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Abstracts and the descriptions of works in Art and Science submitted to www.IntellectualArchive.com in September 2012

ID #: 716 **Natural Sciences / Computer Sciences / Analysis of algorithms**

Submitted on: Sep 01, 2012

Author: **Oleg Kupervasser, Ronen Lerner, Ehud Rivlin**

Title: **Error Analysis for a Navigation Algorithm based on Optical-Flow and a Digital Terrain Map**

Abstract: The paper deals with the error analysis of a navigation algorithm that uses as input a sequence of images acquired by a moving camera and a Digital Terrain Map (DTM) of the region been imaged by the camera during the motion. The main sources of error are more or less straightforward to identify: camera resolution, structure of the observed terrain and DTM accuracy, field of view and camera trajectory. After characterizing and modeling these error sources in the framework of the CDTM algorithm, a closed form expression for their effect on the pose and motion errors of the camera can be found. The analytic expression provides a priori measurements for the accuracy in terms of the parameters mentioned above.

Web link: ***www.IntellectualArchive.com/getfile.php?file=4a18kbdi0Tg&orig_file=Error.pdf***

ID #: 718 **Natural Sciences / Computer Sciences / Analysis of algorithms**

Submitted on: Sep 01, 2012

Author: **Oleg Kupervasser, Vladimir Voronov**

Title: **A navigation filter for fusing DTM/correspondence updates**

Abstract: An algorithm for pose and motion estimation using corresponding features in images and a digital terrain map is proposed. Using a Digital Terrain (or Digital Elevation) Map (DTM/DEM) as a global reference enables recovering the absolute position and orientation of the camera. In order to do this, the DTM is used to formulate a constraint between corresponding features in two consecutive frames. The utilization of data is shown to improve the robustness and accuracy of the inertial navigation algorithm. Extended Kalman filter was used to combine results of inertial navigation algorithm and proposed vision-based navigation algorithm. The feasibility of this algorithms is established through numerical simulations.

Web link: ***www.IntellectualArchive.com/getfile.php?file=NuxLr056iL7&orig_file=DTM_new.pdf***

ID #: 719 **Natural Sciences / Computer Sciences / Analysis of algorithms**

Submitted on: Sep 01, 2012

Author: **Oleg Kupervasser, Vladimir Voronov**

Title: **Correction of inertial navigation system's errors by the help of video-based navigator based on Digital Terrarium Map**

Abstract: This paper deals with the error analysis of a novel navigation algorithm that uses as input the sequence of images acquired from a moving camera and a Digital Terrain (or Elevation) Map (DTM/DEM). More specifcally, it has been shown that the optical flow derived from two consecutive camera frames can be used in combination with a DTM to estimate the position, orientation and ego-motion parameters of the moving camera. As opposed to previous works, the proposed approach does not require an intermediate explicit reconstruction of the 3D world. In the present work the sensitivity of the algorithm outlined above is studied. The main sources for errors are identified to be the optical-flow evaluation and computation, the quality of the information about the terrain, the structure of the observed terrain and the trajectory of the camera. By assuming appropriate characterization of these error sources, a closed form expression for the uncertainty of the pose and motion of the camera is first developed and then the influence of these factors is confirmed using extensive numerical simulations. The main conclusion of this paper is to establish that the proposed navigation algorithm generates accurate estimates for reasonable scenarios and error sources, and thus can be effectively used as part of a navigation system of autonomous vehicles.

Web link: ***www.IntellectualArchive.com/getfile.php?file=leofhVxQtiY&orig_file=Mybig_new.pdf***

ID #: 720 **Natural Sciences / Computer Sciences / Analysis of algorithms**

Submitted on: Sep 01, 2012

Author: **Oleg Kupervasser, Vladimir Voronov**

Title: **A navigation filter for fusing DTM/correspondence updates**

Abstract: An algorithm for pose and motion estimation using corresponding features in images and a digital terrain map is proposed. Using a Digital Terrain (or Digital Elevation) Map (DTM/DEM) as a global reference enables recovering the absolute position and orientation of the camera. In order to do this, the DTM is used to formulate a constraint between corresponding features in two consecutive frames. The utilization of data is shown to improve the robustness and accuracy of the inertial navigation algorithm. Extended Kalman filter was used to combine results of inertial navigation algorithm and proposed vision-based navigation algorithm. The feasibility of this algorithms is established through numerical simulations.

Web link: ***www.IntellectualArchive.com/getfile.php?file=45BLd3mPwXg&orig_file=DTM_new.pdf***

ID #: 721 **Natural Sciences / Mathematics / Algebra**

Submitted on: Sep 02, 2012

Author: **Josimar da Silva Rocha and Said Najati Sidki**

Title: **The n-ary adding machine and soluble groups**

Abstract: We describe under a various conditions abelian subgroups of the automorphism group Aut(Tn) of the regular n-ary tree Tn, which are normalized by the n-ary adding machine t=(e,...,e,t)s, where s is the n-cycle (0, 1, ..., n-1). As an application, for n = p a prime number, and for n = p^2 when p = 2, we prove that every finitely generated soluble subgroup of Aut(Tn), containing t is an extension of a torsion-free metabelian group by a finite group.

Web link: ***www.IntellectualArchive.com/getfile.php?file=kPf1wNZHa82&orig_file=J_da_Silva_Rocha_ASubmeter.pdf***

ID #: 722 **Natural Sciences / Physics / Biophysics**

Submitted on: Sep 03, 2012

Author: **V.T. Volov**

Title: **Fractal-Cluster Theory and Thermodynamic Principles of Biological Systems Control and Analysis**

Abstract: In this article we suggest the results of using of the fractal-cluster theory and thermodynamics for the biological organism evolution and protein-water dehydration analysis. As a result of the analysis three fractal - cluster laws for biological organisms were formulated: energy law, probability law and evolutional law. It was shown that self-organized energy of water-protein system approximately equals 1% percent from ATF (Đ□Đ¢P) energy per one of weight.

