark mass is used as a finite value which depends on temperature and chemical potential. The results are significant and agree well with lattice QCD results.

Summary:

Quark gluon plasma

16

Precision Measurements with Upward-going Muons in ICAL at India-based Neutrino Observatory

Author: Kanishka R[1]

[1] *Dept of Physics, Panjab University, Chandigarh*

Corresponding Author: kanishka.rawat.phy@gmail.com

The magnetized Iron CALorimeter detector (ICAL), proposed to be built in the India-based Neutrino Observatory (INO) laboratory aims to do precision measurements by studying atmospheric neutrino oscillations. The interactions of atmospheric neutrinos with the rock material surrounding the detector produces upward-going muons which carries the signature of oscillation. Thus, upward-going muons provide an independent measurement of the oscillation parameters. We have used different systematics and will discuss their effect on the oscillation parameters. We therefore present here the precision measurements using upward-going muons and discuss their significance in INO.

Summary:

17

Expansion of the early Universe and QGP equation of state

Author: yogesh kumar[1]

Co-author: shougaijam somorendro singh [2]

[1] *university of delhi, india*

[2] *University of delhi*

Corresponding Authors: yogesh.du81@gmail.com, sssingh@physics.du.ac.in

We study the quark gluon plasma equation of state and expansion of the early Universe using a simple phenomenological model. The results are useful in the relativistic heavy ion collisions and compared with the other work.

Summary:

18

Study of sensitivity of INO-ICAL detector to non standard interaction.

Author: Tarak Thakore[1]

[1] *Louisiana State University, LA 70803*

Corresponding Author: tarakstar@gmail.com

The magnetized Iron CALorimeter detector (ICAL) is proposed to be built by the India Based Neutrino Observatory (INO) project
to unravel the unknown properties of neutrinos. The ICAL detector will detect the atmospheric neutrino with multi-GeV energy and traveling wide ranges of path lengths.
We have studied the capability of ICAL detector to search for the non-standard interaction (NSI) in the propagation of neutrino. The importance of this study is that the observable for this analysis is not only the reconstructed energy and
direction (E_μ, $\cos\theta_\mu$) of muon produced in the interaction of neutrino with iron target but, also the reconstructed energy ($E^{/}_{had}$) of produced hadrons along with.
The look-up table obtained by the GEANT simulation code of INO-ICAL collaboration is used for this analysis. We obtain a huge enhancement in the sensitivity to constrain the NSI parameters due to inclusion of $E^{/}_{had}$ compare to that with only (E_μ, $\cos\theta_\mu$).
We also investigate the impact of NSI on the sensitivity of ICAL detector in measuring the neutrino mixing parameters, such as mass hierarchy, atmospheric mass square difference
and the atmospheric mixing angle.

Summary:

19

Sensitivity to invisible neutrino decay of a massive magnetised iron detector in the presence of Earth matter effect

Author: Chandan Gupta[1]

Co-author: Tarak Thakore [2]

[1] *India-based Neutrino Observatory*

[2] *Louisiana State University*

Corresponding Authors: chandang@prl.res.in, tarakstar@gmail.com

The 50 kton Iron Calorimeter (ICAL) detector proposed to be housed in the India-based Neutrino Observatory (INO) aims to discover the neutrino mass hierarchy by probing the Earth matter effects on the propagation of atmospheric neutrinos [1]. In addition to this it will perform precision measurements of the oscillation parameters θ_{23} and $|\Delta m^2_{32}|$. The main channels of interaction are the charged current interactions of ν_μ and $\bar{\nu}_\mu$ with the iron target, which will produce hadrons along with μ^+ or μ^- in the final state. The charge of the muon can be identified well since ICAL is a magnet. This along with excellent muon resolutions and huge mass of the detector makes it suitable to determine mass hierarchy. In addition to the standard oscillation studies, ICAL is well suited
to study exotic physics like neutrino decay. We present the sensitivity studies of ICAL to the invisible decay + oscillation

model in which the third mass eigen state ν_3 decays to invisible final state particles \cite{garcia} along with oscillations.
MINOS experiment has given a constraint of $\tau_3/m_3 > 2.8 \times 10^{-12}$ s/eV at 90\% CL\cite{gomes}.
The study presented here with 500 kton year exposure of ICAL takes into account invisible decay + 3-flavour oscillations
in matter. The binning in $(E_\mu, \cos\theta_\mu, E_{had'})$ (where, $E_\mu, \cos\theta_\mu$ are the observed final state muon energy and
direction and $E_{had'}$ is the observed final state hadron energy) \cite{3dMMD}, with E_μ in the 0.5–25 GeV range and
11 systematic pulls \cite{hi-mu-paper}, gives a limit of $\tau_3/m_3 > 1.56 \times 10^{-10}$ s/eV at 90\% CL.
In addition to constraining the decay parameter, the study on the possible effects of the presence of invisible
decay on the precision measurement of the 2–3 oscillation parameters and mass hierarchy determination is also
performed.

Acknowledgements : We thank Prof. D. Indumathi, IMSc; Satpura6 cluster and INO internal review committee.

Summary:

20

Impact of nuclear effects on neutrino energy reconstruction

Author: Mohammad Ibrahim Mirza[1]

[1] *Christ Church College ,Kanpur*

Corresponding Author: ibm.lhcms@gmail.com

Our work is focused on difficulties related to energy reconstruction in charged current quasi-elastic events.
We study the impacts of final state interaction on the reconstruction of neutrino energy due to misreconstruction of non-quasi elastic events as quasi-elastic events at low energies.
In an attempt to incorporate final state interaction we have used transport model GiBUU(Giessen-Bolztmann-Uehling-Uhlenbeck) on both initial and final state interactions.
Full events are generated for DUNE and our reconstructed neutrino energy results are compared with different theoretical results.

Summary:

21

Imapact of nuclear effects on neutrino energy reconstruction

Authors: Mohammad Ibrahim Mirza[1]; Srishti Nagu[2]

[1] *Christ Church College, Kanpur*

[2] *University of Lucknow*

Corresponding Authors: srishino2016@gmail.com, ibm.lhcms@gmail.com

Our work is focused on difficulties related to energy reconstruction in charged current quasi elastic events.

we study the impact of final state interactions on the reconstruction of neutrino energy due to misreconstruction of non quasi elastic events as quasi elastic events at low energies.
In an attempt to incorporate final state interaction we have used transport model GiBUU on both the initial and final state interactions.
Full events are generated for DUNE and our reconstructed neutrino energy results are compared with different theoretical results.

