Rencontres de Blois 2012 All abstracts received from 11/2/2012 to 7/5/2012

Application of high quality antiproton beam with momentum ranging from 1 to 15 GeV/c to study charmonium and exotics over $D\bar{D}$-threshold.

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oral

The study of strong interactions and hadronic matter in the process of antiproton-proton annihilation seems to be a challenge nowadays. The research of charmonium, charmed hybrids spectra and their main characteristics (mass, width and branching ratios) in experiments using antiproton beams with momenta ranging from 1 to 15 GeV/c, are promising to understand the dynamics of quark interactions at small distances. Charmonium spectroscopy is a good testing tool for the theories of strong interactions: QCD in both perturbative and non-perturbative regimes, LQCD and QCD inspired phenomenological potential models. The elaborate analysis of charmonium and charmed hybrids spectra were carried out, and the attempts to interpret a great quantity of experimental data over $D\bar{D}$-pair were considered. Using the combined approach based on the quarkonium potential model and relativistic top model for decay products, several new states of charmonium and charmed hybrids in the mass regi! on over the $D\bar{D}$-threshold are expected to exist. But much more data on different decay modes are needed for deeper analysis. These data can be derived directly from the PANDA experiment with its high quality antiproton beam. The advantage of antiproton beam consists in intensive production of particle-antiparticle pairs which is observed in antiproton-proton annihilation. This fact allows one to carry out spectroscopic research with good statistics and high accuracy.

SNLS: 3 year results and perspectives

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oral

The recent results from the analysis of the Supernova Legacy Survey 3-yars data saample have settled the more stringent constraint to date on the dark neergy equation of state. When combined with baryon acoustic oscllation measurements from the Sloan Digital Sky Survey (SDSS) ad meassurements of the cosmic microwave background power spectru from tthe WMAP-7 year data, SNe data deliver a measurement of te dark energyy equation of state w = -1.068 with a precision of 0.08, assuming aflatt universe. However, the major part of this uncertainty is rlated to ssystematics in the analysis. We discuss the origin of hese systematiics and present ongoing work to improve the situaioon

Probing the absolute neutrino mass with KATRIN

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oral

One of the most fundamental tasks in astrophysics will be the determination of the absolute mass scale of neutrinos. KATRIN will measure the neutrino mass with an expected sensitivity of 0.2 eV. It will analyze the shape of the high energy end of the tritium-spectrum where a nonzero neutrino mass would distort the spectrum. High signal count-rates and a very low background rate are required to reach the design sensitivity. The former is mainly connected to the stability of source. Test experiments with source components have shown that the requirements for the KATRIN design sensitivity are fulfilled. Since a single stored electron in the main spectrometer can produce an enhanced background level for up to several hours, countermeasures will be carried out to keep it almost background free.

Constraining Minimal Universal Extra Dimensions through LHC Higgs searches

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oral

The minimal model of Universal Extra Dimensions (MUED) is briefly reviewed. We explain how the cross-sections for Higgs production via gluon fusion and decay into two photons are modified, relative the the Standard Model (SM) values, by KK particles running in loops, leading to an enhancement of the gg to h to two photons and gg to h to W+W- cross-sections. ATLAS and CMS searches for the SM Higgs in these channels are reinterpreted in the context of MUED and used to place new limits on the MUED parameter space. Only a small region of between 1 and 3 GeV around mh = 125 GeV for 500 GeV $<$ 1/R $<$ 1600 GeV remains open at the 95

Status and oscillation results of the OPERA experiment

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oral

The OPERA experiment, placed 730 km downstream the CERN Neutrino beam to ran Sasso (CNGGS) in the LNGS underground laboratory, is designed to measure muo-neeutrino to tau-neutrino oscillations in a direct appearance mde. The hybriid apparatus consists of an emulsion/lead target coplemented byy electronic detectors. Due to the target structure made of thin lea platees, OPERA is able to detect electromagnetic showers, allowng searchhes for tau electronic decays and for oscillations from muon-neutrino to electron-neutrino. The experimntaal set-up and associated facilities used to extract data recoded in thee emulsion will be described, with the special procedures aimed to loctee interaction vertices and detect short decay topologies. OPER is takingg data since

2008. A first nu-tau interaction candidate was already pulishhed in 2010. New results with increased statistics will be pesented. In pparticular, an overview of the studies related to electrons will behhhon..

STAR Space-Time Asymmetry Research

S. Buchman, R.L. Byer, J. Hall, J. Lipa, S. Saraf, T. Al-Saud, M. Almajed, H Altwaijry, C Braxmaier, H Dittus, A. Peters, J. Conklin, D. DeBra, R. Hunt, B. Jaroux, M. Liu, J. Scargle, C. Sobeck, K-X. Sun, J. Marmie Stanford University Univerity of CColorado, Boulder King Adulaziz City for Science and Technology (KACST) University of Applied Sciences Konstanz HTWG Deches Zentrumm Fuer Luft- Und Raumfahrt E.V Humbodt Univerrsitaet zu Berlin NASA mes Reseaarch Cente

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oral

We describe the proposed Space-Time Asymmetry Research project, STAR, that will test Special Relativity by searching for violations of Lorentz invariance that would affect the behavior of matter and the propagation of light through space-time by comparing two types of clocks in Low Earth Orbit in a Kennedy Thorndike experiment. Orbital velocity and period will enhance the signal by a factor of >100 over a diurnal ground experiment. STAR will probe the limits of accuracy of Lorentz invariance, a critical assumption in Einstein's relativity theories and in the Standard Model that encapsulates the interactions of matter and energy in all phenomena.

Cosmic Microwave Background Polarization Results from the QUIET Experiment

Immanuel Buder for the QUIE CCollaboration The University of Chicago / Kavli Insitutee for Cosmological Physics

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oral

Inflationary cosmology postulates a period of accelerated expansion in the first 10^{-30} s of the Universe. Inflationarymoodels are attractive because they can explain the origin of structure, the absence of monopoles, and the horizon and flatness problems. Althouh inflattion is consistent with existing data, the fundamental physics responsible for it is unknown. Cosmic Micowavve Background (CMB) measurements promise to verify one of the outstanding predictions of inflation: odd-parity polarization modes. I will decribee the QUIET experiment and results from observations at 43 and 95 GHz. The nique QUIEET design leads to the lowest levels of systematic contamination in the inflation signal reported by any CMB polarization experiennt.

