NINTH INTERNATIONAL SYMPOSIUM
- Frontiers of Fundamental and Computational Physics

Abstracts book

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Abstract ID : 0

Observation of GRBs by the MAGIC Telescope.

Since the beginning of its operation in April 2005, the MAGIC telescope, thanks to its fast repositioning time and the low energy threshold was able to observe several GRB events since their early emission phase. In the case of two bursts, observation started even while the prompt emission was still ongoing. Observations, with energy thresholds spanning between 80 and 300 GeV, did not reveal any gamma-ray emission. Computed upper limits are compatible with a power law extrapolation, where intrinsic fluxes are evaluated tak-ing into account the attenuation due to the scattering in the Metagalactic Radiation Field (MRF). We present a direct determination of the MAGIC sensitivity in GRB modei and the upper limits for the follow-up observations. The MAGIC Telescope, is currently, at energies around 100 GeV, the fastest and most sensitive GRB detector in the world.

Primary authors : Mrs. SCAPIN, Valeria (INFN)

Co-authors :

Presenter : Mrs. SCAPIN, Valeria (INFN)

Track classification :

Contribution type : --not specified--

Submitted by : Mrs. SCAPIN, Valeria

Submitted on Tuesday 10 July 2007

Last modified on : Tuesday 10 July 2007

Comments :

Status : ACCEPTED

Track judgments :

Abstract ID : 1

NEW COSMOLOGICAL CONSTANTS

With the help of equations mentioned in the paper 'Double Relativity Effect
and its Applications the value of Siva's constant 'K' has been calculated. To
find
out the value of 'K', it was assumed that the whole universe contracted to a
lump of mass and that mass had become a black hole because of its abnormal
gravitational attraction.At this situation two casesof 'DoubleRelativity'equations
vd=K and v=Hd compared to find out the value of 'K'.

summary :

This paper is based on the paper entitled "Double Relativity Effect and its
Applications" presented at 'International Conference on Relativity' held at
Amravathi university on 11-14 Jan2005.Abstract published in the souvenir cum
scientific events abstracts ICR-2005.
       The equations derived in the paper 'Double Relativity Effect and its
applications' explained the situation when the dia. of whole universe less than
the dia. of hydrogen atom. This has given some new concepts related to black
holes, hydrogen atom, mass of the universe and mass of our 'local group'. It
was concluded in some equations, which are in terms of Siva's constant '
K'.
       To find out the value of 'K', it was assumed that the whole universe
contracted to a lump of mass and that mass had become a black hole because
of its abnormal gravitational attraction.
       At this situation two cases of 'Double Relativity' equations vd=K and v=Hd
compared to find out the value of 'K'.This value of 'K' has taken place an
impotant role in the new cosmological model 'THE HEART OF THE GOD'

Based on the above papers a lot of work has been done and prepared
following papers for presentation.
1. "The Heart of God"- a New cosmological model says that the Big Bang
       theory is a partial truth of Steady State theory
2. "The Grand Proof Equation" –An equation which satisfies all the equations
       and data of all the above papers.
3. "Chandrasekhar's limit Through GP equation"- a paper shows another way
       to get the exact value of Chandrasekhar's Limit
4. " Kotron Theory"- most elementary particle has been predicted

5.   "Kotron Effect"- An effect can be proved experimentally to prove Kotron

6. "An approach to quantum theory and General Relativity through classical
       theory."

7. "Application of 'Kotron Effect' for black holes-An explanation for
Hawking's
       radiation."

Primary authors : Mr. KODUKULA, Siva Prasad (M.N.Dastur&co(P)Ltd.)

Co-authors :

Presenter : Mr. KODUKULA, Siva Prasad (M.N.Dastur&co(P)Ltd.)

Track classification :

Contribution type : --not specified--

Submitted by : Mr. KODUKULA, Siva Prasad

Submitted on Wednesday 11 July 2007

Last modified on : Tuesday 23 October 2007

Comments :
          Reference:http://www.lulu.com/content/1327365.

Status : ACCEPTED

Track judgments :

Abstract ID : 2

Angular Power Spectrum in Modular Invariant Inflation Model

We propose a scalar potential of inflation, motivated by modular invariant supergravity,
and compute the angular power spectra of the adiabatic density perturbations
that result from this model.
The potential consists of three scalar fields, S, Y and T, together with two free parameters.
By fitting the parameters to cosmological data at the fixed point $T=1$,
we find that the potential behaves like the single-field potential of S, which slowly rolls down
along the minimized trajectory in Y. We further show that the inflation predictions corresponding
to this potential provide a good fit to the recent three-year WMAP data, e.g.
the spectral index n_s = 0.951.

The TT and TE angular power spectra obtained from our model almost completely coincide
with the corresponding results obtained from the \LambdaCDM model.
We conclude that our model is considered to be an adequate theory of inflation that explains
the present data, although the theoretical basis of this model should be further explicated.

Primary authors : Prof. HAYASHI, Mitsuo J. (Tokai University)

Co-authors : Prof. HIRAI, Shiro (Osaka Electro-Communication University) ; Prof. TAKAMI, Tomoyuki (Osaka Electro-Communication University) ; Mr. OKAMEI, Yusuke (Tokai University) ; Mr. TAKAGI, Kenji (Tokai University) ; Dr. WATANABE, Tomoki (Waseda University)

Presenter : Prof. HAYASHI, Mitsuo J. (Tokai University)

Track classification :

Contribution type : --not specified--

Submitted by : Prof. HAYASHI, Mitsuo J.

Submitted on Thursday 12 July 2007

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Comments :
Publised in Int.J.Modern Phys. A22,No.12 (2007)2223-2237; arXiv:astro-t ph/0609657.t

Status : ACCEPTED

Track judgments :

Abstract ID : 4

Extending the redshift-distance relation in Cosmological General Relativity to higher redshifts

The redshift-distance modulus relation, the Hubble Diagram, derived from
Cosmological General Relativity has been extended to arbitrarily large redshifts.
Numerical methods were employed and a density function was found that
results in a valid solution of the field equations at all redshifts. The extension
has been compared to 302 type Ia supernova data as well as to 69 Gamma-ray
burst data. The latter however do not not truly represent a `standard candle'
as the derived distance modulii are not independent of the cosmology used.
Nevertheless the analysis shows a good fit can be achieved without the need
to assume the existence of dark matter.

summary :

This paper numerically solves the differential equation that Carmeli found, from
a solution of Einstein's field equation in his Cosmological Relativity theory, for
the redshift distance relation in the expanding universe. It then finds that for
the solution to remain valid over all redshifts the past density of the universe
beyond a certain redshift must have oscillated between critical and twice critical
density. The theory is then applied to observational data out to a redshift $z = 7$, with good agreement and without the need for ad hoc inclusion of 'dark'
matter. Also it is shown from the theory that the universe remains spatially flat
at all epochs.

Primary authors : Prof. HARTNETT, John (University of Western Australia)

Co-authors :

Presenter : Prof. HARTNETT, John (University of Western Australia)

Track classification :

Contribution type : --not specified--

Submitted by : Prof. HARTNETT, John

Submitted on Tuesday 31 July 2007

Last modified on : Tuesday 31 July 2007

Comments :

Status : ACCEPTED

Track judgments :

Abstract ID : 5

Surface charges and fields in stationary conductors with steady currents

summary :

Is there a force between an external stationary charge and a resistive stationary conductor carrying a steady current? The answer to this question is positive. In this work we present the main results of this interaction. It has three components: (A) Zeroth-order forces (due to the electrostatic charges induced over the surface of the conductor by the external test charge); (B) Forces proportional to the voltage of the battery connected to the resistive current carrying conductor; and (C) Second-order forces (proportional to the square of the drifting velocity of the conduction electrons). We present experiments published in the literature which measured these effects. We also show the analytical solution for the most common situations, namely: straight wires, coaxial cables, transmission lines, plates, strips, cylindrical and spherical shells, and toroidal conductors. This force is due to charges spread along the surface of the current carrying conductor. This distribution of surface charges is maintained by the battery, and keep the current flowing along the conductor. This had been pointed out by Kirchhoff and Weber. These surface charges keep the potential gradient along the resistive circuit. They also create an electric field inside and outside the conductor. With this approach we show that there are no fundamental differences between electrostatics and current-carrying conductors.

Primary authors : Dr. HERNANDES, Julio (UESC/Brazil) ; Dr. KOCH TORRES ASSIS, Andre
                    (Unicamp/Brazil)

Co-authors :

Presenter : Dr. HERNANDES, Julio (UESC/Brazil)

Track classification :

Contribution type : --not specified--

Submitted by : Dr. HERNANDES, Julio

Submitted on Sunday 19 August 2007

Last modified on : Tuesday 13 November 2007

Comments :

Status : ACCEPTED

Track judgments :

Abstract ID : 6

Octonion Wave Equation

We have made an attempt to discuss the octonion field equation as the equation of motion for particles carrying simultaneously electric and magnetic charges (i.e. dyons) in external and internal spaces respectively. It has been concluded that the component of octonion potential wave equations behaves neither the generalized electromagnetic fields of monopoles nor the dyons. Rather, they have the mixed behaviour of electromagnetic fields associated with the electric and magnetic charges in external and internal spaces. We have also made an attempt to investigate the split octonion wave equation and its interpretation in classical electrodynamics and accordingly the consistent and compact forms of eight-dimensional potential and current equation of dyons are obtained in terms of Zorn's vector matrix realization of split octonions.Visualizing the external four space as the localization space for tachyons, it is shown that the split octonion wave equation reduces to the Maxwell's equation (field equation) for bradyons in R^{4}- space as well as that for tachyons in T^{4}- space in the absence of other.

summary :

In order to interpret octonion wave equations in eight dimensional space- time, in the present paper, we have made an attempt to discuss the octonion field equation as the equation of motion for particles carrying simultaneously electric and magnetic (monopole [key-34]) charges (i.e. dyons [key-35]). Starting with the regularity condition in the octonion field equation we have developed consistent and compact formulation of eight-dimensional potential and current equations of dyons. It has been demonstrated that the component of octonion potential wave equations behaves neither the generalized electromagnetic fields of monopoles nor the dyons. Rather, they have the mixed behaviour of electromagnetic fields associated with the electric and magnetic charges in external and internal spaces.