Summary:

22

Underground Cosmic Muons Charge ratio analysis at INO-ICAL Detector

Author: Jaydip Singh[1]

[1] *Lucknow University*

Corresponding Author: jaydip.singh@gmail.com

Cosmic rays primarily composed of high energy protons and atomic nuclei interacts with the earth's atmospheric nuclei and produce pions and kaons, these particles further decay to muons. The charge ratio of these energetic muons is an important measurable which carries information of the pi/k hadronic production ratio, the composition of cosmic ray primaries, the contribution of charmed hadrons and the neutrino flux at very high energies. Measurement of this ratio up to tens of TeV have been made by several experiments (MINOS,OPERA,CMS etc.).

The proposed ICAL detector at INO is a large underground magnetized iron detector. This detector is shielded by 1.2km of rock(aprox).
When the muons produced in the atmosphere pass through rock, low energy muons are stopped in the rock but the high energy muons will reach at the detector. ICAL being a magnetized detector is capable of identifying charge of the particle, hence we can identify mu+ and mu- separately.

In this work we have generated muons flux at the top of the hill using Corsika(Cosmic ray generator) and this flux passed through the hill to the detector. After feeding the rock geometry in Geant4 we have calculated the energy loss of muons passing through rock and
the threshold energy of muons for reaching at the detector. Rock composition considered here is same as that of standard rock. Highly energetic muons will then enter the detector and give track at the detector. Muon tracks will be reconstructed via Kalman filter techniques.
Finally we are measuring energy and number of μ+ and μ- particles passing through the detector and compared it with the existing results.

Summary:

This work is done with Prof. Raj Gandhi (HRI Allahabad) and Dr. Jyotsna Singh (Lucknow University)

This work is done for proposed INO-ICAL detector and this work has importance for measuring the high energy atmospheric neutrino flux using high energy Cosmic muons. So measuring the Cosmic muons charge ratio is an additional importance for INO as well as other neutrino experiments. In this work we have done some charge ratio analysis for INO-ICAL detector in high energy region and have compared our analysis to the other neutrino experiment experiments operating at this energy range (MINOS) .

23

Impact of nuclear effects on extraction of CP phase parameter at DUNE

Author: sabeeha naaz[1]

Co-author: Jaydip Singh [2]

[1] *University of lucknow*

[2] *Lucknow University*

Corresponding Authors: jaydip.singh@gmail.com, sabeehanaaz0786@gmail.com

Determination of neutrino oscillation parameters and particle production cross-sections (axial properties of nucleons and resonance) requires knowledge of neutrino energy. Modern experiment like DUNE, T2K and all other use nuclear targets. Nuclear effects affects the event cross section measurements, event characterization and neutrino energy reconstruction by which it affects the oscillation parameters as Non-standard interaction.

In this work we have done some essential analysis using software GiBUU and GLoBES. We are using this package for analyzing the impact of nuclear effects on CP phase due to bad energy reconstruction for liquid Argon detector proposed for DUNE. Energy reconstruction and neutrino oscillation parameters measurement depends on a correct modification of final state. In this work we first outline the basics of transport theory and its recent generalization to off-shell transport. We will also present some preliminary analysis using GLoBES for different-different CP phase , and then check nuclear effects for each phase by using GiBUU , which will be account in terms of bad energy reconstruction and how these phenomena can destroy the CP phase sensitivities for DUNE experiment.

Summary:

24

A Relativistic Mean Field study of Spin-Orbit Effect in Nuclei and Hypernuclei

Author: Asloob Ahmad Rather[1]

[1] *Aligarh Muslim University*

Corresponding Author: asloobahmad.rs@amu.ac.in

The spin-orbit interaction plays a crucial role in order to understand the fine structure of normal as well as hypernuclei. In hypernuclei, the spin-orbit splitting is different from normal nuclei due to the weaker strength of hyperon-meson couplings. It is a natural outcome in relativistic mean-field theories but is added manually in non-relativistic models. In the relativistic mean-field framework, a large spin-orbit splitting is emerged by the difference of scalar and vector potentials. Therefore, the relativistic mean-field approach is quite promising theoretical framework compared to non-relativistic theories for reproducing the ground-state structural properties of nuclei as well as hypernuclei. In the present work, we made an attempt to investigate the strength of spin-orbit splitting in nucleon-nucleon, lambda-nucleon and sigma-nucleon interactions within the ambit of relativistic mean-field theory and further would analyze its effects in closed shell normal nuclei as well as lambda and sigma hypernuclei.

Summary:

25

Impact of nuclear effects on extraction of CP phase parameter at DUNE

Authors: Anuapam Yadav[1]; sabeeha naaz[2]

Co-author: Jaydip Singh [3]

[1] *University of Lucknow*

[2] *University of lucknow*

[3] *Lucknow University*

Corresponding Authors: jaydip.singh@gmail.com, yadavanupam975@gmail.com, sabeehanaaz0786@gmail.com

Determination of neutrino oscillation parameters and particle production cross-sections (axial properties of nucleons and resonance) requires knowledge of neutrino energy. Modern experiment like DUNE,T2K and all other use nuclear targets. Nuclear effects affect the event cross section measurements,event characterization and neutrino energy reconstruction by which it affects the oscillation parameters as Non-standard interaction.

In this work we have done some essential analysis using software GiBUU and GLoBES. We are using this package for analyzing the impact of nuclear effects on CP phase due to bad energy reconstruction. Energy reconstruction and neutrino oscillation parameters measurement depends on a correct modification of final state. In this work we first outline the basics of transport theory and its recent generalization to off-shell transport. We will also present some preliminary analysis using GLoBES for different-different CP phase , and then check nuclear effects for each phase by using GiBUU , which will be account in terms of bad energy reconstruction and how these phenomena can destroy the CP phase sensitivities for DUNE experiment.

Summary:

Abstract

26

Performance Simulation of Gas Electron Multiplier (GEM)

Author: Othmane Bouhali[1]

[1] *Texas A&M University at Qatar*

Corresponding Author: othmane.bouhali@qatar.tamu.edu

Gas Electron Multiplier (GEM) detectors are widely used in modern High Energy Physics and Nuclear Experiments. GEM detectors come under micropattern Gas detectors (MPGD). The GEM detectors are fabricated by 50 micrometer kapton foil coated with copper electrodes on both sides. On this thin metal-polymer assembly high density of holes are pierced chemically. The holes are usually of diameter 70 micrometer and pitch is 140 micrometer. We apply a few 100 Voltage across the electrodes that will create a huge Electric Field in the holes. Hence an electron which is trapped in these holes will create an avalanche that contains a large number of electrons (large gain).
In this work, we perform a comprehensive simulation of several types of GEM detector to study detector response and performances.

We will present results on the uniformity, induced signal and gas again.