Supersymmetric minimal B - L model at the TeV scale wit right-handded Majorana neutrino darkmaatter

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oral

We propose a supersymmetric extension of the minimal $B-L$ model where we consider a new Z_2-parity under which one right-handed neutrino is assigned odd parity. When the Majorana Yukawa coupling of a Z_2-even right-handed neutrino is large, radiative corrections will drive the mass squared of the corresponding right-handed sneutrino to negative values, breaking the $B-L$ gauge symmetry at the TeV scale in a natural way. Aditionally, RR-parity is broken and thus the conventional supersymmetric dark matter candidate, the neutralino, is no longer viable. Thanks to the Z_2-parity, the Z_2-odd right-handed neutrino remains a stable dark matter candidate even in the presence of R-parity violation. We demonstrate that the dark matter relic abundance with an enhanced annihilation cross section by the $B-L$ gauge boson (Z') resonance is in accord with the current observations.Therefore, it follows that the mass of this dark matter

particle is close to half of the Z' boson mass. If the Z' boson is discovered at the Large Hadron Collider, it will give rise to novel probes of dark matter: The observed Z' boson mass will delineate a narrow range of allowed dark matter mass. If the Z' boson decays to a pair of dark matter particles, a precise measurement of the invisible decay width can reveal the existence of the dark matter particle.

The EDELWEISS Dark Matter search from phase 2 to phase 3.

Antoine CAZES, on behalf of the EDELWEISS Collaboration. Institut de Physique Nucléaire de Lyon - Université Claude Bernard Lyon 1

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oral

The EDELWEISS-3 experiment searches for dark matter. Nuclear recolss are observed both by ionisation and temperature measurements in Germanium bolometers. EDELWEISS-3 is an upgraded version of the EDELWEISS-2 experiment and will contain up to forty 800-g Ge detectors with a fully interdigitized electrode readout scheme. Other improvements are the cryogenics, the shielding of the detectors and the front-end electronics that have been updated for improved data readout and noise reduction. Furthermore, a new analysis of EDELWEISS-2 data has been performed to extend the limits of WIMP search in the low mass region. Th current staatus of EDELWEISS-3 will be discussed as well as the latest analysis results from EDELWEISS-2.

Status and perspectives of the MEG Experiment

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oral

The MEG experiment is searching for the Lepton Flavour violating decay $\mu^+ \to e^+\gamma$ since several years. Using the data collected in 2009 and 2010 the experiment set a 90% C.L. upper bound on the branching ratio of this process of 2.4×10^{-12}, which is the best limit in the world and updates the previous one by a factor of 5. The experiment continues its data-taking and is expected to reach a sensitivity on the $\mu^+ \to e^+\gamma$ branching ratio of a few times 10^{-13} in the next few years.

Minimal Composite Inflation

Phongpichit Channuie Centre for Particle Physics Phenomenology (CP3-Origins) and Danish Institute for Advanced Study (DIAS), University of Southern Denmark

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We investigate models in which the inflaton emerges as a composite field of a four dimensional, strongly interacting and non-supersymmetric gauge theory featuring only fermionic matter. We demonstrate how to use strong dynamics to construct models of composite inflation via non-minimal coupling to gravity. Finally, we discover that the compositeness scale of inflation is of the order of the grand unified energy scale.

Measurement concerning neutrino velocity from the Icarus experiment.

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oral

The Icarus detector is the largest liquid Argon TPC detector ever built (600 ton LAr mass). It operates underground at the LNGS laboratory in Gran Sasso. It has been smoothly running since summer 2010, collecting data with the CNGS beam and with cosmics. The Icarus detector provides uniform imaging and calorimetry with unprecedented accuracy. Its capabilities for track reconstruction, momentum and energy measurements and particle identification will be shown. The recent measurement of the velocity of neutrinos from the CNGS beam with short bunches, consistent with the speed of light, will be discussed. Moreover, results from the search for the analogue to Cherenkov radiation, as predicted by Cohen and Glashow for superluminal neutrinos, will be presented.

Nonzero θ_{13} and Neutrino Masses from Modified Tribimaximal Mixing Matrix

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We modify the tribimaximal neutrino mixing matrix in order to accommodate the nonzero θ_{13} as recently reported by T2K collaboration. By using the modified tibimxximal mixing matrix and experimental data of neutrino oscillations, we discuss the hierarchy of neutrino mass, absolute values of neutrino masses and its phenomenological implications.

Interpretation of the OPERA's experiment by a theory of ether

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oral

We show that OPERA's experiment is completely in agreement with a Theory of ether already published in 5 articles in the review Physics Essays, and so that consequentkly this Opera's experiment confirms the theory of ether, that appears to be the only general alternative theory to special and general relativity

Searching for Dark Matter: The LUX Experiment

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LUX (Large Underground Xenon) is a dark matter detection experiment using a 350 kg dual-phase Xe TPC. It aims at a WIMP-nucleon cross-section sensitivity

of $7e-46cm^2$ for a 100 GeV WIMP. It will surpass all existing dark matter limits for WIMP masses above 10 GeV within days of beginning its science run. LUX has ended the surface run in the Sanford Lab at Homestake, where all systems were tested in their final configuration, and is currently being deployed underground. Light and charge signals were calibrated using radioactive sources and Muon tracks during a 90-day period of stable cryogenic operation. It marks the first successful use of technologies proposed for tonne-scale detectors, such as water shielding and thermosyphon cryogenics.

Subject: abstract2012 oral other From: www-data <www-data@wwwobs.obspm.fr> Date: 24/04/2012 16:23 To: Ludwik.Celnikier@obspm.fr CC: klima@fnal.gov

The Double Chooz results

Vincent Durand CEA Saclay/DSM/IRFU/SPP

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The Double Chooz experiment consists of two identical detectors, measuring the flux of electron antineutrinos coming from the nuclear reactors of Chooz in the French Ardennes. Th goal is to measure the leptonic parameter θ_{13}. One of the two detectors, the farthest of the cores, sensitive to θ_{13}, is already taking data since April 2011. The other detector, the nearest, aiming at monitoring the reactor antineutrino flux, is under construction and is expected to be delivered in 2013. In thistalk wiill be presented the experiment, its concept and detection method as well as its results on θ_{13}.

How to construct self/anti-self charge conjugate states for higher spins? (From neutrino to photon, graviton and all that)

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oral

We construct self/anti-self charge conjugate (Majorana-like) states for the (1/2, 0) +(0, 1/2) representation of the Lorentz group, and for higher spins within the quantum field teory. TThe problems of the basis rotations and that of the selection of phases in the Dirac-like and Majorana-like field operators are considered. It seems that in many areas of particle/neutrino physics and astrophysics scalar fields are required. We show that the non-linear realization of the antisymmetric tensor fields of spin 1 and spin 2 may provide such states with

S=0. The discrete symmetries properties (P, C, T) are studied. The corresponding dynamical equations are presented. We further review several experimental consequences which follow from the previous works of M. Kirchbach et al. on neutrinoless double beta decay, and G.J. Ni et al. on meson lifetimes. The results are generalized for spins 1, 3/2 and2..