Web link: ***www.IntellectualArchive.com/getfile.php?file=dd5DKeEThhL&orig_file=article.docx***

ID #: 723 **Natural Sciences / Physics / General Physics**

Submitted on: Sep 04, 2012

Author: **Vladimir Burdyuzha**

Title: **Cosmology of the lambda-term (vacuum component of the Universe)**

Abstract: The vacuum component of the Universe is investigated in both quantum and classical regimes of its evolution. More than 78 orders of magnitude of the vacuum energy have been reduced in the quantum regime during 10^-6 sec. Near 45 orders have been reduced in the classical regime during 4x10^17 sec. In the quantum regime phase transitions were more effective processes for vacuum energy reduction than production of new quantum states. The validity of evolution of the Universe`s vacuum component is also presented. All the "crisis" 123 orders are, strangely enough, reduced in usual physical processes.

Web link: ***www.IntellectualArchive.com/getfile.php?file=eoqriTO7xHW&orig_file=V_Burdyuzha__Cosmology_of_the_lambda-term.pdf***

ID #: 724 **Natural Sciences / Mathematics / Geometry**

Submitted on: Sep 04, 2012

Author: **Alexander Krasulin**

Title: **Five-Dimensional Tangent Vectors in Space-Time: III. Some Applications**

Abstract: In this part of the series I show how five-tensors can be used for describing in a coordinate-independent way finite and infinitesimal Poincare transformations in flat space-time. As an illustration, I reformulate the classical mechanics of a perfectly rigit body in terms of the analogs of five-vectors in three-dimensional Euclidean space. I then introduce the notion of the bivector derivative for scalar, four-vector
and four-tensor fields in flat space-time and calculate its analog in three-dimensional space for the Lagrange function of a system of several point particles in classical nonrelativistic mechanics.

Web link: ***www.IntellectualArchive.com/getfile.php?file=cfDN5JMGGbm&orig_file=5D_tangent_vectors_Part_3.pdf***

ID #: 725 **Natural Sciences / Physics / Mathematical Physics**

Submitted on: Sep 05, 2012

Author: **A. A. Deriglazov, B. F. Rizzuti**

Title: **Classical mechanics in reparametrization-invariant formulation and the Schroedinger equation**

Abstract: The dynamics of any classical-mechanics system can be formulated in the reparametrization-invariant (RI) form (that is we use the parametric representation for trajectories, ${\bf x}={\bf x}(\tau)$, $t=t(\tau)$ instead of ${\bf x}={\bf x}(t)$). In this pedagogical note we discuss what the quantization rules look like for the RI formulation of mechanics. We point out that in this case some of the rules acquire an intuitively clearer form. Hence the formulation could be an alternative starting point for teaching the basic principles of quantum mechanics. The advantages can be resumed as follows. a) In RI formulation both the temporal and the spatial coordinates are subject to quantization. b) The canonical Hamiltonian of RI formulation is proportional to the quantity $\tilde H=p_t+H$, where H is the Hamiltonian of the initial formulation. Due to the reparametrization invariance, the quantity $\tilde H$ vanishes for any solution, $\tilde H=0$.

Web link: ***www.IntellectualArchive.com/getfile.php?file=NemBLeErTkH&orig_file=A_Deriglazov__Classical_mechanics.pdf***

ID #: 726 **Natural Sciences / Physics / Gravitation Theory (Relativity)**

Submitted on: Sep 05, 2012

Author: **A. Tawfik**

Title: **The Hubble parameter in the early universe with viscous QCD matter and finite cosmological constant**

Abstract: The evolution of a flat, isotropic and homogeneous universe is studied. The background geometry in the early phases of the universe is conjectured to be filled with causal bulk viscous cosmological fluid and dark energy. The energy density relations obtained from the assumption of covariant conservation of energy-momentum tensor of the background matter in the early universe are used to derive the basic equation for the Hubble parameter H. The viscous properties described by ultra-relativistic equations of state and bulk viscosity taken from recent heavy-ion collisions and lattice QCD calculations have been utilized to give an approximate solution of the field equations. The cosmological constant is conjectured to be related to the energy density of the vacuum. In this treatment, there is a clear evidence for singularity at vanishing cosmic time t indicating the dominant contribution from the dark energy. The time evolution of H seems to last for much longer time than the ideal case, where both cosmological constant and viscosity coefficient are entirely vanishing.

Web link: ***www.IntellectualArchive.com/getfile.php?file=aQKdYhIfif9&orig_file=A_Tawfik__The_Hubble_parameter.pdf***

ID #: 727 **Literature / Non-fiction / Guides and manuals**

Submitted on: Sep 05, 2012

Author: **Filipe de Moraes Paiva**

Title: **Pandero Mane, Ideo Piede**

Abstract: Ci libro instruas pri brazila muzika perkut-instrumento nomata pandero. Pandero estas maldika tamburo de unu membrano kaj cimbaletoj. Akustika fiziko de vibrado kaj perkutado de membrano estas studata. Ci fizika studado estas uzata por diskuti teknikon de ludado de pandero. Muzika signaro por pandero estas detale priskribata kune kun detala perkuta tekniko. Ciuj bezonataj zorgoj pri pandero estas diskutitaj.

Detalaj ekzercoj por bone ludi panderon estas montrataj ekde la plej simplaj gis la plej malsimplaj. Ambau, bazaj kaj specialaj teknikoj estas studataj. Pluraj partituroj de ritmoj estas prezentataj kaj la ritmoj estas detale studataj kaj klasifikataj; aperas specialaj capitroj pri brazilaj ritmoj kaj arabaj ritmoj. Ekzemploj de uzado de ritmoj kune kun muzikajoj estas montrataj. Speciale, la libro havas partiturojn de iuj originalaj studoj per panderoj. Fine estas bibliografio pri fiziko, muziko, ritmoj, muzikajoj (KD) ktp.

Web link: ***www.IntellectualArchive.com/getfile.php?file=iKeK1JDID2C&orig_file=panderomaneideopiede20120614.pdf***

ID #: 728 **Natural Sciences** / **Physics** / **Particle physics**

Submitted on: Sep 06, 2012

Author: **A. A. Deriglazov**

Title: **Variational problem for the Frenkel and the Bargmann-Michel-Telegdi (BMT) equations**

Abstract: We propose Lagrangian formulation for the particle with value of spin fixed within the classical theory. The Lagrangian turns out to be invariant under non-abelian group of local symmetries. As the gauge-invariant variables for description of spin we can take either the Frenkel tensor or the BMT vector. Fixation of spin within the classical theory implies $O(\hbar)$\,-corrections to the corresponding equations of motion.