Summary:

27

Inclusive jets results from CMS

Author: Anterpreet Kaur[1]

[1] *Panjab University (IN)*

Corresponding Author: anterpreet.kaur@cern.ch

The collisions of protons at the Large Hadron Collider (LHC) are viewed as interactions between their constituent partons (quarks and gluons). In Quantum Chromodyanmics (QCD), partons are produced in hadron-hadron collisions with huge cross sections and get detected experimentally as spray of particles called jets. The inclusive jet cross section is an important observable as it provides information about the parton distribution functions (PDFs) and the QCD coupling constant. The inclusive jets cross section has been measured differentially in bins of rapidity and transverse momentum of the jets, using LHC proton-proton collision data recorded with the CMS detector. The measured cross sections in data are compared to theoretical predictions at NLO in perturbative QCD and to Monte Carlo event generators.

Summary:

28

Some Aspects of AdS_3/CFT_2

Co-author: MOHSIN ILAHI [1]

[1] *ALIGARH MUSLIM UNIVERSITY*

Corresponding Author: mohsinilahi23@gmail.com

The AdS/CFT correspondence (gauge/gravity) duality refers to the correspondence (duality or equivalence) of seemingly two different physical theories string theory on the one hand and quantum field theory on the other hand which is a theory with no gravity whatsoever. AdS/CFT has found applications in very different domains. This includes non-Abelian gauge theories, blackhole physics and quantum gravity, conformal field theories in different dimensions, nuclear physics and condenced matter physics to name only a partial list of topics. AdS/CFT correspondence relates a string theory living on the bulk of the AdS space to a CFT corresponding to its boundary. Among the AdS/CFT dualities the case of AdS_3/CFT_2 is special since one deals with two dimensional conformal field theories which have been quite extensively studied, on the other side one has a three dimensional AdS gravity which is quite simple by itself. In this work our focus is on AdS3 case, more specifically we study the duality between string theory on AdS_3 X Sˆ3 X Sˆ3 X Sˆ1 and two dimensional conformal field theory. In this case there is considerable confusion regarding the structure of two dimensional conformal field theory relevant. There is a complete agreement that the relevant conformal field theory is large N=4 SCFT. But the problem is that various aspects of the theory do not fit in this scheme very nicely. We are proposing some solutions to these problems.

Summary:

29

Conformal Field theory for AdS3

Author: ABBAS ALI[1]

Co-author: MOHSIN ILAHI [1]

[1] *ALIGARH MUSLIM UNIVERSITY*

Corresponding Authors: mohsinilahi23@gmail.com, pht05aa@gmail.com

Conformal Field theory for AdS3
Abbas Ali, Mohsin Ilahi, Shafeeq Rahman Thottoli and Abdul Salih P P

The AdS/CFT correpondence is a remarkable connection between theories of gravity and Yang-Mills theories. In its various versions it has shed light upon various domains of physical phenomena. Among AdS/CFT dualities, the duality between string theory and superconformal filed theory, the case of AdS3/CFT2 is special because on one side we are dealing with two dimensional superconformal field theory which has been extensively studied. On the other side of this duality we have a three dimensional AdS gravity which is quite simple by itself. Our target space in this study is the case when the compact manifold has two three spheres and a circle. Inspite of the consensus on large N=4 Super conformal field theory being the relevant conformal symmetry there is a considerable amount of confusion about this case. In this work we begin the process of clearing out this opacity.

Summary:

30

Simulation studies of the effect of electrode coating on the efficiency and induced pulse height in Resistive Plate Chambers (RPCs)

Author: Shamsul Haque Thoker[1]

[1] *University Of Kashmir*

Corresponding Author: shamsulthoker@gmail.com

Resistive Plate Chambers are the parallel plate gas based particle detectors, which are being extensively used for trigger and timing applications in modern nuclear and high energy physics experiments.

The proposed large magnetized iron calorimeter at the India-based Neutrino Observatory is planned to have a total mass of 50 kton, will deploy about 28,800 RPCs each of about 4 m2 in area as its active detector elements. In order to apply uniform electric field for creating avalanche inside the gas gap, high voltage of about 10KV is applied across the parallel glass electrode plates of the RPC. A semi-resistive coat of paint is applied on the outer surfaces of both the electrodes, which facilitates application of high voltage.

In our work an attempt is made to calculate in simulation the effect of coating parameters such as its thickness (or surface resistivity) on performance characteristics of the RPC such as the induced pulsed height on pickup strips and hence the RPC efficiency for charge particle detection. The results will be compared with the corresponding experimental results later.

Summary:

31

Reactor anti-neutrino detection at ISMRAN, BARC

Author: Dhruv Mulmule[1]

[1] *Bhabha Atomic Research Center India*

Corresponding Author: dhruv.mulmule@gmail.com

Anti-neutrinos ($\bar{\nu}_e$) from reactors provide an excellent non-intrusive probe for monitoring reactor core composition. An average fission in reactor is followed by production of six $\bar{\nu}_e$s emitted isotropically and without attenuation from the core. Although the interaction cross-section between matter

and anti-neutrinos is very small($10^{-43} cm^2$), the huge emitted flux (1.5×10^{20} $\bar{\nu}_e$/sec from a 1 GWth reactor) allows us to detect their signal with a relatively small detector (1-ton scale) placed ˜10 m from the core. The **I**ndian **S**cintillator **M**atrix for **R**eactor **A**nti-neutrinos(**ISMRAN**) is one such proposed detector set-up, at Dhruva research reactor, consisting of a 10×10 matrix of plastic scintillator bars ($10 \times 10 \times 100$ cm) wrapped with Gd-coated mylar foils to detect anti-neutrinos. A detailed γ and neutron background rate measurement at the reactor hall was carried out using liquid scintillator detector and these rates were quantified for different energy threshold(in MeV_{ee}) for γ and neutrons. The dependence of these backgrounds on the reactor power is also studied. A smaller version, 20% of actual size, of the detector is currently being assembled and tested with digitizers, in the non-reactor (low background) environment of laboratory and will be deployed at the reactor hall later this year.

Summary:

32

Weak quasielastic production of hyperons induced by electrons

Author: ATIKA FATIMA[1]

[1] *AMU*

Corresponding Author: atikafatima1706@gmail.com

TJNAF and Mainz Microtron are using high luminosity electron beams to make cross section measurements. TJNAF also plans to upgrade the beam
energy to 12 GeV and make cross section measurements using several nuclear targets in various regions of x and Q^2. In this work, we
investigate electron induced weak quasielastic production of hyperons via charge changing weak currents on proton target. The vector transition
form factors are obtained in terms of nucleon electromagnetic form factors for which various parameterizations available in literature have been
used. A dipole parameterization for the axial vector form factor have been used in numerical evaluations.Using high intensity electron beam,
one may also determine transition form factors in the vector as well as axial vector sectors as well as to
test Cabibbo model at higher energies. We shall discuss the dependence of these form factors on the differential and total scattering cross
sections. The results would also be compared with the results obtained for electron induced kaon production from proton target.