After decomposing the octonion wave equation in to two quaternion-valued wave equations, it is shown that the two different spaces demonstrate the separate wave equations for electromagnetic fields. Visualizing the external four spaces as the localization space for bradyons and the internal space as the localization space for tachyons, it is shown that the octonion wave equation reduces to the Maxwell's equation (field equation) for bradyons in R^{4} - space as well as that for tachyons in T^{4}- space. It has also been emphasized that the quaternionic decomposition of octonion wave equation gives rise to the equations of dyons and tachyonic dyons, when we take them as combination of bi-quaternion instead of real quaternion in external and internal four-dimensional spaces of eight dimensional space time.

Then we have made an attempt to investigate the split octonion wave equation and its interpretation in classical electrodynamics. Split octonion electrodynamics has been deduced in terms of Zorn's vector matrix realization by describing electrodynamics potential, current and other dynamical quantities as octonion variables. Also the consistent and compact forms of eight-dimensional potential and current equation of dyons are obtained in terms of Zorn's vector matrix realization of split octonions. It has been shown that the octonion valued potential wave equation behaves neither the generalized electromagnetic fields of monopoles nor of the dyons. Rather, they have the mixed behaviour of electromagnetic fields associated with the electric and magnetic charges in external and internal spaces. At last, it is shown that split

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octonion Zorn's vector realization reproduces two different spaces to
demonstrate the separate wave equations for electromagnetic fields.
Visualizing the external four space as the localization space for tachyons, it is
shown that the octonion wave equation, when expressed in terms of split
octonions, reduces to the Maxwell's equation (field equation) for bradyons in R^
{4}- space as well as that for tachyons in T^{4}- space in the absence of
other.
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Primary authors : Dr. NEGI, O.p.s. (Kumaun University)

Co-authors :

Presenter : Dr. NEGI, O.p.s. (Kumaun University)

Track classification :

Contribution type : --not specified--

Submitted by : Dr. NEGI, O.p.s.

Submitted on Thursday 23 August 2007

Last modified on : Thursday 23 August 2007

Comments :

Status : ACCEPTED

Track judgments :

Abstract ID : 7

DYNAMICAL CORRELATION IN LIQUID Li1-xBx (B=Na, K, Rb and Cs) BINARY MIXTURES

The study of dynamical variables: velocity auto correlation function i(t), power spectrum g(i) and mean square displacement of liquid lithium (Li) and its binary alloys Li1-xBx (B=Na, K, Rb and Cs) will be presented based on static harmonic well approximation. The effective interaction for the liquids is computed by our well established local pseudopotential. The negative dip in velocity auto correlation function of Li1-xBx falls between the negative dips of pure components. As x increases, the time t at which velocity auto correlation function reaches to its first zero also increases. In the equiatomic liquids of Li1-xBx, the LiCs has shortest memory. For power spectrum power spectrum, as x increases, the peak of power spectrum shifts towards lower i. In the study of mean square displacement as concentration of other alkalis increases in the Li1-xBx, the slope of the linear growth region decreases, showing the sensitivity of diffusive process.

Primary authors : Prof. GAJJAR, Pankajkumar (Gujarat University)

Co-authors : Ms. PATEL, Minal (V. P. & R. P. T. P. Science College) ; Prof. JANI, Ashvinkumar (Saradr Patel University)

Presenter : Prof. GAJJAR, Pankajkumar (Gujarat University)

Track classification :

Contribution type : --not specified--

Submitted by : Prof. GAJJAR, Pankajkumar

Submitted on Monday 27 August 2007

Last modified on : Monday 27 August 2007

Comments :

Status : ACCEPTED

Track judgments :

Abstract ID : 8

Wavelet-based theory of gauge fields

Continuous wavelet transform has been attracting attention as a possible
tool for regularisation of gauge theories since the first paper of
P.Feredbush (Progr. Theor. Phys., 1995, v.94, 1135). However, up to the present time was used
only for identical substitution of the local fields in the local action
$$S[\phi(x)], \quad \phi(x) \to \phi(x) = \frac{1}{C_\psi} \int \frac{1}{a^d} \psi \left(\frac{x-b}{a} \right) \phi_a(b) \frac{dad^db}{a},$$
where $\phi_a(b)$ is referred as a field measured at point b with resolution
a (by a device with aperture ψ). For the case of gauge fields this
approach assumes the local gauge invariance
$\phi_\mu(x) \to \phi_\mu(x)+\d_\mu \Lambda(x)$; neither the gauge invariance
of the scale-dependent fields $\phi_{\mu a}(x)$, nor their commutation
relations have been specially treated.

In present contribution we consider the wavelet-based quantum field theory
as a nonlocal field theory. Using the ideas of (Efimov, G.V. ,Problems of quantum
theory of nonlocal interactions, Nauka, 1985), we
formulate the gauge principle for the scale-dependent fields, set up the
causality relations (Altaisky, M.V. PEPAN Letters, 2005, v.2, 337) for them. We also
present the Ward identities
for scale-dependent fields without any requirements of the final limit $a\to0$.
As an example, the vacuum polarisation diagram in the scale-dependent quantum
electrodynamics is calculated.

Primary authors : Dr. ALTAISKY, Mikhail (LRB JINR (Dubna) and SRI RAS(Moscow))

Co-authors :

Presenter : Dr. ALTAISKY, Mikhail (LRB JINR (Dubna) and SRI RAS(Moscow))

Track classification :

Contribution type : --not specified--

Submitted by : Dr. ALTAISKY, Mikhail

Submitted on Tuesday 28 August 2007

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Comments :

Status : ACCEPTED

Track judgments :

Abstract ID : 9

The origin of the strong and weak nuclear forces

It is an old unsolved puzzle how the strong nuclear force is related to the weak nuclear force. After we have shown
previously that the masses of the elementary particles can be explained with nuclear lattices we can now show,
with the help of a classical paper of Born and Stern, that the strong force between e.g. the proton and neutron is an
automatic consequence of the weak force which holds the lattices of the elementary particles together. The strong
force is the sum of the unsaturated weak forces of the lattice points at the surface of the lattice. The strong force is
therefore on the order of ten to the six times stronger than the weak force between the lattice points. The strong
and the weak nuclear forces have the same origin.

Primary authors : Prof. KOSCHMIEDER, Lothar (University of Texas)

Co-authors :

Presenter : Prof. KOSCHMIEDER, Lothar (University of Texas)

Track classification :

Contribution type : --not specified--

Submitted by : Prof. KOSCHMIEDER, Lothar

Submitted on Thursday 30 August 2007

Last modified on : Thursday 30 August 2007

Comments :

Status : ACCEPTED

Track judgments :

Abstract ID : 10

Hidden-variable theory versus Copenhagen quantum mechanics

The main assumptions the Copenhagen quantum mechanics has been based on
will be summarized and the known (not yet decided) contradiction between
Einstein and Bohr will be newly analyzed. The given assumptions have been
represented basically by time-dependent Schroedinger equation, to which some
further assumptions have been added. Some critical comments have been
raised against the given mathematical model structure by Pauli (1933) and by
Susskind and Glogover (1964). They may be removed if only the Schroedinger
equation is conserved and the additional assumptions are abandoned, as
shown recently. It seems to be in contradiction to the numerous declarations
that the Copenhagen model has been approved by experimental results.
 However, in the most of these experiments only the agreement with the mere
Schroedinger equation has been tested. All mentioned assumptions have been
tested practically only in the EPR experiment (measurement of coincidence light
transmission through two polarizers) proposed originally by Einstein (1935).
Also these experimental results have been interpreted as supporting the
Copenhagen alternative, which has not been, however, true. In fact the
microscopic world may be described only with the help of the hidden-variable
theory that is represented by the Schroedinger equation without mentioned
additional assumptions, which has the consequence that the earlier gap
between microscopic and microscopic worlds has been removed. The only
difference concerns the existence of discrete states. The possibilities of the
human reason of getting to know the nature will be also shortly discussed in
the beginning of this contribution.

Primary authors : Prof. LOKAJICEK, Milos (Institute of Physics, v.v.i., Acad. of Sciences, Prague)

Co-authors :

Presenter : Prof. LOKAJICEK, Milos (Institute of Physics, v.v.i., Acad. of Sciences, Prague)

Track classification :

Contribution type : --not specified--

Submitted by : Prof. LOKAJICEK, Milos

Submitted on Friday 14 September 2007

Last modified on : Friday 14 September 2007

Comments :

Status : ACCEPTED

Track judgments :

Abstract ID : 11

Derivation of Relativistic Momentum and Energy Using Lorentz Transformations

Abstract: Expressions for the relativistic momentum and energy of a material
body are usually derived using a few standard methods. Use of the law of
conservation of momentum in elastic collisions of mass points (Bergmann,
Rosser, Bohm), the Lorentz invariant action integral (Landau and Lifshitz) and
the four vector acceleration (Synge, Pauli, Hartle) are some of the most well-
known among them. While the first of the methods mentioned above involves
the interaction of more than one particle, the other two make use
of "advanced concepts". I have been able to derive expressions for momentum
and energy of a relativistic particle using the basic velocity transformation rules
for a single particle. The proposed method is not only simple but reveals the
richness of Lorentz transformations.

summary :

Expressions for Relativistic Momentum and Energy are derived using only
Lorentz transformations for single moving particle thereby highlighting the
richness of Lorentz transformations.