Web link: ***www.IntellectualArchive.com/getfile.php?file=0SeK5MY4ifp&orig_file=A_Deriglazov__Variational_problem.pdf***

ID #: 729 **Natural Sciences** / **Physics** / **Particle physics**

Submitted on: Sep 06, 2012

Author: **A. A. Deriglazov**

Title: **Classical-mechanical models without observable trajectories and the Dirac electron**

Abstract: We construct non-Grassmann spinning-particle model which, by analogy with the quantum mechanics, does not admit the notion of a trajectory within the position space. The pseudo-classical character of the model allow us to to avoid the inconsistences arising in the quantum-mechanical interpretation of one-particle sector of the Dirac equation.

Web link: ***www.IntellectualArchive.com/getfile.php?file=FkYSla67GlZ&orig_file=A_Deriglazov__Classical-mechanical_models.pdf***

ID #: 730 **Natural Sciences** / **Physics** / **Particle physics**

Submitted on: Sep 06, 2012

Author: **A. A. Deriglazov, B. F. Rizzuti, G. P. Z. Chauca, P. S. Castro**

Title: **Non-Grassmann mechanical model of the Dirac equation**

Abstract: We construct a new example of the spinning-particle model without Grassmann variables. The spin degrees of freedom are described on the base of an inner anti-de Sitter space. This produces both Γ^μ and $\Gamma^{\mu\nu}$\,-matrices in the course of quantization. Canonical quantization of the model implies the Dirac equation. We present the detailed analysis of both the Lagrangian and the Hamiltonian formulations of the model and obtain the general solution to the classical equations of motion. Comparing {\it Zitterbewegung} of the spatial coordinate with the evolution of spin, we ask on the possibility of space-time interpretation for the inner space of spin. We enumerate similarities between our analogous model of the Dirac equation and the two-body system subject to confining potential which admits only the elliptic orbits of the order of de Broglie wave-length. The Dirac equation dictates the perpendicularity of the elliptic orbits to the direction of center-of-mass motion.

Web link: ***www.IntellectualArchive.com/getfile.php?file=2PjjY2dXv5r&orig_file=A_Deriglazov__Non-Grassmann_mechanical_model.pdf***

ID #: 731 **Natural Sciences** / **Physics** / **Particle physics**

Submitted on: Sep 06, 2012

Author: **A.A. Andrianov, M.A. Kurkov, Fedele Lizzi**

Title: **Spectral action, Weyl anomaly and the Higgs-Dilaton potential**

Abstract: We show how the bosonic spectral action emerges from the fermionic action by the renormalization

group flow in the presence of a dilaton and the Weyl anomaly. The induced action comes out to be basically the Chamseddine-Connes spectral action introduced in the context of noncommutative geometry. The entire spectral action describes gauge and Higgs fields coupled with gravity. We then consider the effective potential and show, that it has the desired features of a broken and an unbroken phase, with the roll down.

Web link: ***www.IntellectualArchive.com/getfile.php?file=DJNfjBXMBjn&orig_file=A_Andrianov__Spectral_action.pdf***

ID #: 732 **Natural Sciences / Physics / Particle physics**

Submitted on: Sep 06, 2012

Author: **A.A. Andrianov, M.V. Ioffe**

Title: **Nonlinear Supersymmetric Quantum Mechanics: concepts and realizations**

Abstract: Nonlinear SUSY approach to preparation of quantum systems with pre-planned spectral properties is reviewed. Possible multidimensional extensions of Nonlinear SUSY are described. The full classification of ladder-reducible and irreducible chains of SUSY algebras in one-dimensional QM is given. Emergence of hidden symmetries and spectrum generating algebras is elucidated in the context of Nonlinear SUSY in one- and two-dimensional QM.

Web link: ***www.IntellectualArchive.com/getfile.php?file=apnCn0l5geG&orig_file=A_Andrianov__Nonlinear_Supersymmetric.pdf***

ID #: 733 **Natural Sciences / Physics / Particle physics**

Submitted on: Sep 06, 2012

Author: **A. A. Andrianov, S. S. Kolevatov, R. Soldati**

Title: **Propagation of photons and massive vector mesons between a parity breaking medium and vacuum**

Abstract: The problem of propagation of photons and massive vector mesons in the presence of Lorenz and CPT invariance violating medium is studied when the parity-odd medium is bounded by a hyperplane separating it from the vacuum. The solutions in both half-spaces are carefully discussed and in the case of space-like boundary stitched on the boundary with help of the Bogolubov transformations provided by the space-like Chern-Simons vector. The presence of two different Fock vacua is shown and the probability amplitude for transmission of particles from vacuum to parity breaking medium is calculated. We have also found classical solutions and showed that the results are consistent with ones obtained by canonical quantization formalism. In the cases, both of entrance to and of escaping from parity-odd medium, the probabilities for reflecting and passing through were found for each polarization using the classical solutions. Finally, the propagator for each polarization is obtained in the momentum space.

Web link: ***www.IntellectualArchive.com/getfile.php?file=8TgSNBb20p4&orig_file=A_Andrianov__Propagation_of_photons.pdf***

ID #: 734 **Natural Sciences / Physics / Gravitation Theory (Relativity)**

Submitted on: Sep 06, 2012

Author: **A.A. Andrianov, F. Cannata, A.Yu. Kamenshchik**

Title: **General solution of scalar field cosmology with a (piecewise) exponential potential**

Abstract: We study in detail the general solution for a scalar field cosmology with an exponential potential, correcting some imprecisions, encountered previously in the literature. In addition, we generalize this solution for a piecewise exponential potential, which is continuous, but not smooth (with cusps).