Summary:

33

Event Rate Calculations at Supernova Neutrino Energies

Author: Shikha Chauhan[1]

[1] *Aligarh Muslim University*

Corresponding Author: niharikavatsa21@gmail.com

In this work, we have studied inclusive charged current quasielastic scattering processes in the energy region relevant for supernova neutrinos. We have calculated total scattering cross section induced by (anti)neutrino on ^{208}Pb target in Local Density Approximation(LDA). For the numerical

calculations various medium effects like
Pauli blocking, Fermi motion effects and the Q-value of the reaction have been incorporated. Furthermore, interaction of bound nucleons which leads to modification in coupling strength is also taken into consideration. Coulomb distortion effect of the outgoing lepton has been included using modified effective momentum approximation(MEMA). To observe the event rates corresponding to supernova neutrinos we have convoluted cross section over various simulated spectra discussed by Totani et al., Duan et al. and Gava et al.

These theoretical results would be important for future oscillation experiments like Observatory for Multiflavour Neutrino Interactions from Supernovae(OMNIS), Lead Astronomical Neutrino Detector(LAND), Helium and Lead Observatory(HALO) and Deep Underground Neutrino Experiment(DUNE).

Summary:

34

Nuclear Medium Effects in weak \& electromagnetic induced DIS processes

Author: farhana zaidi[1]

[1] *aligarh muslim university*

Corresponding Author: zaidi.physics@gmail.com

We have studied nuclear medium effects in electromagnetic and weak structure functions $F_{iA}(x, Q^2);\ (i = 1, 2, L)$ for the charged current deep inelastic scattering(DIS) processes
in a wide range of Q^2 using different nuclear targets.
For the determination of nuclear structure functions Fermi motion, binding energy and nucleon correlations are incorporated by using the spectral function.
Furthermore, shadowing effect which is significant for $x \leq 0.1$ and
mesonic($\pi,\ \rho$) cloud contribution which is significant for the
low and intermediate $x(0.3 < x < 0.6)$ have also been included. We have obtained the structure functions
by using different variants of PDFs parameterization for
nucleons(CTEQ6.6 \& MSTW) as well as for pions (GRV, CTEQ5L \& Conway). For the ρ meson, we have used the same PDFs as in the case of pion.
Furthermore, the importance of kinematic limits of Q^2 and center of mass energy(W) for obtaining the contribution from the safe DIS region will be presented and discussed.
These calculations are performed
in the kinematic range relevant for the current and future experiments like JLab, MINERνA, NOvA and DUNE. The results are also compared with the experimental data of JLab, NMC \& SLAC for electromagnetic
interaction induced process and with the experimental data of NuTeV \&
CHORUS collaborations for weak interaction induced process.

Summary:

35

Search for the differences in Atmospheric Neutrinos and Anti-neutrinos oscillation parameters at the INO-ICAL Experiment

Author: Daljeet Kaur[1]

[1] *S.G.T.B. Khalsa college, University of Delhi*

Corresponding Author: daljeet.kaur97@gmail.com

The India-based Neutrino Observatory (INO) is an approved project aimed at building a world-class underground facility to study the properties of neutrinos. The INO proposes to build a cavern inside the Bodi West hill in Theni district of South India, with about a kilometre of rock above shielding it from cosmic background. A Magnetized Iron Calorimeter (ICAL) being set up at INO as prime experiment. ICAL is an atmospheric neutrino experiment with a unique ability to distinguish between mu(+) and mu(-) events with their magnetic bendings and hence can easily separate neutrinos and anti-neutrinos.

Summary:

36

The partial breaking of the Tri-Bimaximal mixing.

Author: Kanwaljeet Singh Channey[1]

[1] *University of Delhi*

Corresponding Author: kjschanney@yahoo.co.in

The reconstruction of the neutrino mass matrix from the current experimental neutrino data leads to many possible structures. After the measurement of non-zero θ_{13}, many such structures were ruled out. For example, the neutrino mass matrix corresponding to the Tri-Bimaximal (TBM) mixing is incompatible with the current experimental data. But, it can be made compatible with the experiments by adding perturbations that break the TBM symmetry. Such perturbations need not break the TBM symmetry completely and may preserve the first or second column of the TBM mixing matrix. In the present work, we study phenomenological implications of the perturbations that partially break the TBM symmetry.

Summary:

37

Measurement of Z+jets differential cross sections with CMS

Author: Sandeep Kaur[1]

[1] *Panjab University (IN)*

Corresponding Author: sandeep.kaur@cern.ch

We present a measurement of the differential cross section of Z boson production in association with jets based on data taken by the CMS experiment at the LHC. In hadron colliders, the Z boson is predominantly produced though the annihilation of quark and anti-quark pairs. The Z boson decay into two oppositely charged leptons is a "standard candle"for testing the Standard Model (SM) and used in the analysis to select a Z+jets data sample with high purity. The production of a Z boson in association with hadronic jets is a prominent background in many searches for physics beyond the SM. In addition, the Z+jets cross section measurements provides stringent tests of perturbative QCD and of corresponding event generators. The differential cross sections to be presented are measured as function of the jet multiplicity, the transverse momentum and rapidities of the three leading jets. The measurements are compared with theoretical predictions at leading and next-to-leading order pertubative QCD.

Summary:

38

Drell-Yan differential cross section measurement at sqrt(s) = 13 TeV with p-p collisions in the CMS detector

Author: Ridhi Chawla[1]

[1] *Panjab University (IN)*

Corresponding Author: ridhi.chawla@cern.ch

The measurement of the Drell-Yan differential cross section is presented at sqrt(s) = 13 TeV in the dimuon channel. The differential cross section dσ/dM is measured in the mass range 15 to 3000 GeV using an integrated luminosity of 2.8 fb−1 of proton-proton collision data collected using the CMS detector at the LHC. The cross section is compared to various theoretical predictions.

Summary:

39

Texture specific lepton mass matrices and mixing angles

Author: Neelu Mahajan[1]

[1] *GGDSD College, Sector 32 C, Chandigarh*

Corresponding Author: neelu_396@yahoo.co.in

We study the phenomenological consequences of recent results from atmospheric and accelerator neutrino experiments on textures. A systematic analyses of the texture specific mass matrices have been carried out pertaining to Majorana neutrinos. These lepton mass matrices have been examined for their compatibility with the latest neutrino oscillation data in the cases of normal hierarchy (NH),inverted hierarchy (I H) and degenerate scenario of neutrino masses. The phenomenological implications for the neutrino mass spectrum, the CP violating phases, the tritium beta decay and neutrino less double beta decay are also explored.