Primary authors : Prof. KAGALI, Basavaraj (BANGALORE UNIVERSITY)

Co-authors :

Presenter : Prof. KAGALI, Basavaraj (BANGALORE UNIVERSITY)

Track classification :

Contribution type : --not specified--

Submitted by : Prof. KAGALI, Basavaraj

Submitted on Saturday 15 September 2007

Last modified on : Saturday 15 September 2007

Comments :

Status : ACCEPTED

Track judgments :

Abstract ID : 12

Connecting Fundamental Constants

A model for a black hole electron can be developed starting from three basic
constants only: h, c and G. The result is a reasonable description of the
electron with its own associated mass and charge. The nature of this black hole
seems to fit the properties of the Planck particle thus yielding new
mathematical relationships among basic constants. The concept of time loses
its meaning when going from our world to the black hole and an apparent
dimensional mismatch may appear between some quantities. This explains why
the Planck time is numerically very close to the gravity to the electric force ratio
in an electron: its difference, disregarding a 2½ π factor, is only 0.2%. This is
not a coincidence: they both refer to the same particle and the small difference
is between a rotating and a non-rotating particle. The precise determination of
the rotational speed of such a particle yields accurate numbers, within one or
two standard deviations, of most quantities, including the fine structure
constant and the electron magnetic moment. The constant of gravitation G is
fully related to the other constants and can be calculated directly from them.

Primary authors : Mr. DI MARIO, Domenico (Tecno Field Services)

Co-authors :

Presenter : Mr. DI MARIO, Domenico (Tecno Field Services)

Track classification :

Contribution type : --not specified--

Submitted by : Mr. DI MARIO, Domenico

Submitted on Tuesday 18 September 2007

Last modified on : Tuesday 18 September 2007

Comments :

Status : ACCEPTED

Track judgments :

Abstract ID : 13

Tonelli Principle: finite reduction and fixed energy Molecular Dynamics trajectories

We propose a novel theoretical and practical alternative to the Maupertuis functional in the field of molecular dynamics: Tonelli functional. We adapt this technique to the study of rare events where the initial and the final state of a system are known and we look for transition paths. A rigorous mathematical development of the functional and an efficient numerical algorithm are the main part of this method. We couple the Tonelli functional with an exact finite dimensional reduction (error estimates for this implementation are precisely stated). This is not far from a multiscale approach, in fact the reduction will help the study of the high frequencies of the systems: it can be seen as a magnifying glass for atomic trajectories. We test our techniques first on simple models, in order to show the details and the main features of these new tools. Then we pass to a more demanding and interesting test: the isomerization of a Lennard-Jones cluster of 38 interacting atoms.

Primary authors : TURCO, Alessandro (PhD student at S.I.S.S.A.)

Co-authors : Dr. PASSERONE, Daniele (EMPA-Swiss Federal Laboratories for Materials Testing and Research) ; Prof. CARDIN, Franco (Univ. Padova (Dip. Matematica Pura e Applicata))

Presenter : TURCO, Alessandro (PhD student at S.I.S.S.A.)

Track classification :

Contribution type : --not specified--

Submitted by : TURCO, Alessandro

Submitted on Wednesday 19 September 2007

Last modified on : Wednesday 19 September 2007

Comments :

Status : ACCEPTED

Track judgments :

Abstract ID : 14

LOGICAL CONSEQUENCES OF THE LEAST ACTION PRINCIPLE CONSIDERED IN THE RELATIVISTIC FORM

As it is known, in classical physics a corpuscle describes the existence of certain bodies subjected to external forces or fields, and the wave concept describes the propagation of such oscillations and fields However, in quantum relativity both particle and fields are described by similar equations of propagation of certain wave-trains, based on the cuadridimensional interval ds. As a consequence, it results that a Lorentz transformation L must be always put in correspondence with a pair (S, f), S representing a certain material reference system which acts upon a wave-train having the state-vector f. Moreover, this aspect implies an intuitive interpretation for the dependence of the mass of a body inside a reference system. Thus, when the Lorentz transformation doesn't generate a pulse (for example when the relative speed between the material body and the wave is equal to c, the speed of light in vacuum), the mass m is equal to i, which means that no interaction due to the received pulse exists.

Primary authors : Mr. TOMA, Alexandru (Electronics Department, FILS Faculty, Politehnica University, Bucharest)

Co-authors :

Presenter : Mr. TOMA, Alexandru (Electronics Department, FILS Faculty, Politehnica University, Bucharest)

Track classification :

Contribution type : --not specified--

Submitted by : Mr. TOMA, Alexandru

Submitted on Wednesday 19 September 2007

Last modified on : Wednesday 19 September 2007

Comments :

Status : ACCEPTED

Track judgments :

Abstract ID : 15

Monte Carlo Simulation of the Optical Absorption of Hydrogenated Nanocrystalline Silicon Thin Films

Hydrogenated nanocrystalline silicon (nano-Si:H) thin films are considered as an
heterogeneous mediums, they consist of an ordered silicon nanocrystallites
which have a spherical form with size varies from 2 to 4 nm included in
amorphous matrix. These nanomaterials deposed by Plasma Enhanced
Chemical Vapor Deposition technique (PECVD) at low temperature (<300°C)
constitute an important class with some of their properties distinctly different
from either amorphous or single crystals. The important key for the success of
nano-Si:H as a photovoltaic (PV) absorbent material is its enhanced optical
absorption compared to the monocrystalline silicon. The main reason of this
optical behavior is due to its particularly structure which gives place to the bulk
and surface light scattering phenomena. The optical and electric measurements
of these heterogeneous mediums give access to an "apparent" absorption
coefficient affected by scattering effects, different from the "true" one
measured
for homogeneous mediums. In this work, we have developed a numerical
simulation based on Monte Carlo methods, in order to study the influence of
various characteristic parameters of a heterogeneous material (crystalline /
amorphous fraction, film thickness,…) on its optical absorption. We have
obtained a good proportionality between the crystalline fraction and both the
absorption coefficient and the mean optical path traveled by the scattered
photons. Moreover, the study points to the conclusion that the absorption film
increase with the decrease of film thickness mainly in infrared region, which is
an important issue for nanocrystalline silicon solar cells. A very good agreement
was obtained between our results and the experimental results suggested in
the literature.

Primary authors : Mrs. TOUIL NéE BESAHRAOUI, Fatiha (Laboratory of Physics of Thin Films and
          Materials for Electronics (L.P.C.M.M.E), Department of Phcs, Faculty of Sciences,
          University of Oran (Es-Senia), P. O. Box 1524, El M'naouer, Oran, Algeria.)

Co-authors :

Presenter : Mrs. TOUIL NéE BESAHRAOUI, Fatiha (Laboratory of Physics of Thin Films and Materials for
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Track classification :

Contribution type : --not specified--

Submitted by : Mrs. TOUIL NéE BESAHRAOUI, Fatiha

Submitted on Thursday 20 September 2007

Last modified on : Thursday 20 September 2007

Comments :

Status : ACCEPTED

Track judgments :

Abstract ID : 16

5-dimensional relativistic hydrodynamics and cosmology

We consider a test perfect fluid in 5-dimensional relativity. This picture permits a 4-dimensional particle production effect, even in thel limit of negligible gravitation, the source of particle production vanishing if the cosmological fluid is isentropic.

Primary authors : Prof. GEMELLI, Gianluca (L.S. "B. Pascal")

Co-authors :

Presenter : Prof. GEMELLI, Gianluca (L.S. "B. Pascal")

Track classification :

Contribution type : --not specified--

Submitted by : Prof. GEMELLI, Gianluca

Submitted on Friday 21 September 2007

Last modified on : Friday 21 September 2007

Comments :

Status : ACCEPTED

Track judgments :

Abstract ID : 17

Hubble diagrams of soft and hard radiation sources in the graviton background

In the sea of super-strong interacting gravitons,
non-forehead collisions with gravitons deflect photons, and this
deflection may differ for soft and hard radiations. As a result,
the Hubble diagram would not be a universal function and it will
have a different view for such sources as supernovae in visible
light and gamma-ray bursts. Observations of these two kinds are
compared here with the limit cases of the Hubble diagram.

Primary authors : Dr. IVANOV, Michael A. (Belarus State University of Informatics and Radioelectronics)

Co-authors :

Presenter : Dr. IVANOV, Michael A. (Belarus State University of Informatics and Radioelectronics)

Track classification :

Contribution type : --not specified--

Submitted by : Dr. IVANOV, Michael A.