Web link: ***www.IntellectualArchive.com/getfile.php?file=t57vRpkogbm&orig_file=A_Andrianov__General_solution_of_scalar_field.pdf***

ID #: 735 **Natural Sciences / Physics / Particle physics**

Submitted on: Sep 06, 2012

Author: **A.A. Andrianov, M.A. Kurkov, Fedele Lizzi**

Title: **Spectral Action from Anomalies**

Abstract: Starting from a theory of fermions moving in a fixed gauge and gravitational background we implement the scale invariance of the theory. Upon quantization the theory is anomalous but the

anomaly can be cancelled by the addition of another term to the action. This term comes out to be basically the Chamseddine Connes spectral action introduced in the context of noncommutative geometry. An alternative realization of the dilaton may involve a collective scalar mode of all fermions accumulated in a {scale-noninvariant} dilaton action. The entire spectral action describes gauge and Higgs fields coupled with gravity. Here this action is coupled with a dilaton and we discuss how it relates to the transition from the radiation to the electroweak broken phase via condensation of Higgs fields.

Web link: ***www.IntellectualArchive.com/getfile.php?file=Mi579485xvi&orig_file=A_Andrianov__Spectral_Action_from_Anomalies.pdf***

ID #: 736 **Natural Sciences / Physics / Gravitation Theory (Relativity)**

Submitted on: Sep 06, 2012

Author: **Filipe de Moraes Paiva, A.F.F. Teixeira**

Title: **Time travel and geodesics in general relativity**

Abstract: In the homogeneous metric of Som-Raychaudhuri, in general relativity, we study the three types of geodesics: timelike, null, and spacelike; in particular, the little known geodesics of simultaneities. We also study the non-geodetic circular motion with constant velocity, particularly closed timelike curves, and time travel of a voyager.

Web link: ***www.IntellectualArchive.com/getfile.php?file=b9qEbK4Ntp6&orig_file=A_Teixeira__Time_travel.pdf***

ID #: 737 **Natural Sciences / Physics / Gravitation Theory (Relativity)**

Submitted on: Sep 06, 2012

Author: **Filipe de Moraes Paiva, A.F.F. Teixeira**

Title: **The relativistic time - II**

Abstract: The theory of relativity showed that several Newtonian ideas about spacetime are imperfect. We present here some relativistic concepts related to these ideas: simultaneity of events and synchronization of clocks (both along a line in the space frame), gravitational Doppler effect, and time travel.

Web link: ***www.IntellectualArchive.com/getfile.php?file=VLtm4QHu6Qj&orig_file=A_Teixeira__The_relativistic_time.pdf***

ID #: 738 **Natural Sciences / Astronomy / Astrophysics**

Submitted on: Sep 06, 2012

Author: **Alejandro Clocchiatti, Nicholas B. Suntzeff, Ricardo Covarrubias, Pablo Candia**

Title: **The Ultimate Light Curve of SN 1998bw/GRB 980425**

Abstract: We present multicolor light curves of SN 1998bw which appeared in ESO184-G82 in close temporal and spacial association with GRB 980425. They are based on observations done at Cerro Tololo Inter-American Observatory and data from the literature. The CTIO photometry reaches ~86 days after the GRB in U and ~160 days after the GRB in BV(RI)_C. The observations in U extend by about 30 days the previously known coverage, and determine the slope of the early exponential tail. We calibrate a large set of local standards in common with those of previous studies and use them to transform published observations of the SN to our realization of the standard photometric system. We show that the photometry from different sources merges smoothly and provide a unified set of 300 observations of the SN in five bands. Using the extensive set of spectra in public domain we compute extinction and K corrections, and build quasi-bolometric unreddened rest frame light curves. We provide low degree piecewise spline fits to these light curves with daily sampling.

Web link: ***www.IntellectualArchive.com/getfile.php?file=gl9rPkj58Gs&orig_file=Alejandro_Clocchiatti__The_Ultimate_Light_Curve.pdf***

ID #: 739 **Natural Sciences / Physics / Gravitation Theory (Relativity)**

Submitted on: Sep 06, 2012

Author: **A.N. Petrov**

Title: **Noether and Belinfante corrected types of currents for perturbations in the Einstein-Gauss-Bonnet gravity**

Abstract: In the framework of an arbitrary D-dimensional metric theory, perturbations are considered on

arbitrary backgrounds that are however solutions of the theory. Conserved currents for perturbations are presented following two known prescriptions: canonical Noether theorem and Belinfante symmetrization rule. Using generalized formulae, currents in the Einstein-Gauss-Bonnet (EGB) gravity for arbitrary types of perturbations on arbitrary curved backgrounds (not only vacuum) are constructed in an explicit covariant form. Special attention is paid to the energy-momentum tensors for perturbations which are an important part in the structure of the currents. We use the derived expressions for two applied calculations: a) to present the energy density for weak flat gravitational waves in D-dimensional EGB gravity; b) to construct the mass flux for the Maeda-Dadhich-Molina 3D radiating black holes of a Kaluza-Klein type in 6D EGB gravity. *** This article was published in `Class. Quantum Grav. 28 (2011) 215021` ***

Web link: ***www.IntellectualArchive.com/getfile.php?file=tQt5BBK6vbM&orig_file=A_N_Petrov__Noether_and_Belinfante.pdf***

ID #: 740 **Natural Sciences / Computer Sciences / Artificial intuition**

Submitted on: Sep 07, 2012

Author: **Alex Shkotin, Vladimir Ryakhovsky, Dmitry Kudryavtsev**

Title: **Towards OWL-based Knowledge Representation in Petrology**

Abstract: This paper presents our work on development of OWL-driven systems for formal representation and reasoning about terminological knowledge and facts in petrology. The long-term aim of our project is to provide solid foundations for a large-scale integration of various kinds of knowledge, including basic terms, rock classification algorithms, findings and reports. We describe three steps we have taken towards that goal here. First, we develop a semi-automated procedure for transforming a database of igneous rock samples to texts in a controlled natural language (CNL), and then a collection of OWL ontologies. Second, we create an OWL ontology of important petrology terms currently described in natural language thesauri. We describe a prototype of a tool for collecting definitions from domain experts. Third, we present an approach to formalization of current industrial standards for classification of rock samples, which requires linear equations in OWL 2.