Summary:

40

Confined Chromoelectric field profiles in dual QCD

Author: Deependra Singh Rawat[1]

[1] *Department of Physics, UGC-Centre of Advanced Study, Kumaun University, Nainital*

Corresponding Author: dsrawatphysics@gmail.com

Utilizing the topological structure of non-Abelian gauge theories, QCD has been analyzed as a color gauge theory of strong interaction. The dynamical breaking of magnetic symmetry of dual QCD vacuum has been shown to acquire the state of color superconductivity. The profiles of color electric field using flux quantization and energy minimization conditions presented in the full infrared sector of QCD. These profiles of confined chromoelectric field have been shown to lead to the localization of field around the poles at large distance scales and homogeneous below the critical radius of phase transition.

Summary:

41

Thermo-QCD and QGP phase transition

Author: Harish Chandola[1]

[1] *Kumaun University*

Corresponding Author: chandolaharish@gmail.com

Abstract

Utilizing the thermodynamical concepts for the analysis of QCD phase structure and other thermal effects in QCD ultraviolet and infrared energy sectors, the thermodynamiocal potential constructed using partition function approach has been shown to identify some of the important thermodynamical variables of thermal dual QCD. The bag model of hadrons has been constructed by incorporating the confining structure of the magnetically dominated dual QCD and used to derive the energy density, entropy density and pressure in both hadronic and plasma phases. The associated equation of state has been used to understand the dynamics of phase transition in QCD and the numerical estimate of critical temperature has been shown to lead to the relaxation of the system via a mixed phase of QGP and hot hadron gas which is expected to open a new window to create QGP in the experimentally realizable near infrared region of QCD with the noble experimental programme of RHIC and LHC.

Summary:

Abstract

Utilizing the thermodynamical concepts for the analysis of QCD phase structure and other thermal effects in QCD ultraviolet and infrared energy sectors, the thermodynamiocal potential constructed using partition function approach has been shown to identify some of the important thermodynamical variables of thermal dual QCD. The bag model of hadrons has been constructed by incorporating the confining structure of the magnetically dominated dual QCD and used to derive the energy density, entropy density and pressure in both hadronic and plasma phases. The associated equation of state has been used to understand the dynamics of phase transition in QCD and the numerical estimate of critical temperature has been shown to lead to the relaxation of the system via a mixed phase of QGP and hot hadron gas which is expected to open a new window to create QGP in the experimentally realizable near infrared region of QCD with the noble experimental programme of RHIC and LHC.

42

Measurements of phi* differential cross sections for Drell–Yan events in pp collisions at sqrt{s} = 8 TeV with CMS

Author: Genius Walia[1]

[1] *Panjab University (IN)*

Corresponding Author: genius.walia@cern.ch

Measurements of phi* differential cross sections for inclusive Drell–Yan events in the dielectron and dimuon final states are presented. The kinematic variable phi*, constructed from the lepton angles, is correlated with the transverse momentum of the vector boson. The data were collected with the CMS experiment at a centre-of-mass energy of 8 TeV and correspond to an integrated luminosity of 19.7 fb–1. The differential cross section dsigma/dphi* normalised to the total cross

section within the fiducial volume is measured with a precision of about 1% and is compared with theoretical predictions. The measured spectrum, for the range φ* < 0.1, differs from the theoret- ical predictions by at most 5% (ResBos), 4% (MADGRAPH) and 9% (POWHEG). For higher values of phi* the deviations are as high as 9%, 5% and 18% in the three cases respectively.

Summary:

44

Measurements of phi* differential cross sections for Drell–Yan events in pp collisions at sqrt{s} = 8 TeV with CMS

Author: Genius Walia[1]

[1] *Panjab University (IN)*

Corresponding Author: genius.walia@cern.ch

Measurements of phi* differential cross sections for inclusive Drell–Yan events in the dielectron and dimuon final states are presented. The kinematic variable phi*, constructed from the lepton angles, is correlated with the transverse momentum of the vector boson. The data were collected with the CMS experiment at a centre-of-mass energy of 8 TeV and correspond to an integrated luminosity of 19.7 fb−1. The differential cross section dsigma/dphi* normalised to the total cross section within the fiducial volume is measured with a precision of about 1% and is compared with theoretical predictions. The measured spectrum, for the range φ* < 0.1, differs from the theoret- ical predictions by at most 5% (ResBos), 4% (MADGRAPH) and 9% (POWHEG). For higher values of phi* the deviations are as high as 9%, 5% and 18% in the three cases respectively.

Summary:

45

Search for New Physics with high-mass tau lepton pairs in pp collisions at sqrt(s) = 13 TeV using CMS detector

Author: Amandeep Kaur Kalsi[1]

[1] *Panjab University (IN)*

Corresponding Author: amandeep.kaur.kalsi@cern.ch

A search for new physics beyond the standard model in events containing tau-lepton pairs of high mass is performed, using data corresponding to an integrated luminosity of 2.2 fbˆ{-1} collected by the CMS detector in pp collisions at sqrt(s) = 13 TeV. The observation is found to be in good agreement with the standard model prediction. Hence, an upper limit at 95% C.L. on the product of cross section times branching fraction into tau-lepton pair is calculated as a function of the resonance mass for the Sequential Standard Model. In this model, the presence of Z' bosons decaying into tau-lepton pairs is excluded for Z' masses below 2.1 TeV.

Summary:

46

Differential cross-section measurements of W+jets using CMS detector at LHC energy.

Author: Bhawandeep Bhawandeep[1]

[1] *Panjab University, Chandigarh*

Corresponding Author: b.bhawandeep@cern.ch

Study and measurement of the differential cross-sections of W+jets is presented via muon decay mode using proton-proton collisions data recorded by the CMS detector at LHC. The differential cross-section measurements are presented as a function of several variables including the jet multiplicity, the jet transverse momentum and pseudorapidity, the scalar sum of the jets transverse momentum and several angular correlations among jets. The cross-section measurements are compared with the predictions from leading-order generators, next-to-leading-order and next-to- next-to-leading-order theoretical predictions.