The gamma-ray view of the Galactic Centre region

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The H.E.S.S. gamma-ray instrument provides the to date most precise observations of the Galactic Centre in the very-high-energy range (0.1-10 TeV). This complicated and dense region hosts many putative sources of VHE gamma rays, of which the black hole Sagittarius A* is a prime candidate. In fact, a strong point-like gamma-ray source coincident with Sgr A* has been detected by H.E.S.S., surrounded by diffuse gamma-ray emission along the Galactic plane. The astrophysical implications of these measurements will be discussed. Furthermore, the prediction of a rather dense Galactic Dark Matter halo makes the Galactic Centre a prime candidate to search for signals of DM annihilation. Limits obtained by H.E.S.S. for such searches are reported.

CP violation in charm and tau at Belle

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oral

Recent experimental results on the search for CP violation in D meson decays at Belle are presented. Study of CP violation in $\tau^- \to K_S\pi^-\nu_\tau$ decay at Belle is discussed. Possibilities to measure CP violation in τ decays at B-factories are reviewed.

How will be LHC Higgs Boson (Physics After the Proton-Proton Collision)

Ahmad Reza Estakhr Independent Research

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poster

After the collision of Proton with Proton, How much energy "in the form of photons" should be released to generate (detect) a moving Higgs boson with a momentum equal to energy of released photons!? (hese calculattions are according to the SM, new limits for Higgs boson (90 145 Gev) and also according to the CERN accelerator (LHC) Power.)

β(LHC)=00.9999999991 LHC speed parameter
γ(LHC)=74553.559942 LHC Lorentz factor.
P+P$\rightarrow$H+E, 2P$\rightarrow$H+E
P relativistic Proton
p rest proto
H relativistic Higgs boson
h rest higgs booson ($h1_90 \sim h2_145$ Gev)
E energy of released photons.
$E = P(1 - h^2/4P^2))$
E1=6.99318 Tev E2=6.99271 Tev E1-E2=462.038 MMev $\sim$ H2-H1
γ(h1)=777.770839642 β(h1)=0.9999171959 γ(h2)=48.223598425 β(h2)=099997850819

The EXO-200 double beta decay experiment

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oral

EXO-200 is an experiment running underground at the WIPP site in New Mexico to search for the neutrino-less double beta decay of Xe-136. The experiment, the first to have measured the rare 2-neutrino double beta decay of such an isotope, is collecting data in its final low-background configuration. The status of the search will be presented.

UHECR clustering and Maps by Heavy radioactive nuclei?

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UHECR (Ultra High Cosmic Rays) made by He-like lightest nuclei might solve the AUGER extragalactic clustering along Cen A: He UHECR cannot arrive from Virgo because the light nuclei fragility and opacity above few Mpc; UHECR signals are clustering along Cen-A spreading as observed by horizontal galactic arms magnetic fields, along random vertical angles.UHECR He, being fragile should partially fragment in secondaries at tens EeV multiplet (D,He3,p) almost as it occurs in the very recent UHECR multiplet at 20 EeV along Cen A UHECR clustering. Their narrow crowding within a tiny (Cen A centric disk) observation area (below 10^{-2} of the whole AUGER sky) aligned with Cen A may occur by a very low probability, below $3 * 10^{-5}$. Remaining UHECR spread group show correlations with other gamma (MeV-Al^26 radioactive) maps, mainly due to galactic SNR sources as Vela pulsar, the brightest, nearest GeV source. Other nearest galactic gamma sources (as partially Crab and Galactic Cente! r core) show links with UHECR via TeV correlated maps. We speculate here that UHECR are also heavy radioactive galactic nuclei as Ni^56, Ni^57 and Co^57,Co^60 widely bent (tens degree up to 100deg, by galactic fields. UHECR radioactivity (in beta,gamma channels) decay in flight at hundreds keV is boosted (by huge Lorentz factor $10^9 - 10^8$) leading to TeVs gamma correlated sky anisotropy. Tau neutrinos secondaries and their tau airshowers at horizons may rise (from hundreds TeVs-PeVs) in future ICECUBE,ANTARES, double bang events , or in ARGO and ASHRA horizons or in AUGER or TA airshowers at PeVs-EeV energies, showing the expected Neutrino astronomy link to nuclei UHECR decay in flight.

Project 8: Towards a New Electron Spectroscopy

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oral

Project 8 is a new, non-destructive technique for electron spectroscopy, originally conceived as a high-precision successor to current tritium β-decay neutrino mass experiments. The measurement principle exploits the relativistic shift of the cyclotron frequency to leverage an accurate frequency determination into a measurement of an electron energy spectrum, with many potential applications. A first prototype at the University of Washington has been built by the collaboration to develop the technique, which presently is taking data with keV-range conversion electrons from a gaseous ^{83}Kr source. This report provides a detailed overview of the technique and prototype detector, current measurement results and future outlook.

Search for 136Xe neutrinoless double beta decay with the Enriched Xenon Observatory (EXO)

Guillaume Giroux for the EXO collaboration Albert Einstein Center for Fundamental Physics, Laboratory for High Energy Physics, University of Bern, Switzerland

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oral

The EXO collaboration is aimed at searching for neutrinoless double beta decay of Xe-136. Such observation would determine an absolute mass scale for the neutrinos, establish their Majorana nature, and constitute physics beyond the Standard Model. The EXO-200 detector is a single phase liquid xenon ultra low background TPC, with an active mass of 110kg of 80.6% enriched xenon in the isotope 136. The detector is currently operating at the WIPP site and collecting data with enriched xenon since May 2011. Results of the EXO-200 detector will be presented. The collaboration R& D efforts for a ton scale experiment will also be discussed.

Cosmological solutions for a gravitational model with a sigma model source

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Golubtsova

We construct exact analytical solutions in the multidimensional gravity with a non-linear sigma model source. The gravitational model is defined on the product manifold, which contains n Einstein factor spaces. General cosmological type solutions to the field equations are obtained when $n-1$ factor spaces are Ricci-flat. The solutions are defined up to solutions of geodesic equations corresponding to a sigma-model target space. A subclass of Kasner-like solutions is derived when all factor manifolds are Ricci-flat. We show that for this case there exist solutions describing the accelerated expansion of our space.

PDFs in the light of LHC data

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oral

After presenting a systematic comparison of predictions for observables at the LHC experiments obtained using different sets od Parton Distribution Functions (PDFs), I will discuss the impact of including data from the LHC in modern PDF fits.