Web link: ***www.IntellectualArchive.com/getfile.php?file=0lWqLDhQYOE&orig_file=Alex_Shkotin__Towards_OWL-based.pdf***

ID #: 741 **Natural Sciences / Computer Sciences / Functional programming**

Submitted on: Sep 07, 2012

Author: **Alex Shkotin**

Title: **Program structure**

Abstract: A program is usually represented as a word chain. It is exactly a word chain that appears as the lexical analyzer output and is parsed. The work shows that a program can be syntactically represented as an oriented word tree, that is a syntactic program tree, program words being located both in tree nodes and on tree arrows. The basic property of a tree is that arrows starting from each node are marked by different words (including an empty word). Semantics can then be directly specified on such tree using either requirements or additional links, and adding instructions to some tree nodes enables program execution specification.

Web link: ***www.IntellectualArchive.com/getfile.php?file=uQNlisMimZe&orig_file=Alex_Shkotin__Program_structure.pdf***

ID #: 742 **Natural Sciences / Physics / Condensed Matter Physics**

Submitted on: Sep 07, 2012

Author: **Elena Agliari, Adriano Barra, Raffaella Burioni, Federico Camboni, Pierluigi Contucci**

Title: **Effective Interactions in Group Competition with Strategic Diffusive Dynamics**

Abstract: We analyze, on a random graph, a diffusive strategic dynamics with pairwise interactions, where nor Glauber prescription, neither detailed balance hold. We observe numerically that such a dynamics reaches a well defined steady state that fulfills a shift property: the critical temperature of the canonical ferromagnetic phase transition is higher with respect to the expected equilibrium one, known both numerically via Glauber relaxation or Monte Carlo simulations as well as analytically via cavity techniques or replica approaches. We show how the relaxed states of this kind of dynamics can be described by statistical mechanics equilibria of a diluted p-spin model, for a suitable non-integer real p. Several implications from both theoretical physics and quantitative sociology points of view are discussed.

Web link: ***www.IntellectualArchive.com/getfile.php?file=FHfXYlgZkvv&orig_file=Adriano_Barra__Effectiv***

e_Interactions.pdf

ID #: 743 **Natural Sciences / Physics / Condensed Matter Physics**

Submitted on: Sep 07, 2012

Author: **P. M. R. Brydon, Andreas P. Schnyder, Carsten Timm**

Title: **Topologically protected flat zero-energy surface bands in non-centrosymmetric superconductors**

Abstract: Nodal non-centrosymmetric superconductors (NCS) have recently been shown to be topologically non-trivial. An important consequence is the existence of topologically protected flat zero-energy surface bands, which are related to the topological characteristics of the line nodes of the bulk gap via a bulk-boundary correspondence. In this paper we examine these zero-energy surface bands using a quasiclassical theory. We determine their spectrum and derive a general condition for their existence in terms of the sign change of the gap functions. A key experimental signature of the zero-energy surface bands is a zero-bias peak in the tunneling conductance, which depends strongly on the surface orientation. This can be used as a fingerprint of a topologically non-trivial NCS.

Web link: ***www.IntellectualArchive.com/getfile.php?file=gLiiNiJ4DpT&orig_file=Andreas_Schnyder__Topologically_protected.pdf***

ID #: 744 **Natural Sciences / Physics / Gravitation Theory (Relativity)**

Submitted on: Sep 07, 2012

Author: **Anja Marunovic, Tomislav Prokopec**

Title: **Time transients in the quantum corrected Newtonian potential induced by a massless nonminimally coupled scalar field**

Abstract: We calculate the one loop graviton vacuum polarization induced by a massless, nonminimally coupled scalar field on Minkowski background. We make use of the Schwinger-Keldysh formalism, which allows us to study time dependent phenomena. As an application we compute the leading quantum correction to the Newtonian potential of a point particle. The novel aspect of the calculation is the use of the Schwinger-Keldysh formalism, within which we calculate the time transients induced by switching on of the graviton-scalar coupling.

Web link: ***www.IntellectualArchive.com/getfile.php?file=gAAOLOQ15Bk&orig_file=Anja_Marunovic__Time_transients.pdf***

ID #: 745 **Natural Sciences / Physics / Particle physics**

Submitted on: Sep 08, 2012

Author: **Aybike Catal-Ozer, Cemsinan Deliduman, Ulas Saka**

Title: **A Massive S-duality in 4 dimensions**

Abstract: We reduce the Type IIA supergravity theory with a generalized Scherk-Schwarz ansatz that exploits the scaling symmetry of the dilaton, the metric and the NS 2-form field. The resulting theory is a new massive, gauged supergravity theory in four dimensions with a massive 2-form field and a massive 1-form field. We show that this theory is S-dual to a theory with a massive vector field and a massive 2-form field, which are dual to the massive 2-form and 1-form fields in the original theory, respectively. The S-dual theory is shown to arise from a Scherk-Schwarz reduction of the heterotic theory. Hence we establish a massive, S-duality type relation between the IIA theory and the heterotic theory in four dimensions. We also show that the Lagrangian for the new four dimensional theory can be put in the most general form of a D=4, N=4 gauged Lagrangian found by Schon and Weidner, in which (part of) the SL(2) group has been gauged.

Web link: ***www.IntellectualArchive.com/getfile.php?file=J7cjd2kEPSM&orig_file=Ulas_Saka__A_Massive_S-duality.pdf***

ID #: 746 **Natural Sciences / Physics / Particle physics**

Submitted on: Sep 08, 2012

Author: **Akbari Jahan, D. K. Choudhury**

Title: **Transverse Momentum Dependent Parton Density Functions and a Self-similarity based Model of Proton Structure Function $ F_{2}(x,Q^{2}) $ at Large and Small x**

Abstract: Unintegrated parton density functions (uPDFs) of Quantum Chromodynamics (QCD), also known as TMDPDFs, are generally used to study details of hadronic final states in high energy lepton-hadron

and hadron-hadron collisions; while the integrated parton density functions (PDFs) are used for conventional deep inelastic inclusive processes. The self-similarity based Model of proton structure function $ F_{2}(x,Q^{2}) $ suggested in recent years are however based on specific uPDFs with self-similarity at small \textit{x}. In this work, we study large \textit{x} limit of such a Model and modify the defining uPDFs to make them compatible with theoretical expectations in such limit. Possibility of saturation of Froissart bound in this Model is discussed. We also reanalyze the PDFs in this approach using its conventional relation with TMDPDFs.