Summary:

47

β-decay of neutron-rich thermally fissile Th and U isotopes

Author: Tabassum Naz[1]

[1] *Aligarh Muslim University*

Corresponding Author: tabasumnaz321@gmail.com

We have used the covariant density functional theory (CDFT) with finite-range (DD-ME1 and DD-ME2) along with density dependent point-coupling (DD-PC1) interaction to study the binding energies, and the stability of neutron-rich thermally fissile thorium ($^{240-268}Th$) and uranium ($^{240-270}U$) isotopes by β-decay. The semi-emprical formula of Fiset and Nix is used for calculating the half-life time of the isotopes.
The binding energies and half-life are compared with experimental data wherever available, finite-range drop model (FRDM) , infinite-nuclear matter model (INM) and our results are found in good agreement. From the present study, we concluded that once the neutron-rich thermally fissile isotope is formed
(naturally or artificially), it immediately undergoes β-decay.

Summary:

48

Study Of Superheavy Nuclei With Z=126 Using CDFT Approach

Author: TASLEEM SIDDIQUI[1]

[1] *Aligarh Muslim Universuty*

Corresponding Author: ph_tasleem@yahoo.com

An accurate description for investigating the nuclear structure phenomena, ground state properties, and collective excitation of nuclei provided by self-consistent mean-field model based on Relativistic Mean Field Theory (RMF) over the long range of nuclear chart. Density Functional Theory play

a key role for understanding the dynamics of nuclear many body system in terms of Energy Density Functionals (EDFs). Relativistic models with an explicit density dependent meson nucleon and point coupling model give more accurate microscopic description of nuclei over the nuclear chart as compared to the standard non-linear meson self interaction. Covariant Density Functionals are very authentic in nuclear structure studies not only due to the relativistic kinematics but because of relativistic field in the nucleus. These conditions make it necessary to reanalyze the structure of super heavy nuclei using both the set of energy density functionals. In the present work, we have used Covariant Density Functional Theory (DD-ME1, DD-ME2, DD-PC1) to discuss the bulk properties of isotopic chain of Z=126, which covers the neutron number 162 to 214. In this study the effect of deformation are taken into account which make it different from earlier studies of the shell structure in super heavy nuclei limited to spherical shape. we obtained the ground state and bulk properties such as binding energy, neutron separation energy, quadrupole deformation, potential energy surface. We have also studied spontaneous fission and alpha decay chain of some nuclei. Since there is no experimental observation made yet for such a large Z region, therefore we have compared our results with Finite Range Droplet Model (FRDM)

Summary:

49

Analysis of proton-9Be scattering observables using most accurate spin orbit potential

Author: Mariyah siddiqah[1]

[1] *Aligarh Muslim University*

Corresponding Author: shah.siddiqah@gmail.com

Microscopic calculation of a nucleon-nucleus optical potential has been one of the important aims in nuclear reaction theory. The effective interaction (t matrix) obtained by solving the Bethe-Goldstone integral equation for a nucleon-nucleon interaction in nuclear matter is folded over the nucleon density in the target using local-density approximation to obtain non local nuclear optical potential. In order to simplify the calculations, Brieva and Rook (BR) [1] proposed an approximate form of the equivalent local potential.Novel features of the present work is that we had obtained an exact expression for both the direct and a local equivalent to the exchange parts of the spin-orbit potential which is an improvement over the Brieva and Rook approximate form. The detailed numerical calculations and results have been reported in our recent work [2]. Employing this exact spin orbit potential in Brueckner-Hartree-Fock (BHF) approach we have analyzed the differential cross section of 9Be at various energies. We observe that the spin orbit potential depends mildly on energy and gives reasonably good agreement between our results and the experimental scattering data.

[1]F. A. Brieva and J. R. Rook, Nucl. Phys. A 291, 299(1977)

[2] W.Haider et al., Phys.Rev.C 93, 054615 (2016)

Summary:

52

Two- and three-body hyperon-nucleon interactions in Λ hypernuclei

Author: M. Imran[1]

Co-author: ASLOOB A. Rather [1]

[1] *Department of Physics, Aligarh Muslim University, Aligarh-202002*

Corresponding Authors: asloobahmad.rs@amu.ac.in, pasha08imran@gmail.com

Strangeness degree of freedom can be experimentally implanted into a bound nucleus forming a composite system of nucleons and hyperons. Strangeness degree of freedom when injected to a bound nucleus may induce several dynamical changes in the nuclear structure such as shape, size, density profile, nuclear core polarization etc. Hypernuclei are the unique laboratories for studying these interesting aspects owing to presence of hyperon in a nuclear matter of different densities. Study of hypernuclei are also important to obtain information about the hyperon-nucleon (YN) and hyperon-hyperon (YY) interactions which is crucial for proper understanding of the octet of baryons (N, Λ, Σ, Ξ, Ω) in a unified way. Moreover, a clear understanding of YN and YY interaction is necessary to understand the properties of both finite as well as bulk strange hadronic matter and neutron stars. The YN scattering experiments data are scarce; therefore, in order to extract information about YN and YY interactions, many-body hypernuclear structure calculations are essential. Especially, the structure calculations of light hypernuclei are important to extract information about the YN interaction while heavier hypernuclear systems provide a platform to test the behavior of strangeness degree of freedom in bulk nuclear matter.
The aim of the present investigation is to understand the role of the two-body and three-body ΛN and ΛNN interactions in the study of Λ-hypernuclei. Over the past few decades, several YN interaction models have been proposed but none of them correctly reproduces the hypernuclear spectra [1-4]. Many authors explore phenomenological strange sector potentials in order to reproduce accurate binding energies of light hypernuclei [6-9]. We too used phenomenological ΛN and ΛNN potentials in our study [6-8]. The findings of the investigation lead to some interesting results. The study suggests that the three-body ΛNN potential is crucial to reproduce correct binding energies of light hypernuclei [5-12].

REFERENCES

[1] Nagel M. M., Rijken T. A. and deSwart J. J., Phys. Rev. D 15, 2547, (1977).
[2] Nagels M. M., Rijken T. A. and deSwart J. J., Phys. Rev. D 20, 1633, (1979).
[3] Maessen P. M. M., Rijken T. A. and deSwart J. J., Phys. Rev. C 40, 2226, (1989).
[4] Holzenkamp B., Holinde K. and Speth J., Nucl. Phys. A, 500, 485, (1989).
[5] Nogga A., Nucl. Phys. A, 914, 140, (2013).
[6] Imran M., Usmani A. A., Ikram M., Hasan Z. and Khanna F. C., J. Phys. G: Nucl. Part. Phys. G 41, 65101, (2014).
[7] Usmani A. A., Phys. Rev. C 73, 011302(R), (2006).
[8] Usmani A. A. and Hasan Z., Phys. Rev. C 74, 034320, (2006).
[9] Lonardoni D., Pederiva F. and Gandolfi S., Phys. Rev. C 89, 014314, (2014).
[10] Carlson J., Pandharipande V. R., and Wiringa R. B., Nucl. Phys. A 401, 59, (1983).
[11] Bodmer A. R., Usmani Q. N. and Carlson, J., Phys. Rev. C 29, 684, (1984).
[12] Bhaduri R. K., Loiseau B. A. and Nogami, Y., Ann. Phys. (NY) 44, 57, (1967).