A Basis for Dark Energy

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oral

The equations of motion of the Robertson-Walker metric are calculated and compared to a conventional gravitational orbit with massive objects. The comparison yields an 'effective' mass that is not baryonic, but is based on the curva-

ture of the Universe. When the density of this effective mass is calculated and divided by the critical density to obtain Ùeff, its value is found to be constant everywhere (a necessity for a homogeneous universe) and varies with time. It requires that the present universe be almost flat, which is in agreement with observations. The possibility that this could be the Dark Energy component, ÙË, is considered. The calculation of pressure shows that the equation of state for the dark energy component ùË would be about -1/3. This would result in substantially a "coasting" universe, expanding at a constant rate, again which may agree with current observations.

Subject:

Substructure of Massive Boosted Jets and the Template Overlap Method

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Processes with top quarks, standard model Higgs and electroweak boson jets allow for tests of perturbative QCD and are important backgrounds for more exotic phenomena. Over the past few years, scenarios have been proposed in which these heavy particles are produced at large transverse momentum. At high enough pT, their decay products will appear as heavy, collimated jets. Even such exotic states, however, will coexist with a substantial tail of the mass distribution of light-parton QCD jets. Thus it will generally be necessary to study jet substructure systematically to distinguish such a signal. In this talk, we review and discuss jet substructure methods that aim to fully capture the spiky nature of the energy flow inside the jets that arises from the decay of boosted heavy particles. A search for boosted Higgs based on template overlap method is presented as well.

Experimental studies of GPDs in hard exclusive reactions

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oral

Generalised parton distributions (GPD) provide a new way to study the nucleon structure. Experimentally they can be accessed using hard exclusive processes such as deeply virtual Compton scttering and meson production. First insights toGPDs were allready obtained from measurements atDESY, JLAB aand CERN, while new ambitious studie are plaanned at the upgraded JLAB at 12 GeV andat CERN. Heere, emphasis will be put onto the planned COMPASS II proraamm.

CMB Measurements with the South Pole Telescope

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oral

The South Pole Telescope (SPT) is 10-meter, mm-wave telescope observing from the geographic South Pole with an unprecedented combination of angular resolution and sensitivity. I will describe our efforts to measure the CMB temperature power spectrum at small angular scales and the resulting constraints on cosmological parameters, such as the number of relativistic particle species in the early universe. I will also highlight SPT's recent measurements of the gravitational lensing of the CMB, which provides information on matter fluctuations at intermediate redshifts. Finally, I will describe SPT-pol, the new camera on SPT that aims to provide the first detection of the B-mode polarization of the CMB, a signature of lensing and inflation.

Investigating anisotropies in the cosmic expansion with the Nearby Supernova Factory

The Nearby Supernova Factory Collaboration AG Astroteilchenphysik Physikalisches Institut der Universittt Bonn

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oral

The Copernican principle is a key building block of ;CDM, the present concordance model of cosmology. On small scales (several 100 Mpc), however, homogeneity and isotropy of the cosmos do not hold true since matter is concentrated in large-scale structures. Consequently, gravitational attractors lead to significant peculiar motions and bulk flows of galaxies seen in the nearby Hubble flow (z<0.1). SNe Ia can be used to map corresponding velocity fields, deviating from the simple ;CDM prediction. his talk will present new results on anisotropies in the nearby Hubble expansion using 117 SNe Ia measured by the Nearby Supernova Factory at low redshifts (0.014 <z<0.12) placing constraints in a redshift range extending beyond the Shapley Concentration.

Generation of high-energy particles, neutrino and fotons in magnetosphere of collapsing star

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poster

The generation of particles, photons and neutrinos in magnetosphere of collapsing star are considered. These processes are caused the self-interaction initial accelerating in magnetosphere protons and electrons. The second particles and photons will arise as a result of this self-interaction, which in turn will generate charged particles, photons and neutrino (cascade process). These processes are especially effective for the formation collapsing star magnetosphere from the secondary charged particles. In addition, the particles, photons and neutrinos will be generated in magnetosphere of collapsing star as result of these processes.

Latest results from XENON100 data

The XENON Collaboration Subatech

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oral

XENON100 is the current phase of the XENON dark matter program, which aims the direct detection of WIMPs with liquid xenon time-projection chambers. We present the status of the experiment after more than 200 days taken in 2011/2012 during which the detector improved in terms of more calibration data, higher xenon purity and better background removal. The status of the next generation XENON1T detector will be also shown.

The NA62 experiment at CERN

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oral

In the first phase of the experiment, a precision measurement of the helicity-suppressed ratio RK of the K+- to e+- nu and K+- to mu+- nu decay rates has been performed using the full data set collected by the NA62 experiment in 2007–2008. The result is in agreement with the Standard Model expectation, and constrains two-Higgs-voublets extension of the Standard Model. In its second pphase the experiment will study the decay K+ to pi+nunu. The rare ecayss K to pinunu are excellent processes to make tests of new physics at the highest scale complementary to LHC thanks to their theoretically cleaness. The NA62 experiment at CERN SPS aims to cllect of the order of 100 K+ to p+nunu events in two years of data taking, keeping the background at the level of 10

Plasma influence on the process of the spin light of neutrino

Alexey Lokhov Moscow State University

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oral

We present the further development of the theory of spin light of neutrino ($SL\nu$) - a new possible mechanism of electromagnetic radiation produced by neutrino in dense matter or external fields. We particularly consider the propagation of neutrino in dense cold plasma. The method of exact solutions of the modified Dirac equation is exploited. We derive the spectrum of the emitted plasmon and the differential probability and intensity of radiation as well as the total rate and power of the considered process. These values are estimated for a set of parameters that could describe possible astrophysical situations (neutron stars etc.).

Statistical criteria for step-like anomalies in cumulative spectra

A.V. Lokhov, F.V. Tkachov, P.S. Trukhanov Moscow State University

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poster

We present a non-trivial example of application of the statistical method of quasi-optimal weights and construct a convenient statistical citerion for ssearches of step-like anomalies in cumulative spectra such as the tritium beta-decay spectra in the Troitsk-nu-mass and similar experiments (Mainz, KATRIN, etc.). The obtained criterion is almost as powerful as the locally most powerful one near the null hypothesis and appreciably excels the conventional χ^2 and Kolmgorov-Smirrnov tests. A less powerful criterion of pairwise correlations of neighbours is also proposed; it is, however, more roust and senssitive to anomalies of more general shapes. The obtained criteria are applied to the Troitsk-ν-mass data. The prsence off step-like anomalies in the Troitsk-ν-mass spectrum is shown to be statistically rejectd..