Web link: ***www.IntellectualArchive.com/getfile.php?file=xkiii5BlebM&orig_file=Akbari_Jahan__Transverse_Momentum.pdf***

ID #: 747 **Natural Sciences / Astronomy / Astrophysics**

Submitted on: Sep 08, 2012

Author: **Anatolij A. Mihajlov, Ljubinko M. Ignjatovic, Vladimir A. Sreckovic, Milan S. Dimitrijevic**

Title: **Chemi-ionization in Solar Photosphere: Influence on the Hydrogen Atom excited States Population**

Abstract: In this paper, the influence of chemi-ionization processes in $H^*(n \ge 2) + H(1s)$ collisions, as well as the influence of inverse chemi-recombination processes on hydrogen atom excited-state populations in solar photosphere, are compared with the influence of concurrent electron-atom and electron-ion ionization and recombination processes. It has been found that the considered chemi-ionization/recombination processes dominate over the relevant concurrent processes in almost the whole solar photosphere. Thus, it is shown that these processes and their importance for the non-LTE modeling of the solar atmosphere should be investigated further.

Web link: ***www.IntellectualArchive.com/getfile.php?file=lhKaA7gEf65&orig_file=Anatolij_Mihajlov__Chemi-ionization.pdf***

ID #: 748 **Natural Sciences / Physics / Condensed Matter Physics**

Submitted on: Sep 08, 2012

Author: **Aline Leon, Joachim Wuttke**

Title: **Hydrogen Release from Sodium Alanate Observed by Time-resolved Neutron Backscattering**

Abstract: Innermolecular motion in Na3AlH6 gives rise to a Lorentzian spectrum with a wavenumber-independent width of about 1 micro-eV at 180 deg C, which is probably due to rotation of AlH6 tetrahedra. There is no such quasielastic line in NaAlH4 or NaH. Based on this finding, time-resolved measurements on the neutron backscattering spectrometer SPHERES were used to monitor the decomposition kinetics of sodium alanate, NaAlH4 to Na3AlH6 to NaH. Both reaction steps were found to be accelerated by autocatalysis, most likely at the surfaces of Na3AlH6 and NaH crystallites.

Web link: ***www.IntellectualArchive.com/getfile.php?file=glnvZt2Pwev&orig_file=Aline_Leon__Hydrogen_Release.pdf***

ID #: 749 **Natural Sciences / Physics / General Physics**

Submitted on: Sep 08, 2012

Author: **A. P. Misra**

Title: **Electromagnetic surface modes in a magnetized quantum electron-hole plasma**

Abstract: The propagation of surface electromagnetic waves along a uniform magnetic field is studied in a quantum electron-hole semiconductor plasma. A new forward propagating mode, not reported before, is found by the effect of quantum tunneling, which otherwise does not exist. In the classical limit ($\hbar\rightarrow 0$) one of the low-frequency modes is found similar to an experimentally observed one in n-type InSb at room temperature. The surface modes are shown to be significantly modified in the case of high-conductivity semiconductor plasmas where electrons and holes may be degenerate. The effects of the external magnetic field and the quantum tunneling on the surface wave modes are discussed.

Web link: ***www.IntellectualArchive.com/getfile.php?file=il8k9OvAS6p&orig_file=A_Misra__Electromagnetic_surface_modes.pdf***

ID #: 750 **Natural Sciences / Mathematics / Probability**

Submitted on: Sep 08, 2012

Author: **Paolo Da Pelo, Alberto Lanconelli, Aurel I. Stan**

Title: **A Hölder-Young-Lieb inequality for norms of Gaussian Wick products**

Abstract: An important connection between the finite dimensional Gaussian Wick product and Lebesgue convolution product will be proven first. Then this connection will be used to prove an important Hölder inequality for the norms of Gaussian Wick products, reprove Nelson hypercontractivity inequality, and prove a more general inequality whose marginal cases are the Hölder and Nelson inequalities mentioned before. We will show that there is a deep connection between the Gaussian Hölder inequality and classic Hölder inequality, between the Nelson hypercontractivity and classic Young inequality with the sharp constant, and between the third more general inequality and an extension by Lieb of the Young inequality with the best constant. Since the Gaussian probability measure exists even in the infinite dimensional case, the above three inequalities can be extended, via a classic Fatou`s lemma argument, to the infinite dimensional framework.

Web link: ***www.IntellectualArchive.com/getfile.php?file=MhDEFVY4NOc&orig_file=Aurel_Stan__A_Holder-Young-Lieb_inequality.pdf***

ID #: 751 **Natural Sciences** / **Mathematics** / **Numerical analysis**

Submitted on: Sep 08, 2012

Author: **Kazufumi Ito, Bangti Jin, Tomoya Takeuchi**

Title: **Multi-Parameter Tikhonov Regularization**

Abstract: We study multi-parameter Tikhonov regularization, i.e., with multiple penalties. Such models are useful when the sought-for solution exhibits several distinct features simultaneously. Two choice rules, i.e., discrepancy principle and balancing principle, are studied for choosing an appropriate (vector-valued) regularization parameter, and some theoretical results are presented. In particular, the consistency of the discrepancy principle as well as convergence rate are established, and an a posteriori error estimate for the balancing principle is established. Also two fixed point algorithms are proposed for computing the regularization parameter by the latter rule. Numerical results for several nonsmooth multi-parameter models are presented, which show clearly their superior performance over their single-parameter counterparts.