Submitted on Sunday 23 September 2007

Last modified on : Sunday 23 September 2007

Comments :

Status : ACCEPTED

Track judgments :

Abstract ID : 18

Theory of Time (beyond the standard model)

A frame of non-uniform time is discussed. A concept of 'flow of time' is presented. The principle of time relativity by analogy with Galilean principle of relativity is set. Equivalence principle is set to state that the outcome of non-uniform time in an inertial frame of reference is equivalent to the outcome of a fictitious gravity force external to the frame of reference. Thus it is flow of time that causes gravity rather than mass. The latter is compared to experimental data achieving precision of up to 0.0003%. It is shown that the law of energy conservation is inapplicable to the frames of non-uniform time. A theoretical model of a physical entity (point mass, photon) travelling in the field of non-uniform time is considered. A generalized law that allows the flow of time to replace classical energy conservation is introduced on the basis of the experiment of Pound and Rebka. It is shown that linear dependence of flow of time on spatial value conforms the inverse square law of universal gravitation and Keplerian mechanics. Momentum is shown to still be conserved. The inertial mass is shown to be substantially relative, infinitely growing as the flow of time tends to infinity. Extreme cases of generalized energy conservation are also discussed.

Primary authors : POLIAKOV, Eugene (Institute of Physics of Time, St.Petersburg, Russia)

Co-authors :

Presenter : POLIAKOV, Eugene (Institute of Physics of Time, St.Petersburg, Russia)

Track classification :

Contribution type : --not specified--

Submitted by : POLIAKOV, Eugene

Submitted on Monday 24 September 2007

Last modified on : Tuesday 25 September 2007

Comments :
> If possible, I propose the topic as an oral talk at the "Introductory session" t (Monday, 07 January 2008) or at "Foundations of Physics and Quantum t Mechanics" (Wednesday, 09 January 2008)

Status : ACCEPTED

Track judgments :

Abstract ID : 19

The quasi-homogeneous condition in (0,2) gauged linear sigma model on supermanifold

We focus on constructing a two dimensional (0,2) supersymmetric potential
term in both the Abelian gauge group and the non-Abelian gauge group.These
model are constructed on supermanifold by using new operators.In Abelian
gauge model, the new operator is considered to define the U(1) charges to the
(0,2) superfields.We found that the consistency conditions for the Abelian
gauge group which assure the (0,2) supersymmetric invariance of
superpotential term agree with (0,2) chirality conditions for
superpotential.Then, supermanifold becomes the super weighted complex
projective space and the superpotential has to satisfy a quasi-homogeneous
condition. On the otherhand, the superpotential for the non-Abelian gauge
group does not satisfy quasi-homogeneous condition for the SU(N), but the U
(1) part of the U(N).We verified the quasi-homogeneous condition in the SU(2)
case.

Primary authors : Mr. OKAME, Yusuke (Department of Science and Technology, Graduate School of
                  Science and Technology, Tokai University)

Co-authors : Prof. HAYASHI, Mitsuo J. (Department of Science and Technology, Graduate School of
             Science and Technology, Tokai University)

Presenter : Mr. OKAME, Yusuke (Department of Science and Technology, Graduate School of Science and
            Technology, Tokai University)

Track classification :

Contribution type : --not specified--

Submitted by : Mr. OKAME, Yusuke

Submitted on Wednesday 26 September 2007

Last modified on : Wednesday 26 September 2007

Comments :
     We are very glad to submitt the abstruct of our recent work. We prefer to t
     presented it at poster session.t
     t
     Sincerely yourst
     t
     Y. Okame

Status : ACCEPTED

Track judgments :

Abstract ID : 20

The Speed of Light and the Hubble parameter: The Mass-Boom Effect

We prove here that Newton's universal gravitation and momentum conservation together reproduce Weinberg's relation. It is shown that the Hubble parameter H must be built in this relation, or equivalently the age of the Universe t. We note that Weinberg's relation is fulfilled by Dirac's hypothesis. We prove that the speed of light c decreases with cosmological time and is proportional to the Hubble parameter H. We see the expansion of the Universe as an apparent effect due to clocks. We present a generalized red shift law and find a predicted acceleration for photons that agrees well with the result from Pioneer 10/11 anomalous acceleration. We finally present a cosmological model coherent with the above results that we call the Mass-Boom.

Primary authors : Prof. ALFONSO-FAUS, Antonio (E.U.I.T. Aeronáutica, UPM, Madrid Spain)

Co-authors :

Presenter : Prof. ALFONSO-FAUS, Antonio (E.U.I.T. Aeronáutica, UPM, Madrid Spain)

Track classification :

Contribution type : --not specified--

Submitted by : Prof. ALFONSO-FAUS, Antonio

Submitted on Thursday 27 September 2007

Last modified on : Thursday 27 September 2007

Comments :

Status : ACCEPTED

Track judgments :

Abstract ID : 21

Quanutm Information and Collapse of Wave Function

The phenomena of wave function collapse, i.e. the principal stochasticity
observed in the measurements of superpositions of quantum pure states
is considered from Quantum Information viewpoint[1].
In Information Theory, any measuring system (MS) can be described
 as the information channel, through which
  the information about studied object S is transferred from S
 to information system (observer) O; S signal passes also through
detector D, being amplified. It was shown that Heisenberg commutation
 relations put the severe constraints on the information capacity
 of arbitrary quantum channels[2].
We argue that this constraints induce the collapse of wave function
for O due to the principal losses of S information, which permit
to discriminate the pure and mixed S states with the same $\bar Q$.
 Namely, their difference characterized
 by Q^I - interference term observable, which is conjugated to Q.
 However, in accordance with uncertainty relations, the mentioned constraints
 suppress effectively the
 acquisition by O of any information about arbitrary observable
 Q' conjugated to Q.
% In particular, due to this effect O can't distinguish
% S pure states and
% statistical mixtures with the same $\bar{Q}$, because
 It's shown that
 such incompleteness of information about S state results in the
  the principal stochasticity of O states induced by pure S
 states, the parameters of such O states correspond to
 the observation of collapse of wave function.
 In our approach the constraints on information transfer from S to O are
 derived for the formalism of inference maps
 in Hilbert space[3]. O state decoherence by the interaction
with environment E doesn't change the obtained constraints principally,
but can enlarge the information losses additionally. Analogous results are
obtained for the description of quantum measurements in
 Observables Algebra (C^*algebras) formalism[1,4] .
%

Primary authors : Dr. MAYBUROV, Sergey (Lebedev Inst. of Physics)

Co-authors :

Presenter : Dr. MAYBUROV, Sergey (Lebedev Inst. of Physics)

Track classification :

Contribution type : --not specified--

Submitted by : Dr. MAYBUROV, Sergey

Submitted on Thursday 27 September 2007

Last modified on : Thursday 27 September 2007

Comments :

Status : ACCEPTED

Track judgments :

Abstract ID : 22

An extension of the Maxwell Theory to light-like and superluminal motion of charges

We start by pointing out that the classical Maxwell theory can be extended in more than one way to the domain of light-like and superluminal motion of charges so as to leave predictions of the theory in the sub-luminal domain unaffected. We show that whereas the 'default extension' of the theory offers no great gains, in a different
and apparently novel extension the traditionally infinite self-action and consequent infinite electromagnetic mass both disappear when the charge moves precisely at light-speed and, possibly, at discrete superluminal speeds. We discuss the equation of motion of the charge in the former case, seeking comparisons with the Dirac theory. In the latter case we show that the extension predicts discrete stable self-binding orbits when a single charge is in superluminal circular motion. This can be explained in part as a result of the charge appearing – from an electromagnetic interaction point of view – to be in three places at once, corresponding to the past,
present and future intersections with the (self) light-cone. But we demonstrate that only with the novel extension is the force emanating from the past and future locations of the same charge attractive rather than repulsive. We observe that the three (necessarily) inseparable images invite comparison with quarks, suggesting a connection between superluminal motion and the strong force.

Primary authors : Dr. IBISON, Michael (Institute for Advanced Studies at Austin)

Co-authors :

Presenter : Dr. IBISON, Michael (Institute for Advanced Studies at Austin)

Track classification :

Contribution type : --not specified--

Submitted by : Dr. IBISON, Michael

Submitted on Friday 28 September 2007

Last modified on : Friday 28 September 2007

Comments :
> I am submitting two abstracts "Cosmological Expansion as a Perfectt Electromagnetic Absorber" and "An extension of the Maxwell Theory to light-liket and superluminal motion of charges", both of which have to do with directt action. It would seem appropriate to give two presentations only if a) there wast sufficient interest in the topics, and b) the schedule was not already wellt occupied. If either of these conditions is not met then I would be happy to taket advice, including dropping one (or both!) of these, and merging the two talkst into one – depending on the allotted time. I do not want either of theset submissions to be considered for a poster, however.

Status : ACCEPTED

Track judgments :

Abstract ID : 23

Cosmological Expansion as a Perfect Electromagnetic Absorber

We examine the issue of energy conservation in Cosmology with the aim of a satisfactory account of energy loss by EM radiation undergoing Cosmological red-shift. A solution is sought with the help of Hamilton's method in which the Cosmological scale factor a is regarded as the sole independent variable, and the curvature $\sqrt { - g\left(a \right)} R\left({a,\left\{ {a_{,\lambda } } \right\}},\left\{ {a_{,\mu \nu } } \right\}} \right)$ is interpreted as the dynamical part of the action of a relativistic scalar field in flat spacetime. It is shown that the resulting Hamiltonian is just the Friedman equation of the traditional (GR) approach, but having the additional quality that each of the matter, radiation and vacuum terms - including the kinetic / gravitational field term on the 'left-hand side' of the Friedman equation - can be formally identified as an energy density, with the equation as a whole being a formal statement of energy conservation. The utility of this approach is illustrated with an explanation for Cosmological red-shift in terms of coupling between the EM field and the relativistic scalar field a in the flat background. We show that in the FRW coordinate system interaction with the gravitational field affects EM propagation exactly as would a homogeneous lossy medium, with the 'lost' energy helping drive the Cosmological expansion. We argue that this implies that the Wheeler and Feynman boundary condition required by the direct action version of EM is always met in every open Cosmology, with the future perfect absorber being the Cosmological expansion itself.