Results of T2K

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oral

T2K is an off-axis long baseline neutrino oscillation experiment designed to measure the θ_{13} mixing parameter through the observation of ν_e appearance in a ν_μ beam. Concurrent measurement of ν_μ disappearance allows refined measurements of the atmospheric Δm^2 and of the θ_{23} mixing parameters. Analsis of datta taken from January 2010 to March 2011 led to the first indication of $\nu_\mu \rightarrow \nu_e$ appearnce (2.55 σ significance), opening the way to CP violation searches in the leptonic sector. Measurement f ν_μ disappearance were performed as well. Data taking restarted in March 2012 at higher intensity. Results, data taking status and future plans will be disuussed.

Search for Neutrinoless Double Beta Decay with CUORE

CUORE Collaboration Universita' di Milano Bicocca

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oral

The Cryogenic Underground Observatory for Rare Events (CUORE) is an experiment to search for neutrinoless double beta decay (0nuDBD) in Te-130 and oteer rare processes. The observation of 0nuDBD would indicate that neutrinos are Majorana particles and would provide information about the absolute neutrino mass scale. CUORE is a bolometric detector composed of 988 TeO2 crystals, with the total mass of about 750 kg of natural Tellurium. The experiment is located at the Laboratori Nazionali del Gran Sasso in Italy and is now approaching the final stage of construction. Most of the crystals have been produced, and the final test of the Cuore assembly line (so called Cuore-0 test) is expected to be up and running by the end of May 2012. If successful, the construction of the full Cuore detector will begin in summer 2012 and is expected to finish by 2014. The tlk will ssummarize the physics reach of the experiment, the status of the construction, in particular of CUORE-0, and the expected sensitivity.

Search for sterile neutrinos at a new Short-Base-Line CERN neutrino beam

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oral

In the last few years the experimental results on neutrino/antineutrino oscillations at Short-Baseline (SBL) showed a tension with several phenomenological models. The recent and carefully recomputed antineutrino fluxes from nuclear reactors have further increased this tension drawing a picture not fully compatible with the 3 neutrino oscillation scenario. We will present an experimental search for sterile neutrinos with a new CERN-SPS neutrino beam using muon spectrometers and large LAr detectors. To definitively clarify the physics issue, the proposed experiment will study oscillations in a muon neutrino/antineutrino beam, both in appearance and disappearance modes, in the range of $\Delta m^2 \sim 1\mathrm{eV}^2$.

Multidimensional Cosmology and Variations of Fundamental Constants

V.N. Melnikov Center for Gravitation and Fundamental Metrology, VNIIMS, and Instiute oof Gravitation and Cosmology, PFUR.

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oral

Problems of gravitation as the fundamental interaction and fundamental physical constants choice, their classification, number, precision of measurement, possible variations are analyzed. Integrable multidimensional gravitational and cosmological models with scalar fields, forms and other matter sources are described and their role in solving basic problems of modern cosmology and black hole physics, such as the present acceleration of the Universe, nonsingular initial state, stability of fundamental constants etc. is pointed out. The results are compared with existing experimental and observational data. Special attention is devoted to theories with variations of constants e.g. STT and multidimensional ones and the problems of G and á: absolute value measurements, possible time and range variations.

Z' signals in polarised top-antitop final states

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oral

We study the sensitivity of top-antitop samples produced at all energy stages of the Large Hadron Collider (LHC) to the nature of an underlying Z' boson, in presence of full tree level standard model (SM) background effects and relative interferences. We concentrate on differential mass spectra as well as both spatial and spin asymmetries thereby demonstrating that exploiting combinations of these observables will enable one to distinguish between sequential Z's and those pertaining to Left-Right symmetric models as well as E6 inspired ones, assuming realistic final state reconstruction efficiencies and error estimates. We go on to discuss other models suited to this channel.

Some aspects of the solvable f(R,T) models

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oral

In this talk, we investigate the solvable cosmological models in the frame of the new model f(R,T), where R is the Ricci scalar and T is the trace of the stress-energy tensor. This model was recently proposed by [T. Harko, F.S.N. Lobo, S. Nojiri, S.D. Odintsov, Phys. Rev. D 84, 024020 (2011)]. We show that the dust fluid reproduce ΛCDM, phantom-non phantom era and also the phantom cosmology with some specified forms of the action $f(R,T)$.

Thermal Neutron Accelerators

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oral

The main aim of this proposal it to reveal the secrets of the universe by accelerating neutrons. The proposal idea in its abridged version speaks about the possibility of making neutrons accelerate with help of thermal energy and magnetic energy under controlled conditions. Which is helpful in revealing the hidden secrets of the universe like dark energy and in finding Higgs Boson.

TILTED BULK DUST COSMOLOGICAL MODEL

ANITA BAGORA JAIPUR NATIONAL UNIVERSITY,JAIPUR

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oral

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Abstract. Bancchi typeI bulk viscous fluid tilted cosmological model filled with dust fluid is investigated.We assume that (constant),where is the coefficient of bulk viscosity and is the expansion in the model.Also,we have assumed a condition A = (BC)1/3 between metric potential. The physical and geometrical aspects of the model in the presence and absence of bulk viscosity are also discussed. Keywords Tilteed cosmological model; Bulk viscosity; Bianchi type-I universe. PACS numbes: 998.80.-k, 04.20.-q 2000 Mathmaticcs Subject Classification: 83C50, 83F05. *Crresponding Ahhho

Recent Results from the MINOS Experiment

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oral

The MINOS experiment is a long-baseline accelerator neutrino oscillation experiment, designed to study the neutrino oscillation mixing parameters. The NuMI beams are sent from Fermilab through two magnetized tracking calorimeter detectors, one 1km downstream at Fermilab, the other 735 km away in the Soudan underground lab in Minnesota. The neutrino flux is studied before and after oscillations to make precision measurements of the atmospheric neutrino oscillation parameters $sin^2(2\theta_{13})$ and $|\Delta m^2_{23}|$ by muon neutrino disappearance, and to measure θ_{13} by searching fro electron neutrino appearance. The recent results, which include measurements from both neutrino beam and antineutrino beam are presented.

Velocity barrier of matter & antimatter in early universe.

Uday S. Rajput Dr. H. S. Gour university Sagar (M.P.)