Summary:

Effects of the two- and three-body hyperon-nucleon interactions are investigated in light hypernuclei. The aim of the present study is to test the the role of two- and three-body strange potentials in the hypernuclear systems.

53

Generalised Tsallis distributions in Hardon-Nucleus Collisions.

Author: Sandeep Sharma[1]

[1] *Panjab University (IN)*

Corresponding Author: sandeep.sharma@cern.ch

Particle collisions at relativistic high energy leads to production of large number of multi particles. Thermodynamics and statistics plays an important role in studying the characteristic properties of charged multi particle production in leptonic, hadronic, hadron- nucleus collisions at high energy. Various thermal models using standard statistical distributions have been developed to describe the multi particle production in systematic way. Statistical equilibrium leads to non exponential behavior of transverse energy distribution of hadrons produced in high energy collisions. This deviation is related to power-like hadron spectra as hadrons produced from quarks and gluon fragmentation overcomes the thermal hadron production which is exponential in nature. Distributions satisfying the such criteria is required in investigating the multi particle production. We use the different approaches to study the hadron production in particle collisions at high energies. Tsallis q- statistics, Gamma distributions and micro canonical distribution have been considered to study multiplicity distributions in hadron-nucleus collisions at high energies.

Summary:

54

Forward Backward multiplicity correlations in pp interactions at √s = 0.9, 2.76, 7.0 and 13.0 TeV

Author: Shaista Khan[1]

[1] *Aligarh Muslim University*

Corresponding Author: khanshaista123@gmail.com

The forward-backward (FB) multiplicity correlations are investigated by analyzing the Monte Carlo simulated data corresponding to pp collisions at LHC energies and the findings are compared with those observed with the real data. Such a study would be an attempt to distinguish between various theoretical models and identify the model describing the features of the experimental data nicely. Monte Carlo event samples, each (comprising of 10^6 events) corresponding to pp collisions at 0.9, 2.76, 7.0 and 13.0 TeV are simulated using the codes \amm-v1.21-v2.21 and \hij-1.35. The dependence of the FB correlation coefficient, b_{corr}, on the pseudorapidity window widths ($\Delta\eta$) and position (η_{sep}) in full and limited azimuthal acceptance are studied. It is observed that the b_{corr} decreases with increasing η_{sep}, whereas a non-linear increase of b_{corr} with $\Delta\eta$ is seen. The findings also reveal that for a given width and separation, b_{corr} increases with increasing collision energy which can not be explained exclusively by the increase of average particle multiplicities within the windows. It is observed that the values of b_{corr} predicted by \am are closer to those estimated with the real data while \hi predicted b_{corr} values are significantly smaller. Furthermore, the strength of correlation is estimated in various configurations of two azimuthal sectors selected within the symmetric η-windows. Such an azimuthal cut is applied because of the idea that measurement of the FB multiplicity correlations between two small windows separated in pseudorapidity and azimuthal angle represents the two distinct contributions, coming from the short-range (SR) and the long-range (LR) correlations. The method of analysis and the findings based on azimuthal cut will be discussed in detail.

Summary:

55

Change in prompt muon spectrum with growing energies

Author: SATENDRA KUMAR CHAUHAN[1]

[1] *UNIVERSITY OF LUCKNOW,LUCKNOW INDIA*

Corresponding Author: satenluck@gmail.com

The cosmic rays when interacts with the earth's atmospheric nuclei produces cascade of muons. These interactions and their products at high energies have always been a topic of interest for theoretical as well as experimental physics. The conventional muon fluxes obtained from the decay of charged pions and kaons till few GeV energies are well studied where as at higher energies such as 10^6 GeV the conventional muon fluxes needs the inclusion of muon fluxes produced from the leptonic decay of charm particles. This contribution is known as prompt muon fluxes. The estimation of prompt muon fluxes at higher energies is very important. The muon production at higher energies varies with the logarithmic growth of energy. For the evaluation of prompt muon fluxes we have estimated the contribution of leptons from charm particles (D^0, D^+, D^-, λc, J/Psi). Here we have adopted two phenomenological approaches for the charm production : the recombination quark parton model(RQPM) and the quark gluon string model (QGSM) based on non perturbative QCD. Our results of prompt fluxes are compared with the prompt fluxes calculated in different models: TIG, PRS, GGV(based on perturbative QCD). Here the transport equation of muons are calculated by using semi analytical method. Finally the calculated flux is passed through the iron detector and the number of muons cascades are evaluated. These observations will help us to understand the contribution of charm particles at higher energies.

Summary:

56

Change in prompt muon spectrum with growing energies

Authors: SATENDRA KUMAR CHAUHAN[1]; SHARDA PANDEY[1]

[1] *UNIVERSITY OF LUCKNOW,LUCKNOW INDIA*

Corresponding Authors: sharda2012536@gmail.com, satenluck@gmail.com

The cosmic rays when interacts with the earth's atmospheric nuclei produces cascade of muons. These interactions and their products at high energies have always been a topic of interest for theoretical as well as experimental physics. The conventional muon fluxes obtained from the decay of charged pions and kaons till few GeV energies are well studied where as at higher energies such as 10^6 GeV along with the conventional muon fluxes the inclusion of muon fluxes produced from the leptonic decay of charm particles is also required.This contribution is known as prompt muon fluxes. The estimation of prompt muon fluxes at higher energies is very important. The muon production at higher energies varies with the logarithmic growth of energy. For the evaluation of prompt muon fluxes we have estimated the contribution of leptons from charm particles (D^0, D^+, D^-,$\bar{D}$, λ_c, J/Ψ). Here we have adopted two phenomenological approaches for the charm production : the recombination quark parton model(RQPM) and the quark gluon string model (QGSM) based on non perturbative QCD. Our results of prompt fluxes are compared with the prompt fluxes calculated in different models: TIG, PRS, GGV(based on perturbative QCD). Here the transport equation of muons are calculated by using semi analytical method. Finally the calculated flux is passed through the iron detector and the number of muons cascades are evaluated. These observations will help us to understand the contribution of charm particles at higher energies.