Primary authors : Dr. IBISON, Michael (Institute for Advanced Studies at Austin)

Co-authors :

Presenter : Dr. IBISON, Michael (Institute for Advanced Studies at Austin)

Track classification :

Contribution type : --not specified--

Submitted by : Dr. IBISON, Michael

Submitted on Friday 28 September 2007

Last modified on : Friday 28 September 2007

Comments :
> I am submitting two abstracts "Cosmological Expansion as a Perfectt Electromagnetic Absorber" and "An extension of the Maxwell Theory to light-liket and superluminal motion of charges", both of which have to do with directt action. It would seem appropriate to give two presentations only if a) there wast sufficient interest in the topics, and b) the schedule was not already wellt occupied. If either of these conditions is not met then I would be happy to taket advice, including dropping one (or both!) of these, and merging the two talkst into one – depending on the allotted time. I do not want either of theset submissions to be considered for a poster, however.

Status : ACCEPTED

Track judgments :

Abstract ID : 24

Matrix of Cofactors of Dimensional Transformation of Real Material Space: Interval or Radiovector of Length Unified

According to our theoretical results, we examine Einstein-Minkowski's conceptions with regard to the distance or longitudinal interval and temporary interval between events infinitely near and rectify the well-known Planck's longitude.

We prove that the own scale of matter has by base a dimensional octet being the primitive dimension characteristic of: a dimensional self-assembly and Deployment of longitudinal three-axial, time, mass, of electric charge, of thermodynamic temperature, of particle, of grouping and of cycle universal. It constitutes and defines the infinitesimal interval o radiovector of length unified. Whatever be the chosen inertial frame of reference, the inner mathematical structure of radius vector is invariant, and its change is independent of the chosen system.

The fact about that the relativistic variation of longitude happens only along the "instantaneous" better punctual or cellular direction and sense of motion is equivalent to the also fact about that the own motion is always punctually or cellularly one-directional despite of, in respect to frame of reference.

Where each point or cell of universe of Real Material Space is corresponded by a only one specific own radius vector and may be described by one and only one physical system or by one and only one of its constituents. Every real physical system is also inseparable part of the only one and united multiconnected real material space; each system always interacts with the rest of real material space at least across an uninterrupted chain of microscopical processes of Big Bang and Big Crunch kinds.

For every and all physical property may be obtained its respective interval starting from Matrix of Cofactors of Dimensional Transformation of Real Material Space.

When, the inner harmony of World, its inherent unicity and its very great forms of expressing may be noticed by Law of Equivalent Interconnection of Interval of an Event.

summary :

The inner harmony of World, its inherent unicity and its very great forms of expressing may be noticed by Law of Equivalent Interconnection of Interval of an Event.

For every and all physical property may be obtained its respective interval starting from Matrix of Cofactors of Dimensional Transformation of Real Material Space.

Primary authors : Dr. MONTERO GARCíA, José De La Luz (Institute for Scientific and Technological Information (IDICT))

Co-authors :

Presenter : Dr. MONTERO GARCíA, José De La Luz (Institute for Scientific and Technological Information (IDICT))

Track classification :

Contribution type : --not specified--

Submitted by : Dr. MONTERO GARCíA, José De La Luz

Submitted on Friday 28 September 2007

Last modified on : Friday 28 September 2007

Comments :
        Topics: Gravitation and Cosmologyt
        t
        Contributed talks

Status : ACCEPTED

Track judgments :

Abstract ID : 25

Energetic-Longitudinal Constant: It is exactly in the long forgotten Quantum Action?

From our theories Quantum Cellular Structural Geometry and Unified Theory of
the Physical and Mathematical Universal Constants it is possible to prove that
the subsystem of energetic universal constants is not complete at present
because it only relates to time and temperature completely disregarding of
longitude. It is exactly in the long forgotten energetic-longitudinal constant
where the topological congruence of physics becomes clearer.
In accordance with the Fourth Law of Thermodynamics, temperature on one
side and longitude and time on the other are opposite and express its limit and
reveal the global scheme of the functioning of world.
We prove that in nature there is only one interaction or force that we have
discovered energetic-longitudinal constant in the four field modalities
gravitational, electromagnetic, strong and weak, with their respective
transmission entities. This approach can be perfectly extended to gluonic field of
the quarks.
Where it is essential to understand that it is not the equivalence of charges or
the equivalence of the corresponding fields, but the conjunction of both factors.
Then, as a result, we get the Unified Equation of the Global Strong-
Electromagnetic-Weak-Gravitational-Nexus. Its absence has made it impossible
for science up to now to warn about the cited global link.
In the unified equation only from experimental values will it be possible to
evaluate the strong charge and the weak charge, the strong field and the weak
field. Notwithstanding, the equivalent way can be achieved upon the theoretical
base of the laws of dimensional equivalence.
This way, the Unique Generalized Force is a certain function of the distance,
process that does not take place at the level of Planck's energy, without strictly
depending energetic-longitudinal constant.

summary :
  This work prove that in nature there is only one interaction or force that we
  have discovered energetic-longitudinal constant in the four field modalities, with
  their respective transmission entities.
  The Unique Generalized Force is a certain function of the distance, process that
  does not take place at the level of Planck's energy, without strictly depending
  energetic-longitudinal constant.

Primary authors : Dr. MONTERO GARCíA, José De La Luz (Institute for Scientific and Technological
                  Information (IDICT))

Co-authors :

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Track classification :

Contribution type : --not specified--

Submitted by : Dr. MONTERO GARCíA, José De La Luz

Submitted on Friday 28 September 2007

Last modified on : Friday 28 September 2007

Comments :

        Topic: High Energy Physics and Astrophysicst
        t
        Contributed talks

Status : ACCEPTED

Track judgments :

Abstract ID : 26

Geometric-Structural-Cellular-Quantum Solution of Planetary Systems: Gravity?

An incorrect appraisal of Titius-Bode's Law, Kepler's Laws and the Law of
Universal Gravitation characterize, the conceptions that nowadays we have of
the Universe in its set.
We prove that these laws do not describe completely the geometric-structural
peculiarity of Planetary Systems, its origin and current functioning.
Our put forward is a Geometric-Structural-Cellular-Quantum Solution of
Planetary Systems in correspondence with Fourth Principle of Thermodynamics
one; the Universe has a measure that them express the global scheme of
functioning of World and its admittedly certain hexagonal structure.
We start from a new structural notion where the harmony of the Solar System
expresses by means of three harmonic principal orders with the discovery of
eight regularities or Titius-Bode's Laws and the Geometric Fundamental Law of
Planetary Systems or Kepler's Fourth Law.
The above-mentioned orders of harmony allow us to demonstrate the existence
of an syncretic overlap between the previous laws where the elliptical orbits are
equivalent by circular orbits, phenomenon that characterizes the intrinsic
structural hexagonal cellularity, which does not depend on the mass of the
entity that generates the field of central force with the unique volumetric
acceleration of orbital sweep in a plane of structural symmetry that ratifies the
planarity of Planetary System.
Everything which allows to state that the Universe is in constant local
widespread rotation, as the structure and unstructuring are processes
concatenated expression of the Structural Global Principle of Matter, the
Universe pulsates, but locally in a universal way as it expresses the Universal
Natural Radiations across Cosmic Microwave Background Radiation.
With these results it is possible to specify different implied concepts: the Black
Holes, the Ozone Layer, the no ratification of Pluto like comet and the
generalization of Einstein's Equivalence Principle.
Is Life a phenomenon what not been involved with the general harmony of the
material World?

summary :
   We start from a new structural notion where the harmony of the Solar System
   expresses by means of three harmonic principal orders with the discovery of
   eight regularities or Titius-Bode's Laws and the Geometric Fundamental Law of
   Planetary Systems or Kepler's Fourth Law.
   With these results it is possible to specify different implied concepts: the Black
   Holes, the Ozone Layer, the no ratification of Pluto like comet and the
   generalization of Einstein's Equivalence Principle.

Primary authors : Dr. MONTERO GARCíA, José De La Luz (Institute for Scientific and Technological
                  Information (IDICT))

Co-authors :

Presenter : Dr. MONTERO GARCíA, José De La Luz (Institute for Scientific and Technological Information
            (IDICT))

Track classification :

Contribution type : --not specified--

Submitted by : Dr. MONTERO GARCíA, José De La Luz

Submitted on Friday 28 September 2007

Last modified on : Friday 28 September 2007

Comments :
> Topic: Gravitation and Cosmologyt
> t
> Contributed talks

Status : ACCEPTED

Track judgments :

Abstract ID : 27

Is the Gravitational Charge or Mass one Frontiers of Step Connection Quantitative Between the Quantum-Classic Universe?

According to our theoretical results, the evolution has its foundation in the structural hierarchic sequence of matter by mass levels and doesn't in time, in view of the undeniable fact of the universality of the gravitation and does not exist entity without gravitational charge.

The latter, on average, it is uniformly compacted and uniformly uncompacted being characterized at all the levels through alternation sequential integrative concatenated very dense zones surrounded by rarefied mass zones. Where widespread quantum anyone are these, them are unfragmentables unitary to its level, fragmentables entire by below towards the depth and entire agglomerates overhead, towards the immensity. Dark matter or the Global Structural Principle?