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oral

In the early universe the matter and antimatter formed in the same quantity. The speeds sparked in the early universe with the formation of matter and antimatter. As soon as the matter and antimatter formed, the extensive attraction existing amongst the two created speeds. These speeds were linear in the preliminary seconds, but according to the basic principles of physics, the matter & antimatter resists the alteration in its state, and when the speeds began increasing because of the attraction, the matter and antimatter in order to resist this, started revolving on their respective axis, and thus began the rotation. Rotational speed played a special roll in important roll in the early universe. As soon as the matter & antimatter began rotating, "restriction areas" were generated around all the massive objects. Those objects around which "light & matter restriction" area existed became black holes, and those objects around which only "matter restriction" area existed, tra! nsformed into either stars or planets.

Wh ere "resstrriction areas" are generated around all the matter & antimatter? How our universe was born? Where did the antimatter formed during the

genesis of the universe go? Why was the need of dark matter and dark energy felt? How stars, black holes & galaxies formed?

Results and perspectives of the solar axion search with the CAST experiment

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oral

The status of the solar axion search with the CERN Axion Solar Telescope (CAST) will be presented. Recent results obtained by the use of ^{3}He as a buffer gas has allowed us to extend our sensitivity to higher axion masses than our previous measurements with ^{4}He. With about 1 h of data taking at each of 252 different pressure settings we have scanned the axion mass range 0.39 eV$\leq m_a \leq$ 0.64 eV. From the absence of an excess of x rays when the magnet was pointing to the Sun we set a typical upper limit on the axion-photon coupling of $g_{a\gamma} \leq 2.3 \times 10^{-10}$ GeV^{-1} at 95% C.L., the exact value depending on the pressure setting. CAST published results represent the best experimental limit on the photon couplings to axions and other similar exotic particles dubbed WISPs (Weakly Interacting Slim Particles) in the considered mass range and for the first time the limit enters the region favored by QCD axion models. Preliminary sensitivities for axio! n masses up to 1.16 eV will also be shown. Expected sensibilities for the extension of the CAST program up to 2014 will be presented. Moreover long term options for a new helioscope experiment will be evoked.

Ultra-high energy photons as a Lorentz-invariance messenger

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poster

We develop a systematic approach to the calculation of scattering cross sections in theories with violation of the Lorentz invariance taking into account the whole information about the theory Lagrangian. We derive the Feynman rules and formulas for sums over polarizations in spinor electrodynamics with

Lorentz violating operators of dimensions four and six. These rules are applied to compute the probabilities of several astrophysically relevant processes. We calculate the rates of photon decay and vacuum Cherenkov radiation along with the cross sections of electron-positron pair production on background radiation and in the Coulomb field. The latter process is essential for detection of photon-induced air showers in the atmosphere.

Sterile neutrinos: dark matter, baryogenesis and more

Oleg Ruchayskiy CERN

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oral

The Neutrino Minimal Standard Model (nuMSM) has been recently proposed to explain the matter-antimatter asymmetry of the Universe, the nature of Dark Matter, and neutrino masses by introducing three "sterile neutrinos" with the masses below 100 GeV. It predicts that no new physics will be found at the LHC and suggests how the nature of Dark Matter and other "beyond the Standard Model" phenomena can nevertheless be probed with existing experimental technologies. We review the status of the model, existing experimental bounds on its parameters (coming from the particle physics experiments and from cosmology) and prospects for future searches of sterile neutrinos in laboratory experiments and in space.

Probing Dark Matter with Neutrinos

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oral

Dark Matter particles can be captured in the core of the Sun or the Eatth, or in the Galactic center, by interacting wth the nucleii in the medium. The capture rate dpends onn the composition of the medium, dark matter mass and its local density. If the captured dark matter annihilate or decay into the Standard Model particles, there is a possibility of producing neutrios whicch can be detected via muon tracks or showers. I will prsentt theoretical predictions for the indirect detection of the dark matter particles via neutrino signals due t their annnihilations in the core of the Sun/Eath andd in the Galactic center. I will discuss how measurements of muons and/or showers by IceCube and KM3NeT

ay be able to distinguish between different dark matter models, such as gravitio, Kaluuza-Klein particle or leptophilic dark mateer

Matter Suppression of Collective Supernova Neutrino Oscillations

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oral

We perform a study of the supernova neutrino flavor evolution during the accretion phase, using results from recent neutrino hydrodynamics simulations. In contrast to what was expected in the presence of only neutrino-neutrino interactions, we find the multiangle effects associated with the dense ordinary matter suppress collective oscillations. The matter suppression implies that neutrino oscillations will start outside the neutrino decoupling region and therefore will have a negligible impact on the neutrino heating and the explosion dynamics. Moreover we revisit these results performing a linearized stability analysis of the equations, with realistic neutrino energy and angle distributions, finding an agreement with the numerical results.

NEXT Experiment

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oral

New motivation for the search of the neutrinoless double-beta decay arises from the measurements of neutrino oscillations as it is still unknown their mass hierarchy or if they are Dirac or Majorana particles. The NEXT experiment will operate a 100 kg high-pressure xenon gas TPC to look for this decay in Xe-136. It is based on electroluminescence light detection measured with photomultipliers and silicon photomultipliers. Three main features make it a very competitive experiment: an excellent energy resolution, the use of pattern recognition to discriminate between background and signal and its scalability to larger masses. NEXT will be installed at the main hall of the Canfranc Underground Laboratory (LSC). After an active R&D program first prototypes are providing data

and the TDR has been finished. The final detector, NEXT-100, is planned to run at the beginning of 2014.

Accelerating universe and the expanding atom

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oral

In the cosmic Euclidean volume, inverse of the fine structure ratio is equal to the natural logarithm of ratio of number of (electrons or positrons) and the Avogadro number. Bohr radius of hydrogen atom, quanta of the angular momentum and the strong interaction range - are connected with the large scale structure of the massive universe. In the accelerating universe, as the space expands, in hydrogen atom, distance between proton and electron increases and is directly proportional to the size of the universe. Obtained value of the present Hubble constant is 69.54 or 70.75 Km/sec/Mpc. 'Rate of decrease in fine structure ratio' is a measure of cosmic rate of expansion. Considering the integral nature of number of protons (of any nucleus), integral nature of 'hbar' can be understood.

Multiplicity Dependence of Two-Particle Correlations in Proton-Proton Collisions measured with ALICE at the LHC

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oral

We investigate properties of jets in proton-proton collisions using two-particle angular correlations. By choosing an analysis approach based on two-particle correlations, the properties of both high-energetic jets and low-energetic jets (minijets) can be accessed. Observing the strength of the correlation as a function of the event multiplicity reveals jet fragmentation properties as well as the contribution of jets to the overall event multiplicity. Furthermore, the analysis discloses information on the underlying multiple parton interactions. We analyze proton-proton collision data at the center-of-mass energies sqrts = 0.9, 2.76,

and 7.0 TeV. The ALICE data are compared to Pythia6, Pythia8, and Phojet simulations.