Web link: ***www.IntellectualArchive.com/getfile.php?file=ujJMOoOUijW&orig_file=Bangti_Jin__Multi-Parameter_Tikhonov.pdf***

ID #: 752 **Natural Sciences** / **Physics** / **General Physics**

Submitted on: Sep 09, 2012

Author: **Filipe de Moraes Paiva, A. F. F. Teixeira**

Title: **Oscillation of a rigid rod in the special relativity**

Abstract: In the special relativity, a rigid rod slides upon itself, with one extremity oscillating harmonically. We discovered restrictions in the amplitude of the motion and in the length of the rod, essential to eliminate unphysical solutions. ***Two columns (Esperanto/English)***

Web link: ***www.IntellectualArchive.com/getfile.php?file=NrNhOKrD7cj&orig_file=Filipe_Paiva__Oscillation_of_a_rigid_rod.pdf***

ID #: 753 **Natural Sciences** / **Physics** / **General Physics**

Submitted on: Sep 09, 2012

Author: **Filipe de Moraes Paiva, A. F. F. Teixeira**

Title: **Algorithm for structure constants**

Abstract: In a n-dimensional Lie algebra, random numerical values are assigned by computer to n(n-1) especially selected structure constants. An algorithm is then created, which calculates without ambiguity the remaining constants, obeying the Jacobi conditions. Differently from others, this algorithm is suitable even for poor personal computer. ***Two columns Esperanto/English***

Web link: ***www.IntellectualArchive.com/getfile.php?file=4io8RUX8TNk&orig_file=Filipe_Paiva__Algorithm_for_structure_constants.pdf***

ID #: 754 **Natural Sciences** / **Physics** / **General Physics**

Submitted on: Sep 09, 2012

Author: **Filipe de Moraes Paiva, A. F. F. Teixeira**

Title: **Geodesics of simultaneity in Schwarzschild**

Abstract: Geodesic of simultaneity is a spacelike geodesic in which every pair of neighbour events are simultaneous ($g_{0\mu}\dd x^\mu=0$). These geodesics are studied in the exterior region of Sch`s metric. ***Two columns Esperanto/English***

Web link: ***www.IntellectualArchive.com/getfile.php?file=lvghF3afg8R&orig_file=Filipe_Paiva__Geodesics_of_simultaneity.pdf***

ID #: 755 **Natural Sciences / Physics / General Physics**

Submitted on: Sep 09, 2012

Author: **Filipe de Moraes Paiva, A. F. F. Teixeira**

Title: **Doppleraj efikoj ce Schwarzschild**

Abstract: Motion of bodies and light rays are studied in the gravitational field of Schwarzschild. Several Doppler effects are described. ***In Esperanto***

Web link: ***www.IntellectualArchive.com/getfile.php?file=rGsfBOJWMRw&orig_file=Filipe_Paiva__Dopplera j_efikoj.pdf***

ID #: 756 **Natural Sciences / Physics / General Physics**

Submitted on: Sep 09, 2012

Author: **Filipe de Moraes Paiva, A. F. F. Teixeira**

Title: **Dopplera efiko de luma ebeno vidata per akcelata observanto**

Abstract: A plane lights on monochromatically and immediately after lights off, while an observer starts moving out from the plane, perpendicularly to it, with constant proper acceleration. Special relativity predicts that the observer will see a light circle always in the direction opposite to the plane, without Doppler effect, and that the circle will seem to progressively shrink to a point. ***In Esperanto***

Web link: ***www.IntellectualArchive.com/getfile.php?file=ahJ2Ac55rYi&orig_file=Filipe_Paiva__Dopplera_efiko.pdf***

ID #: 757 **Natural Sciences / Physics / General Physics**

Submitted on: Sep 09, 2012

Author: **Filipe de Moraes Paiva, A. F. F. Teixeira**

Title: **Relativistic Doppler effect in a uniformly accelerated motion - III**

Abstract: In the context of special relativity, we describe with detail the Doppler effect between a light source at rest and an observer in linear motion and constant proper acceleration. To have an Englis version of this article, ask the authors.

Web link: ***www.IntellectualArchive.com/getfile.php?file=fGDkjm3YjZr&orig_file=Filipe_Paiva__Relativistic_Doppler_effect.pdf***

ID #: 758 **Natural Sciences / Physics / General Physics**

Submitted on: Sep 09, 2012

Author: **Filipe de Moraes Paiva, A. F. F. Teixeira**

Title: **Relativeca Dopplera efiko inter du akcelataj korpoj - I**

Abstract: We describe the Doppler effect between equally accelerated light source and observer under the special relativity. The proper accelerations are constant and parallel. An English version is available by request. ***In Esperanto. English text on request.***

Web link: ***www.IntellectualArchive.com/getfile.php?file=gWSYISILgRt&orig_file=Filipe_Paiva__Relativeca_Dopplera_efiko.pdf***

ID #: 759 **Natural Sciences / Physics / General Physics**

Submitted on: Sep 09, 2012

Author: **Filipe de Moraes Paiva, A. F. F. Teixeira**

Title: **Relativeca Dopplera efekto ce unuforme akcelata movo -- II**

Abstract: A light source of monochromatic radiation, in rectilinear motion under constant proper acceleration,

passes near an observer at rest. In the context of special relativity, we describe the observed Doppler effect. We describe also the interesting discontinuous effect when riding through occurs. An English version of this article is available. ***In Esperanto. English text on request.***

Web link: ***www.IntellectualArchive.com/getfile.php?file=lo0XQcoiXFX&orig_file=Filipe_Paiva__Relativeca_Dopplera_efekto.pdf***

ID #: 760 **Natural Sciences / Physics / General Physics**

Submitted on: Sep 09, 2012

Author: **Filipe de Moraes Paiva, A. F. F. Teixeira**

Title: **Relativeca Dopplera efekto ce unuforme akcelata movo - I**

Abstract: An observer, in rectilinear motion under constant proper acceleration, passes near a source of monochromatic radiation at rest. In the context of special relativity, we describe the observed Doppler effect. We describe also the interesting discontinuous effect when riding through occurs. An English version of this article is available. ***In Esperanto. English text on request.***

Web link: ***www.IntellectualArchive.com/getfile.php?file=E51Ali4IlMe&orig_file=Filipe_Paiva__Relativeca_Dopplera_efekto_1.pdf***