Summary:

57

Change in prompt muon spectrum with growing energies

Authors: SATENDRA KUMAR CHAUHAN[1]; SHARDA PANDEY[1]

Co-author: JYOTSNA SINGH [1]

[1] *UNIVERSITY OF LUCKNOW,LUCKNOW INDIA*

Corresponding Authors: sharda2012536@gmail.com, jyo2210@yahoo.co.in, satenluck@gmail.com

The cosmic rays when interacts with the earth's atmospheric nuclei produces cascade of muons. These interactions and their products at high energies have always been a topic of interest for theoretical as well as experimental physics. The conventional muon fluxes obtained from the decay of charged pions and kaons till few GeV energies are well studied where as at higher energies such as 10^6 GeV along with the conventional muon fluxes the inclusion of muon fluxes produced from the leptonic decay of charm particles is also required. This contribution is known as prompt muon fluxes. The estimation of prompt muon fluxes at higher energies is very important. The muon production at higher energies varies with the logarithmic growth of energy. For the evaluation of prompt muon fluxes we have estimated the contribution of leptons from charm particles (D^0, D^+, D^-,$\bar{D}$, λ_c, J/Ψ). Here we have adopted two phenomenological approaches for the charm production : the recombination quark parton model(RQPM) and the quark gluon string model (QGSM) based on non perturbative QCD. Our results of prompt fluxes are compared with the prompt fluxes calculated in different models: TIG, PRS, GGV(based on perturbative QCD). Here the transport equation of muons are calculated by using semi analytical method. Finally the calculated flux is passed through the iron detector and the number of muons cascades are evaluated. These observations will help us to understand the contribution of charm particles at higher energies.

Summary:

Day 1 : Inaugural Session / **118**

Address by Chief Guest and Inaugural Talk "Neutrino oscillations -discovery, status and prospect"

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

Summary:

119

XXX

Day 1 : Midday Session / **120**

Development of Particle Detectors at TIFR for Underground Experiments - Then and Now

Day 1 : Midday Session / **121**

Precision Neutrino Physics and "Rediscovery of the Nucleus

Day 1 : Midday Session / **122**

Japanese neutrino program and J-PARC neutrino beam

Day 1 : Afternoon Session / **123**

Status and prospects of T2K/T2K-II and Hyper-Kamiokande

Day 1 : Afternoon Session / **124**

Long-Baseline Program at Fermilab: Current Results and Future Expectations

Day 1 : Afternoon Session / **125**

NNN

Day 1 : Afternoon Session / **126**

Neutrino Mass Hierarchy and CP-violation: How to get them?

Day 1 : Afternoon Session / **127**

Probing Non-holomorphic MSSM via precision constraints, dark matter and LHC data

Day 2 : Morning Session / **128**

Interpretation of Neutrino-Nucleus Interactions

Day 2 : Morning Session / **129**

Weak B and D decays: a new window to look for the nature of hadronic resonances

Day 2 : Morning Session / 130

One Pion Production in the Resonance Region

Day 2 / 131

High Resolution Neutrino (Near) Detector & Precision Measurements of Electroweak Interactions

Day 2 / 132

Standard Model Physics at the LHC

Day 2 / 133

NNN

Day 2 / 134

NNN

Day 2 / 135

Open Charm and Beauty quarks in the quark-gluon plasma : the primordial fluid

Day 2 / 136

NNN

Day 3 : Morning Session / 137

Weak B and D Decays: A New Window to Look for the Nature of Hadronic Resonances

Day 3 : Morning Session / 138

Long Baseline Neutrino Oscillations: Current Status and Future Challenges

Day 3 : Morning Session / 139

GENIE Status and Prospects

Day 3 / 140

Fermi's lab Current and Future Neutrino Cross-section Measurements Program

Day 3 / 141

NNN

Day 3 / 142

Muons in ICAL

Day 3 / 143

NNN

Day 3 / 144

Evening Talk

Day 4 : Morning Session / 145

The Gamma production from Giant Resonances of Carbon/Oxygen at Low Energy (10-100MeV) and Importance to Supernova Physics

Day 4 : Morning Session / 146

Sensitivity of Anomalous Couplings at LHeC

Day 4 : Morning Session / 147

Does the Wolfenstein form work for the leptonic mixing matrix?

Day 4 / 148

CMS Upgrade and Future Prospects

Day 4 / 149

The implications of Sterile Neutrino for CP Measurements at Long Baseline

Day 4 / 150

Low energy nutrino & dark matter : identification using Sb-KeV Germanium detector

Day 4 / 151

Self-induced neutrino flavour conversion even without flavour mixing

Day 4 / 152

NNN

Poster Session / 153

Discriminating Dirac and Majorana neutrino CP phases in the light of thermal leptogenesis in type I+II seesaw models.

Corresponding Author: rup@tezu.ernet.in

We study the effects of Dirac and Majorana CP phases in the origin of baryon asymmetry of the Universe through the mechanism of the leptogenesis. In this work we also try to connect neutrino CP phases, lightest neutrino mass and baryogenesis within the framework of a model where both type I and type II seesaw contribute to the neutrino mass. Type I seesaw mass matrix considered as a TBM type neutrino mass matrix which gives zero θ13 whereas type II seesaw acts as a correction to generate nonzero θ13. Considering type II seesaw mass matrix as a subleading and equally dominating compared to type I seesaw, we try to constrain all these experimentally undetermined neutrino parameters namely Dirac and Majorana CP phases and lightest neutrino mass from the requirement of producing correct baryon asymmetry of the Universe.

Day 5 : Morning Session / **154**

Exploring Atomic Nucleus from Emerging Particles from its Door-Step

Day 5 : Morning Session / **155**

Kaon Decay-at-rest Opportunities with MiniBooNE

Day 5 : Special Session (Flash Talk) / **156**

Flash Talk (10 minutes each) Best Three Posters

Day 5 / **157**

Summary Talk

Day 5 / **158**

Concluding Remarks

Poster Session / **159**

Search of Standard Model Higgs Boson via WW decay channel using the CMS detector

Ankita Mehta (Panjab University (IN))

160

Recitation from the Holy Quran

Day 1 : Inaugural Session / 161

Recitation from the Holy Quran

Day 1 : Inaugural Session / 162

Welcome Address by the Convener

Day 1 : Inaugural Session / 163

Address by the Chairperson

Day 1 : Inaugural Session / 164

Address by the Dean, Faculty of Science

Day 1 : Inaugural Session / 165

Address by the Guest of Honour

Day 1 : Inaugural Session / 166

Presidential Address

Day 1 : Inaugural Session / **167**

Vote of Thanks

Day 1 : Inaugural Session / **168**

University Tarana & National Anthem

Day 2 / **169**

The INO Project

Day 2 / **170**

Thermodynamics of hot and dense deconfined QCD matter created in the heavy-ion collisions

Day 5 : Morning Session / **171**

CP Violation in the neutrino oscillation and non-standard interactions

Day 4 / **172**

Self induced neutrino flavour conversion even without flavour mixing