Status of the GERDA experiment aimed to search for neutrinoless double beta decay

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Observation of neutrinoless double beta decay would show that neutrinos are Majorana particles and provide information on the absolute scale of neutrino mass. The GERDA (GERmanium Detector Array) experiment at the Laboratori Nazionali del Gran Sasso (LNGS, Italy) searches for the neutrinoless double beta decay of ^{76}Ge. Thesetup impleements a new shielding concept by operating bare germanium detectors (enriched in ^{76}Ge) in high purity liquid argon supplemented by a water shield. GERDA follows a staged implementation: About 18 kg of enriched co-axial germanium detectors have been deployed in Phase I which started physics data taking in November 2011. Additional more than 20 kg of novel BEGe (Broad Energy Germanium) detectors are currently being produced and first 7 BEGe detectors are already available. Phase II will encompass the operation of about 40 kg of enriched germanium detectors. For this phase it is also planned to install light sensors in the liquid argon, in order to detect the scintllation llight of the liquid argon to veto background signals.The GERDA experimental setup allows also develop and test the experimental techniques for a possible future one ton experiment to explore the full mass range predicted for the inverted neutrino mass hierarchy. In this talk status of GERDA Phase I as well as preparation for Phase II will be presetted.

Electromagnetic interactions of neutrinos in extreme external conditions

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oral

After a sort rreview on neutrino electromagnetic properties, neutrino electromagnetic interactions under the influence of extreme conditions, namely in presence of strong electromagnetic fields and dense matter, are discussed. We consider neutrino motion in presence of extreme conditions in various external electromagnetic fields and media configurations within the developed method of exact solutions of quantum equations for the neutrino wave function accounting for the field and matter presence. Results obtained, in particular neutrino energy quantization in rotating matter, are of interest for applications in astrophysics.

Reference

11. C.Giunti,, A.Studenikin, "Electromagnetic properties of neutrino", Phys.Atom.Nucl. 73 (2009) 2089-2125, arXiv:0812.3646 v5, 12 Apr 2010. 2 A.Studenikinn, "Neutrino magnetic moment: a window to new physics", Nucl.hys..B (Proc.Supl.) 188 (2009) 220. 3. K.Kouzako, A.Studenikin, "Magnetic neutrino scattering on atomic electrons revisted", Phys.Lett.B 696 (2011) 252-256. 4.K.Kouzakov, A.Studenikin, M.Voloshin, "Neutrino-impact ionization of atoms in search for neutrino magnetic moment", Phys.Rev.D 83 (2011) 113001. 5. A.Studeniknn, "Method of exact solutions of wave equations in studies of neutrinos and electrons in dense matter", J.Phys.A: Math.Theor. 41 (2008) 16407 (20 pp). 6. I.Balntsev,, Yu.Popov, A.Studenikin, "On the problem of relativistic particle motion in strong magnetic field and dense matter", J. Phys. A: Math. Theor. 44 (2011) 255301 (12p...

Standard cosmology with time delay parameter

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oral

We introduce to standard cosmological models time delay tau parameter. Then the Friedmann equations assumed the forms of first order delay differential equation $3H^2 = \rho(t-\tau)+\Lambda$, where ρ is classical energy density and τ is the Planckian time. The energy density of the perfect fluid has the sense after the Planck delay. The problem of initial conditions is formulated for the initial function H given in the time interval $[-\tau,0]$. We postulated the form of the initial function as loop quantum cosmology solutions for a massless scalar field. We investigated the solutions of the delay Friedmann like equations. The possibility of obtaining cyclic evolution representing by a limit cycle is also investigated

Neutrino flavor oscillations in accelerating matter

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oral

A short review on studies of neutrino flavor oscillations in moving with a constant speed matter is presented. Then neutrino flavor oscillations in matter moving with acceleration are considered. We develop an approach that is valid for both nonrelativistic and relativistic matter motion. For both these cases the effective neutrino potentials in accelerating matter are obtained and neutrino flavor oscillation probabilities and the Mikheyev ;Smirnov ;Wolfenstein resonance conditions are evaluated. The obtained results in the limit of zero matter acceleration reproduce the corresponding expressions for the case of matter at rest. The developed approach is applied for neutrino flavor oscillations in the case of rotating matter. The results obtained might be of interest for astrophysical applications.

A possible new mechanism of cosmic γ–rays emission

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oral

Not all mechanisms of an emission of very high energy cosmic gamma–rays are clear. We find that charged unstable particles as well as neutral unstable particles with non–zero magnetic moment which live sufficiently long may emit electromagnetic radiation. This new mechanism is connected with properties of unstable particles at the post exponential time region. Analyzing the transition time region between exponential and non-exponential form of the survival amplitude it is found that the instantaneous energy of the unstable particle can take very large values, much larger than the energy of this state for t from the exponential time region. Basing on the results obtained for a model considered, it is shown that this purely quantum mechanical effect may be responsible for causing unstable particles to emit electromagnetic–, $X-$ or γ–rays at some time intervals from the transition time regions.

Late time properties of a decaying false vacuum

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oral

The false vacuum states are unstable and they decay by tunneling. Some of them may survive up to times when their survival probability has a non–exponential form. At times much latter than the transition time, when contributions to the survival probability of its exponential and non–exponential parts are comparable, the survival probability as a function of time t has an inverse power–like form. We show that at this time region the instantaneous energy of the false vacuum states tends to the energy of the true vacuum state as $\frac{1}{t^2}$ for $t \to \infty$.

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ATLAS measurements of inclusive W and Z production as probes of the Standard Model

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poster

The inclusive production of W and Z bosons has been measured as a function of rapidity and transverse momentum in leptonic decay channels. The data constrain partons densities, test non-perturbative models and higher-order perturbative calculation, and via measurements of the polarisation and branching ratios, constrain electroweak coupling. A selection of these results will be presented.

Searching for Dark Matter: The LUX Experiment

Luiz de Viveiros, on behalf of the LUX Collaboration LIP-Coimbra

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LUX (Large Underground Xenon) is a dark matter detection experiment using a 350 kg dual-phase Xe TPC. It aims at a WIMP-nucleon cross-section sensitivity of $7e-46cm^2$ for a 100 GeV WIMP. It will surpass all existing dark matter limits for WIMP masses above 10 GeV within days of beginning its science run. LUX has ended the surface run in the Sanford Lab at Homestake, where all systems were tested in their final configuration, and is currently being deployed underground. Light and charge signals were calibrated using radioactive sources and Muon tracks during a 90-day period of stable cryogenic operation. It marks the first successful use of technologies proposed for tonne-scale detectors, such as water shielding and thermosyphon cryogenics.