The triple meaning universal of gravitational charge as expression of nature of World gravitatory, inertial and energetic have a fourth main meaning: the one of being the right measures for the order of magnitude of real material systems. Where the variation of the gravitational charge and of any magnitude is, for principle, proportional also to itself. It is evident that H. A. Lorentz, A. Einstein and H. Minkowski, would noticed the fact but they did not consider it explicit and analytically in the Special Theory of Relativity.

The universal primitive dimensional constant of mass or gravitational charge rectifies to Planck's mass known, physics and mathematical rigor establishes accurately the frontier between classic-quantum: world macro always agglomerate and world micro singularity or of low strictly quantum agglomeration.

It confirms the intelligent suspicion of E. Schröedinger about that his equation and it still carries on trying to find erroneously the Compton's wavelength of Earth, a mistake that still today continues being committed.

In addition, some considerations are approached for the elaboration of a physical theory of the bi-directional transit of the classic-quantum and vice versa, very linked to the process of Life and the conscience.

summary :

The triple meaning universal of gravitational charge as expression of nature of World gravitatory, inertial and energetic have a fourth main meaning: the one of being the right measures for the order of magnitude of real material systems. The universal primitive dimensional constant of mass or gravitational charge rectifies to Planck's mass known, establishes accurately the frontier between classic-quantum.

Primary authors : Dr. MONTERO GARCíA, José De La Luz (Institute for Scientific and Technological Information (IDICT))

Co-authors :

Presenter : Dr. MONTERO GARCíA, José De La Luz (Institute for Scientific and Technological Information (IDICT))

Track classification :

Contribution type : --not specified--

Submitted by : Dr. MONTERO GARCíA, José De La Luz

Submitted on Friday 28 September 2007

Last modified on : Friday 28 September 2007

Comments :
Topic: Theoretical Physics   t
t
Contributed talks

Status : ACCEPTED

Track judgments :

Abstract ID : 28

Scale Dimensionality of Matter

Are the Special Theory of Relativity and Quantum Mechanics in keeping with
Scale Dimensionality of Matter?
We prove what Nature changes scale hierarchical level of organization and
measure, not through the dimensional proportional uniform way, but by keeping
its fundamental arithmetic-geometric-topologic-dimensional properties.
The diversity of the systems appears thanks to this extremely beautiful
behavior of matter. It is only natural and perfectly understandable from the
primitive dimensional octet and the laws of equivalence and dimensional
harmony.
This is absolutely logical. When the real material space expands from its
homogeneous and fundamental uniform cellular structure toward its less dense
perturbations inhomogeneous and not uniform as those we call Solar System,
all dimensions modify in the most diverse way. It would keep its principal global
invariants with its arithmetic-geometric-topologic-dimensional and structural-
cellular-dynamic-quantum essence, expressed in its universal constants.
It which proves that in a megascopic system like the solar one, the properties
of the real material space cannot be violated, and that in the dimensional
magnification every dimension is affected by all the rest, that is, the dimensional
connection cannot be fragmented. In addition,   Scale
Dimensionality is characterized, as we have already said, by the indissoluble
systemic dimensional interinfluence and not by Scale Relativity and Fractal
Space-Time.
The values of Astronomic Unit, the Solar Mass and the Tropical Year are not any.
The primitive dimensional octet and the laws of equivalence and universal
harmony determine them, where grouping and magnetism relate with much
accuracy as "builders" of our Solar System.

summary :

When the real material space expands from its homogeneous and fundamental
uniform cellular structure toward its less dense perturbations inhomogeneous
and not uniform as those we call Solar System, all dimensions modify in the
most diverse way. It would keep its principal global invariants with its arithmetic-
geometric-topologic-dimensional and structural-cellular-dynamic-quantum
essence, expressed in its universal constants.

Primary authors : Dr. MONTERO GARCíA, José De La Luz (Institute for Scientific and Technological
          Information (IDICT))

Co-authors :

Presenter : Dr. MONTERO GARCíA, José De La Luz (Institute for Scientific and Technological Information
          (IDICT))

Track classification :

Contribution type : --not specified--

Submitted by : Dr. MONTERO GARCíA, José De La Luz

Submitted on Friday 28 September 2007

Last modified on : Friday 28 September 2007

Comments :
          Topic: Gravitation and Cosmology   Contributed talks

Status : ACCEPTED

Track judgments :

Abstract ID : 29

Another Paradox in Relativistic Quantum Mechanics

Another Paradox in Relativistic Quantum Mechanics

B.A.Kagali *

Department of Physics, Bangalore University, Bangalore 560 056, India

Abstract: In this paper, I present another paradoxical result in relativistic
quantum mechanics. One is familiar with Klein paradox that arises when one
considers spin half particles incident on a sharply rising potential barrier. It is
found there that the reflected flux exceeds the incident flux etc. Explanation for
the paradox is found by invoking the possibility of pair production etc (J D
Bjorken and S D Drell: Relativistic Quantum Mechanics). I have found that when
is considering relativistic particles incident on strong potential hills, it is
possible
that the incident particle experiences potential wells i.e. potentials that can
cause binding, leading to the possibilities of confinement. I have worked out full
details for spinless particles in one to three spatial dimensions for arbitrarily
shaped potential hills so long as they are strong enough. Spin half particles are
also expected to show a similar behavior for strong potentials though one
encounters coupled differential equations. It is pointed out that an explanation
for this paradoxical situation can only be found outside the framework of the
single particle relativistic wave equations.

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summary :
Another paradoxical result has been discovered for single particle relativistic
wave equations wherein we find boud states arising out of sharp and strong
potential hills. Explanation for the paradox can be found outside single particle
wave equations admitting pair production etc.

Primary authors : Prof. KAGALI, Basavaraj (BANGALORE UNIVERSITY)

Co-authors :

Presenter : Prof. KAGALI, Basavaraj (BANGALORE UNIVERSITY)

Track classification :

Contribution type : --not specified--

Submitted by : Prof. KAGALI, Basavaraj

Submitted on Friday 28 September 2007

Last modified on : Friday 28 September 2007

Comments :

Status : ACCEPTED

Track judgments :

Abstract ID : 30

Lens effect estimations on CMB radiation using AP3M simulations

Calculations of lensed CMB maps are performed with the Hydra4.2 code
designed by the Hydra Consortium. This code has been
modified to move CMB photons while the AP3M N-body simulation is running.
An appropriate ray-tracing procedure is used to compute
such effect. The results seem to improve previous works which are based on
PM N-body simulations.

Primary authors : Prof. FULLANA I ALFONSO, Màrius Josep (Universitat Politècnica de València) ; Prof. ARNAU I CóRDOBA, Josep Vicent (Universitat de València) ; Prof. SáEZ MILáN, Diego Pascual (Universitat de València)

Co-authors :

Presenter : Prof. FULLANA I ALFONSO, Màrius Josep (Universitat Politècnica de València)

Track classification :

Contribution type : --not specified--

Submitted by : Prof. FULLANA I ALFONSO, Màrius Josep

Submitted on Saturday 29 September 2007

Last modified on : Saturday 29 September 2007

Comments :
> This work should be included in the Astrophysics or Cosmology sesion, t
> although it also has a computational part to be distributed in a t
> computational sesion.t
> Please, correct the name of the University in the authors index of Màrius J. t
> Fullana i Alfonso: the right one is "Universitat Politècnica de València", t
> thanks.

Status : ACCEPTED

Track judgments :

Abstract ID : 31

New concepts of dimensions and consequences

In the 1930s Kaluza and Klein proposed a supplementary 5th dimension as an attempt to unify electromagnetism and gravity. The paper therefore begins by revisiting recent extensions to the concept of dimension towards such goal, usually with spatial additional dimensions. Other theories, such as Non-commutative geometry and Deformed or Doubly Special relativity, however challenge the concept of continuous space-time or even envision types of dimensions different from space and time, like Finkelstein with 'change', Penrose with twistors and DSR with massive reference frames.

The author has proposed at FFP8 to relate customary four-dimensional (τ, Θ, φ, r) representation to a fourfold system of types of dimensions altogether mixing background and reality through reference frame and referred to events, actions and masses.
The corresponding perceptible reality integrates a negentropic (time) dimension, an entropic spatial (or extensive or lengthy) dimension, hence isotropic with a form or frame (wave) function non local
dimension and a change dimension.
The paper is rather principial than phenomenological but will present several consequences of the previously proposed 'fourfold co-necessity principle' expanding the concept of covariance.
First consequence would anticipate four rather than two types of singularities, even though singularity seems to contradict fourfold co-necessity, each one losing a type of dimension for a specific subreality. CPT invariance may derive from there.
Second one pertains to four types of universal minima and maxima.
Then the paper aims at exhibiting physical meaning deriving from the fourfold co-necessity principle by listing paradoxes that seem lifted when change and form are considered as two dimensions replacing two dimensions currently considered spatial.
For instance form minimum, combined with the others, fits with string theories confirmed assumptions of minimal area. Other physical interpretations may contribute some meaning to non-commutative and DSR theories, with minimum energy or change.
Envisioned experiments to refute the theory will be proposed.

summary :
  References:

  Primary authors : Dr. JOURNEAU, Philippe (Aegeus)

  Co-authors :

  Presenter : Dr. JOURNEAU, Philippe (Aegeus)

  Track classification :

  Contribution type : --not specified--

  Submitted by : Dr. JOURNEAU, Philippe

  Submitted on Sunday 30 September 2007

  Last modified on : Friday 26 October 2007

Comments :

Status : ACCEPTED

Track judgments :

Abstract ID : 32

Cosmology in the Light of the Theory of Time

Extreme cases of generalized energy conservation in the frame of non-uniform time (whose corollary reveals the nature of gravity) are discussed in detail. The nature of cold dark matter is explained as well as of cosmic background radiation which turns out not to be a result of the big bang. Optical scattering caused by cold dark matter is specifically considered. The "biggest blunder" of Einstein's life is proved not to be a blunder at all. Hubble's law is doubted. A new explanation for hydrogen and helium line broadening in the spectrum of the Sun is adduced as well as the way to solve the Solar neutrino problem. A thermo¬nuclear-free star energy engine hypothesized by Kozyrev is proposed. The problem of singularity is discarded. The theories of the big bang and black holes are disproved. A hypothesis of the nature of pulsars, quasars, and supernovae is proposed. It is shown that the Universe can originate from one quantum. A number of experiments to prove the theory of time in discussion are proposed.