STUDY OF PROPERTIES OF THE CENTRAL NUCLEUS-NUCLEUS COLLISIONS T HHIGH ENERGIES USING A NEW METHOD BASED ON RANDOM MATRIX TEOORY

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oral

One of the important experimental methods to get the information on the changes of states of nuclear matter by increasing its baryon density is the study of properties of hadron-nuclear and nuclear-nuclear interactions depending on the centrality of collisions at high energies. On the other hand the centrality of collisions can not be defined directly in the experiment. In different experiments the values of the centrality are defined as a number of identified protons , projectiles' and targets' fragments, slow particles, all particles, as the energy flow of the particles with emission angles Čá Čř 0Ďa or with Čá Čř 90Ďa. Apparently, it is not simple to compare quantitatively the results on centrality-dependences obtained in literature while on the other hand the definition of centrality could significantly influence the final results. May be this is a reason, why we could not get a clear signal on new phases of strongly interacting matter, though a lot of interest! ing information has been given in those experiments. Ref. [1] proposes a novel method for analysis of experimental data obtained at high energy nucleus-nucleus collisions. The method, based on the ideas of Random Matrix Theory [2]. The important advantage of the method is that it is free from unwanted background contributions, it does not produce background information during applying and the results are visual ones. The analysis has been done for different range of values of the momentum of secondary charged particles: 0.15-1.14 (region I); 1.14-4.0 GeV/c (region II) and 4.0-7.5 GeV/c (region III). In each region the p(s) are defined [3]. One could find that: the behavior of p(s) for particles from Region I could describe by Passion distribution, there is some deviation for the behavior of p(s) from Poisson distribution in region II and Wigner type distribution appear for behavior of p(s) defined for the particles from region III. These results are demonstrated in the Figure and they would be explained by different ways. Bec! ause of a lot of different mechanism could be reason to appear Wigner type behavior for p(s) distribution.

S Figure. Te p(ss) distributions for charged particles produced in 12CC at 4.2 AGeV/c in : (a) region I; (b) region II; (c) region III.

I ur talk wwe offer to use the above mentioned method to fix the centrality of collisions. We are studying of the behavior of p(s) function in the three defined momentum regions as a function of charged particles (negative and positive pions and protons) multiplicity (Ncharge). We have found that the observed pictures for second and third regions change with Ncharge. For the events with

some maximum number of Ncharge we could get Poisson distributions for p(s) instead Wigner ones in second and third regions of momentum. We support to use these values of Ncharge as some critical ones to fix the centrality.

Referencs

1.. E.I.Shahaliev, R.G.Nazmitdinov, A.A.Kuznetsov, M.K.Suleymanov, O.V.Teryaev. Physics of Atomic Nuclei, 2006, Vol. 69, No. 1, pp. 142ąV146. . M. L. Mehta„ Random Matrices, Second ed.(Academic, New York, 1991) 3. T.Ghur,. Muuller-Groeling, and H.A. Weidenmuller, Phys.Rep. 299,189 198..

Observation of Electron Antineutrino Disappearance by the Daya Bay Reactor Neutrino Experiment

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Many experiments have demonstrated the neutrino's ability to change flavor while traveling through space. One of the last remaining unknown parameters describing these oscillations, $\theta_1 3$, is crucial in defining the magnitude of possible CP-violation in the lepton sector, and examining the neutrino's role in the universe's matter-antimatter asymmetry. The Daya Bay experiment has measured $\theta_1 3$ with unprecedented precision by observing the disappearance of reactor antineutrinos with identical detectors at multiple locations. With roughly two months of data, the experiment has measured the value of $sin^2(2theta13)$ to be 0.920.17, and excluded the $\theta 13 = 0$ hypothesis to five standard deviations. This talk will describe the Daya Bay experiment and current results.

Searches for Astrophysical Neutrinos with IceCube

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Powrful astropphysical objects such as active galactic nuclei, core collapse supernova jets and gamma ray bursts are potential sources of the highest energy cosmic rays. Many models of cosmic ray proton acceleration predict a corresponding flux of neutrinos in the TeV-PeV energy range. The detection of astrophysical neutrinos requires the largest neutrino detector ever built: IceCube, a cubic-kilometer array located near the geographic South Pole.

IceCube consists of 86 cables with 60 digital optical modules per cable, deployed between 1450 and 2450 meters deep in the Antarctic ice. The detector includes an inner array of densely spaced cables called DeepCore, which enhances IceCube's performance at low energies, and an array of air-shower detection tanks on the surface. IceCube has been collecting data throughout its construction, which was completed in 2010.

I wil evieww tthe latest results from astrophysical neutrino searches with the IceCube detector, prospects for future searches, and the implications for neutrino production in astrophysical soucees.

Searching for the Dirac nature of neutrinos: combining neutrinoless double beta decay and neutrino mass measurements

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Establishing the nature of neutrino, whether they are Dirac or Majorana particles, is one of the fundamental questions we need to assure in particle physics. It will tell us if lepton number is a conserved symmetry of the physics BSM. Neutrinoless double beta decay is the tool of choice for testing the Majorana nautre of neutrinos. A wide experimental effort taking place worldwide and soon new results will become available.

Study of sterile neutrino mixing in low energy neutrino factory

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poster

A neutrino factory has been suggested as a powerful tool for studying new physics, for example, sterile neutrinos, exploiting its near detectors.
Here we use tee new version of GLoBES, to study the potential of a low energy neutrino factory (LENF) in constraining the sterile mixing angles and the mass-square difference. Unlike in conventional long baseline neutrino experiments, the $\nu_\mu \to \nu_e$ and $\nu_e \to \nu_e$ channels are also included, since they are proved helpful in constraining θ_{14}.
Moreover the rrecent re-analysis of reactor neutrino experiments suggests the presence of neutrino oscillations due to large sterile neutrino mixing wit ν_e.

WWe show that, with a near detector, LENF can constrain the sterile parameter values in a very small range and helps us to check the recent Reactor Anomaly.
Finally we willl explore the dependence of the performance of the LENF depending on different experimental setups, such like the detector type (TASD and LiAr), the energy range, the systematic errors. ec..

Asymmetric WIMP Dark Matter and DM/antiDM Oscillations

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In asymmetric DM scenarios the DM particle X carries a charge, analogous to the baryonic sector. This opens a possibility to relate the DM abundance to the lepton or baryon asymmetry, and therefore to address the two big puzzles simultaneously. In this talk I will discuss the effect of oscillations between dark matter and its antiparticle on the evolution of the DM relic abundance and show how oscillations re-open the parameter space of asymmetric DM models and change applicable phenomenological bounds.