Primary authors : POLIAKOV, Eugene (Institute of Physics of Time, St.Petersburg, Russia)

Co-authors :

Presenter : POLIAKOV, Eugene (Institute of Physics of Time, St.Petersburg, Russia)

Track classification :

Contribution type : --not specified--

Submitted by : POLIAKOV, Eugene

Submitted on Sunday 30 September 2007

Last modified on : Sunday 30 September 2007

Comments :
> The topic is proposed as an oral talk as a sequel of ID 18 at "Foundations t of Physics and Quantum Mechanics" session (Wednesday, 09 January t 2008). If ID 18 is rejected this one should be withdrawn automatically.

Status : ACCEPTED

Track judgments :

Abstract ID : 33

First-principles investigations of intrinsic and Si-doped GaAs nanowires: structural stability and electronic properties

Intrinsic and Si-doped GaAs nanowires (NWs) are investigated by first principles pseudopotential calculations.
In contrast to the bulk phase, wurtzite (WZ) NWs are more stable than zinc-blende (ZB) NWs at least up to
diameters of about 50 Ang. The energy gap shows important variations with the diameter of the wire due
to quantum-confinement effects. Motivated by the amphoteric behaviour of Si in GaAs, we have studied
the relative stability and the effect on the electronic properties of substitutional Si impurities at different Ga
and As sites. In both cases, the lowest-energy position for Si atoms is close to the NW surfaces. The
electronic states induced by the impurity are identified and their atomic scale properties are discussed.

Primary authors : Dr. GHADERI JOUYBARI, Nahid (CNR-INFM DEMOCRITOS, Trieste)

Co-authors : Dr. PERESSI, Maria (University of Trieste and CNR-INFM DEMOCRITOS, Trieste) ; Dr. BINGGELI, Nadia (ICTP and CNR-INFM DEMOCRITOS, Trieste)

Presenter : Dr. GHADERI JOUYBARI, Nahid (CNR-INFM DEMOCRITOS, Trieste)

Track classification :

Contribution type : --not specified--

Submitted by : Prof. PERESSI, Maria Peressi

Submitted on Monday 01 October 2007

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Comments :

Status : ACCEPTED

Track judgments :

Abstract ID : 34

Interaction of carbon dioxide with Ni(110): a combined experimental and theoretical study

We present a combined experimental and theoretical study of the CO2 interaction with the Ni(110) surface.
Photoelectron spectroscopy, temperature-programmed desorption and high-resolution electron energy loss
spectroscopy measurements are performed at different coverage and for increasing surface temperature
after adsorption at 90 K with the aim to study the competing processes of CO2 dissociation and desorption.
Simulations are performed within the framework of density functional theory using ab-initio
pseudopotentials, focusing on selected chemisorption geometries, determining the energetics and the
structural and vibrational properties.
Both experimental and theoretical vibrational frequencies yield consistent indications about two inequivalent
adsorption sites that can be simultaneously populated at low temperature: short-bridge site with the
molecular plane perpendicular to the surface and hollow site with the molecular plane inclined with respect
to the surface. In both sites the molecule has pure carbon or mixed oxygen-carbon coordination with the
metal and is negatively charged and bent.
Predicted energy barriers for adsorption and diffusion on the surface suggest a preferential adsorption path
through the short-bridge site to the hollow site, which is compatible with the experimental findings.
Theoretical results qualitatively support literature data concerning the increase of the work function upon
chemisorption.

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Presenter : Dr. DING, Xunlei (CNR-INFM DEMOCRITOS, Trieste)

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Track judgments :

Abstract ID : 35

Machian Cosmology based on Ideas of Dirac, Sciama and Dicke

The contributions to cosmology of Dirac, Sciama and Dicke are revisited and a cosmology encompassing their basic ideas is proposed. Dicke's scalar theory of gravitation (1957) can be formulated in a way which is compatible with Sciama's implementation of Machs principle (1953). Such a gravitational model is shown to satisfy Dirac's large number hypothesis (1938). Contrary to Dirac's prediction this does not produce a visible time dependence of G which indeed is not observed (see arxiv.org/abs/0708.3518).

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Track classification :

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Submitted by : Dr. UNZICKER, Alexander

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Comments :
  should be placed in sectiont
  General Relativity, Cosmology and Fundamental Physics and Astrophysics

Status : ACCEPTED

Track judgments :

Abstract ID : 36

Four qubit entangled pure States and K-way negativities

Negativity, based on Peres Horodecki PPT criterion, has been shown to be an entanglement monotone. Recently, we proposed a characterization of N-partite quantum states based on K-way negativities, where $2 \leq K \leq N$. The K-way partial transpose with respect to a subsystem of an N-partite composite system is constructed by partial transposition subject to specific constraints on transposed matrix elements for each value of K ($2 \leq K \leq N$). In this contribution, we present analytical expressions for the entanglement measures of pure four qubit states. Different parts of an N-partite composite system may be entangled to each other in distinctly different ways. For example, four qubit (ABCD) states may have genuine 4-partite, tri-partite, and bi-partite entanglement. It has been shown in ref. [F. Verstraete, J. Dehaene, B. De Moor, and H. Verschelde1, Phys. Rev. A65, 052112(2002)] that a pure state of four qubits can be transformed to a state belonging to one of a set of nine families of states, by Stochastic local operations and classical communication (SLOCC). We show that the partial transpose with respect to a subsystem can be wriiten as a sum of matrices, where each matrix corresponds to a specific K-way partial transpose. We use the eigen vectors corresponding to negative eigenvalues of global partial transpose and the K-way partial transposes to construct measures of genuine four-partite, tri-partite, and bi-partite entanglement for all the nine families of states. The calculated entanglement measures are functions of local invariants characterizing each family of states and satisfy the general criterion required of an entanglement monotone.

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Track classification :

Contribution type : --not specified--

Submitted by : Prof. SHARMA, Naresh

Submitted on Sunday 28 October 2007

Last modified on : Wednesday 31 October 2007

Comments :
> Session: Foundations of Physics and Quantum Mechanicst
> t
> POSTER contributiont

Status : ACCEPTED

Track judgments :

Abstract ID : 37

Non-locality on the time axis

The concept of non-locality is normally considered in space, and plays an
important role in the nature of quantum mechanics. Here, we consider what
happens if we consider non-locality on the time axis. In particular, we will
consider classical dynamical systems, whose behavior is governed by two
separated points on the time axis. One realization is a "delayed dynamics", if
these two temporal points are located in the past and the present. One the
other hand, if the dynamics depends both on the current and on some future
point, it gives "anticipating dynamics". We discuss that in both cases the
interval between the two separated temporal points, which we may consider
as
a "degree of temporal non-locality", has a role of bifurcation parameter. When
this interval exceeds a critical value, the dynamics can change its behaviors,
such as simple fixed point dynamics to oscillatory or chaotic behaviors. Also,
when certain level of fluctuations is introduced into these dynamics, resonance-
like phenomena arises. We would like to consider how this approach to
temporal non-locality can be extended into quantum mechanics.

Reference:

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International Sysmposium, edited by Burra G. Sidharth, Antonio Alfonso-Faus,
Marius J. Fullana, AIP Conference Proceedings, Vol 905, pp.191--194 (Melville,
New York, 2007) .

2. T. Ohira, Stochasticity and Non-locality of Time, Physica A, Vol. 379, pp. 483-
490, 2007.

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Co-authors :

Presenter : Dr. OHIRA, Toru (Sony Computer Science Laboratories, Inc.)

Track classification :

Contribution type : --not specified--

Submitted by : Dr. TORU, Ohira

Submitted on Monday 29 October 2007

Last modified on : Monday 29 October 2007

Comments :
> I have attended and greatly enjoyed FFP8, with a talk "Stochastic Time". t
> I would liket
> to submit an related abstract this year. I am grateful of your considerationt
> of this submission for an oral presentation in FFP9.t
> t
> Sincerely,t
> t
> Toru Ohira

Status : ACCEPTED

Track judgments :

Abstract ID : 38

Interaction of a CO molecule with a Pt monoatomic wire: electronic structure and ballistic conductance

Recent experiments showed that the ballistic conductance of Pt nanocontacts is strongly modified by CO adsorption. We present first principles density functional calculations of the interaction between a monatomic Pt wire and a CO molecule in three different configurations: adsorbed on bridge, on top or substitutional. We compare the results obtained by using scalar-relativistic (SR) and fully-relativistic (FR) ultrasoft pseudopotentials, with the latter including spin-orbit (SO) coupling effects.

We find that the interaction mechanism is qualitatively the same in the bridge and top configurations, but it is energetically more favorable to adsorb the CO on the bridge site. The interaction is due to the HOMO and to the doubly degenerate LUMO orbitals of CO, which are involved in a donation/back-donation process similar to that occurring when CO adsorbs on transition-metal surfaces. In the substitutional case, which is less favored in energy, this process still occurs, although back-donation is reduced. We show that the inclusion of the SO coupling, while changing the electronic structure of the wire, does not modify substantially the interaction between the molecule and the wire.

We find that the ballistic conductance of the nanowire is not much reduced by the adsorption of the molecule in the bridge and top geometries (from $G=8$ e^2/h to $G=6.6$ e^2/h, in the bridge, and to $G=6.2$ e^2/h in the top), but shows a significant drop in the substitutional case ($G=2.2$ e^2/h). In the bridge and top cases only the conductance of the s and d states that interact with CO is reduced, while in the substitutional case all states with orbital angular momentum $m=0$ and $m=2$ are completely blocked by the CO and states with $m=1$ are half transmitted. The FR conductance has slightly lower values, but they almost agree with the SR ones.

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Co-authors : Prof. DAL CORSO, Andrea (SISSA and Democritos-INFM) ; Dr. SMOGUNOV, Alexander (SISSA, Democritos-INFM and Voronezh State university) ; Prof. TOSATTI, Erio (SISSA, Democritos-INFM and ICTP)

Presenter : Mr. SCLAUZERO, Gabriele (SISSA and Democritos-INFM)

Track classification :

Contribution type : --not specified--

Submitted by : Mr. SCLAUZERO, Gabriele

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Comments :

Status : ACCEPTED

Track judgments :

Abstract ID : 39

Classification methods for Cherenkov telescopes images on a pixel-by-pixel base

The problem of identifying gamma ray events out of charged cosmic ray background (so called hadrons) in Cherenkov telescopes is one of the key problems in Very High Energy gamma ray astronomy. In this contribution, we present a novel approach to this problem by changing the domain representation traditionally used in this field. Two alternative data representation have been explored: the first one, pixel-based representation, consider the full image recorded by a Cherenkov telescope on a pixel-by-pixel base. The second one, projection histograms based representation, is a well known feature extraction method in pattern recognition which capture the geometrical properties of the camera and the neighbourhood relation between pixels. Separation between gamma-like and hadron-like is performed using several machine learning techniques. We have implemented different supervised classifiers trained using Monte Carlo data samples of both types of events. Unsupervised classifiers like Self-Organising Maps (SOM) and Learning Vector Quantization Networks (LVQ) are also applied with the aim to take advantage of clustering result visualization in classification task.

Primary authors : Prof. MALAGON, Constantino (Universidad Nebrija) ; Prof. BARRIO, Juan Abel (Universidad Complutense)

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Presenter : Prof. MALAGON, Constantino (Universidad Nebrija)

Track classification :

Contribution type : --not specified--

Submitted by : Prof. CONSTANTINO, Malagon

Submitted on Tuesday 30 October 2007

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Comments :

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Abstract ID : 40

Controlled manipulation of three cold trapped ions in a cavity

We analyze the entanglement dynamics of spatially separated three two-level cold trapped ions in a high finesse cavity with the cavity tuned to the red sideband of ionic vibrational motion. Eigenstates of pauli operators model the internal states of ions. The composite system consists of ionic internal states, vibrational state in the trap, and the cavity field state. Analytical expressions for the state of composite system as a function of interaction time are obtained for specific initial state preparations and used to calculate the probability of generating three ion W-state with a single excited ion or a W-state with two ions in excited state. The number of initial state vibrational quanta (m) offers a control mechanism for manipulation of composite system states in the sense that whereas for m=1 only bipartite entanglement is possible, the system may have tripartite entanglement as well for m=2. For m greater or equal to 3, the composite system may have genuine 4-partite, tripartite as well as bipartite entanglement. This is an interesting aspect unique to systems where vibrational motion of ions is coupled to cavity field in contrast to the ions coupled only to quantized cavity field or only to the vibrational modes. Entanglement dynamics is examined by plotting the Global [1], 4-way, 3-way, and 2-way negativities [2], for the composite system state, as a function of interaction time. With the cavity prepared initially in a Fock state, the nature of entanglement of ionic internal states can be manipulated by appropriate choice of initial state phonon number. By using the ion-cavity coupling strengths achieved in experimental realizations, the interaction time needed for W-state generation is found to be of the order of 10μ sec. Entanglement dynamics of reduced three ion density operator is also examined by using global, three-way and two-way negativities along with the linear entropy.

 [1] K. Zyczkowski, P. Horodecki, A. Sanpera, and M. Lewen-stein, Phys. Rev. A 58, 883 (1998).
[2] S. Shelly Sharma and N. K. Sharma, Phys. Rev. A76 (2007); S. Shelly Sharma and N. K. Sharma, arXiv: quant-ph/0608062.

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Co-authors : Mr. DE ALMEIDA, Eduardo (Depto. de Física, Universidade Estadual de Londrina, 86051-990, PR Brazil) ; Prof. SHARMA, Naresh Kumar (Depto. de Matematica, Universidade Estadual de Londrina, 86051-990, PR Brazil)

Presenter : Dr. SHARMA, Santosh Shelly (Depto. de Fisica, Universidade Estadual de Londrina, 86051-990, PR Brazil)

Track classification :

Contribution type : --not specified--

Submitted by : Dr. SHARMA, Santosh Shelly

Submitted on Wednesday 31 October 2007

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Comments :
          Session: Foundations of Physics and Quantum Mechanicst

Contributed talk or postert

Status : ACCEPTED

Track judgments :

Abstract ID : 41

Vortex-antivortex labyrinth wavefunction.

We predict pinning of quantized matter wave vortices by optical vortices in specially
arranged optical dipole "labyrinth" traps. The vortex-antivortex optical arrays
of
rectangular symmetry are shown to support vortex-antivortex "antiferromagnet" matter
waves. The separable Hamiltonian for matter waves is proposed which allows to
factorize exactly 3D -wavefunction into product of 1D - harmonic oscillator's
ground state and 2D – "labyrinth" wavefunction. The arguments in favour of
enhanced
stability of compicated macroscopic wavefunction composed of periodically spaced BEC
superfluid vortices with respect to decoherence are presented.

summary :

Ultracold atomic gases/1/ have attracted significant interest nowadays as a possible
experimental tool for realization of a universal quantum computer /2/. The basic
physical mechanism for control of the motion of neutral atoms is optical dipole
trapping /3/.
The goal of present communication is to study BEC wavefunction in complicated
spatially periodic field composed of overlapping optical vortices. The rectangular
vortex lattices arise spontaneously in diode-pumped microchip lasers with slightly
focusing output coupler in a wide range of experimental parameters/4/. The output
laser pattern is ordered in "antiferromagnet"-like lattice with alternating orbital
angular momenta of light from one site to another/5/.Such 2D rectangular array or
"labyrinth" trap could be modelled in the first approximation as a separable optical
potential. This enable us to apply separation of variables technique to 3D
Gross-Pitaevskii(GPE) equation/6,7,8/. The equations for "longitudinal" and
"transversal" parts of macroscopic are solved separately: the first one, the 1D
harmonic oscillator is solved exactly, the second one, "transversal", two dimensional
GPE, is solved numerically, by means of split-step FFT transform method/9/. The mesh
size 512x512 was used with guard bands ratio equals 1:8 /10/. The numerical results
show the rectangular array of BEC vortices, nested at locations of optical vortices
which compose the trapping optical pattern. The observed "pinning" of BEC vortices
is interpreted as action of "elementary" toroidal traps collocated with optical
vortices/8/. The rotational energy of BEC vortices is estimated analytically to be in
the range 0.1 - 10^(-8) eV/11/.

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```

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Track classification :

Contribution type : --not specified--

Submitted by : Dr. OKULOV, Alexey

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Comments :
        Would highly appreciate the support for participation in conference.

Status : ACCEPTED

Track judgments :

Abstract ID : 42

Paraquantum Yang-Mills Theory and PBRST transformations

We investigate an extension of the non-abelian gauge theories in the paraquantum formalism of order 2 for both gauge fields and matter fields. We consider two possibilities. The first one consists in making a direct extension of the theory by taking the effective lagrangian in terms of the parafields, the result is not conclusive .The second one, which consists in applying the Faddeev-Popov formalism on the Klein ordinary fields, gives a set of paraBRST transformations satisfying the nilpotence property . This investigation conduct us to a discussion about the (im)possibility to reformulate an ordinary field theory solely in terms of parafields of order two . A modified Klein transformation which could give some progress in this direction is proposed.

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Co-authors : Prof. BELALOUI, Nadir (Proffeser)

Presenter : Ms. MAGHLAOUI, Leila (student)

Track classification :

Contribution type : --not specified--

Submitted by : Ms. MAGHLAOUI, Leila

Submitted on Wednesday 07 November 2007

Last modified on : Wednesday 07 November 2007

Comments :

Status : ACCEPTED

Track judgments :

Abstract ID : 65

Prova

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Quando la notte ci mettiamo ad osservare le stelle, esse ci appaiono muoversi
sulla sfera celeste, in particolare le vediamo sorgere ad est, culminare (cioe'
raggiungere la loro massima elevazione sull'orizzonte) e poi calare ad ovest.
Il percorso che esse sembrano compiere dipende dalla nostra posizione
sulla Terra.
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Primary authors : Ms. DE MARIA, Maria Michela (Dipartimento di Fisica Università di Udine)

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