ID #: 761 **Natural Sciences / Physics / General Physics**

Submitted on: Sep 09, 2012

Author: **Filipe de Moraes Paiva, A. F. F. Teixeira**

Title: **The relativistic time - I**

Abstract: The relativistic time is different from the Newtonian one. We revisit some of these differences in Doppler effect, twin paradox, rotation, rigid rod, and constant proper acceleration. ***2 columns Esperanto/English***

Web link: ***www.IntellectualArchive.com/getfile.php?file=X9Sg5DLiXSE&orig_file=Filipe_Paiva__La_relativeca_tempo.pdf***

ID #: 762 **Natural Sciences / Physics / Condensed Matter Physics**

Submitted on: Sep 09, 2012

Author: **P.L. Krapivsky, J.M. Luck**

Title: **Dynamics of a quantum particle in low-dimensional disordered systems with extended states**

Abstract: We investigate the dynamics of a quantum particle in disordered tight-binding models in one and two dimensions which are exceptions to the common wisdom on Anderson localization, in the sense that the localization length diverges at some special energies. We provide a consistent picture for two well-known one-dimensional examples: the chain with off-diagonal disorder and the random-dimer model. In both cases the quantum motion exhibits a peculiar kind of anomalous diffusion which can be referred to as bi-fractality. The disorder-averaged density profile of the particle becomes critical in the long-time regime. The q-th moment of the position of the particle diverges with time whenever q exceeds some q_0. We obtain q_0=2 for off-diagonal disorder on the chain (and conjecturally on two-dimensional bipartite lattices as well). For the random-dimer model, our result q_0=1/2 corroborates known rigorous results.

Web link: ***www.IntellectualArchive.com/getfile.php?file=flLjlrpfZfM&orig_file=P_L_Krapivsky__Dynamics_of_a_quantum_particle.pdf***

ID #: 764 **Natural Sciences / Physics / Mathematical Physics**

Submitted on: Sep 10, 2012

Author: **J. G. Brankov, N. S. Tonchev**

Title: **Generalized inequalities for the Bogoliubov-Duhamel inner product with applications in the Approximating Hamiltonian Method**

Abstract: Infinite sets of inequalities which generalize all the known inequalities that can be used in the majorization step of the Approximating Hamiltonian method are derived. They provide upper bounds on the difference between the quadratic fluctuations of intensive observables of a N-particle system and the corresponding Bogoliubov-Duhamel inner product. The novel feature is that, under sufficiently mild conditions, the upper bounds have the same form and order of magnitude with respect to N for all the quantities derived by a finite number of commutations of an original intensive

observable with the Hamiltonian. The results are illustrated on two types of exactly solvable model systems: one with bounded separable attraction and the other containing interaction of a boson field with matter.

Web link: ***www.IntellectualArchive.com/getfile.php?file=2cVO8f6rlXf&orig_file=J_Brankov__Generalized_inequalities.pdf***

ID #: 765 **Natural Sciences / Mathematics / Algebra**

Submitted on: Sep 10, 2012

Author: **S. Khoroshkin, O. Ogievetsky**

Title: **Structure constants of diagonal reduction algebras of gl type**

Abstract: We describe, in terms of generators and relations, the reduction algebra, related to the diagonal embedding of the Lie algebra gl_n into gl_n oplus gl_n. Its representation theory is related to the theory of decompositions of tensor products of gl_n-modules.

Web link: ***www.IntellectualArchive.com/getfile.php?file=lYf6mQlvP6c&orig_file=O_Ogievetsky__Structure_constants.pdf***

ID #: 766 **Natural Sciences / Computer Sciences / Analysis of algorithms**

Submitted on: Sep 10, 2012

Author: **Ashok Kumar Das**

Title: **An Unconditionally Secure Key Management Scheme for Large-Scale Heterogeneous Wireless Sensor Networks**

Abstract: Key establishment in sensor networks becomes a challenging problem because of the resource limitations of the sensors and also due to vulnerability to physical capture of the sensor nodes. In this paper, we propose an unconditionally secure probabilistic group-based key pre-distribution scheme for a heterogeneous wireless sensor network. The proposed scheme always guarantees that no matter how many sensor nodes are compromised, the non-compromised nodes can still communicate with 100% secrecy, i.e., the proposed scheme is always unconditionally secure against node capture attacks. Moreover, it provides significantly better trade-off between communication overhead, computational overhead, network connectivity and security against node capture as compared to the existing key pre-distribution schemes. It also supports dynamic node addition after the initial deployment of the nodes in the network.

Web link: ***www.IntellectualArchive.com/getfile.php?file=eWWY3Xa0T3l&orig_file=Ashok_Kumar_Das__An_Unconditionally_Secure_Key.pdf***

ID #: 767 **Natural Sciences / Astronomy / Cosmology**

Submitted on: Sep 10, 2012

Author: **W. Zhao, Q.-G. Huang**

Title: **Testing inflationary consistency relations by the potential CMB observations**

Abstract: Testing the so-called consistency relations plays an important role for distinguishing the different classes of inflation models. In this paper, we investigate the possible testing based on the potential observations of the cosmic microwave background (CMB) radiation, including the planned CMBPol mission and the ideal CMB experiment where only the reduced cosmic weak lensing contamination for the B-mode polarization is considered. We find that for the canonical single-field inflation and the phantom inflation, the consistency relations are quite hard to be tested: the testing is possible only if $r>0.14$ for CMBPol mission, and $r>0.06$ for the ideal experiment. However, the situation could become much better for the general Lorentz invariant single-field inflation with large non-gaussian signal and the two-field inflation with strong correlation between the adiabatic and the isocurvature perturbations. We find that for these two classes of inflation the testing is possible if $r\gtrsim 10^{-2}$ or even smaller for both CMB experiments.

Web link: ***www.IntellectualArchive.com/getfile.php?file=0Gs09YFXZ6o&orig_file=W_Zhao__Testing_inflationary_consistency.pdf***

ID #: 768 **Natural Sciences / Astronomy / Astrophysics**

Submitted on: Sep 10, 2012

Author: **Anatoly Nekrasov, Mohsen Shadmehri**

Title: **Multicomponent theory of buoyancy instabilities in magnetized plasmas: The case of**

magnetic field parallel to gravity

Abstract: We investigate electromagnetic buoyancy instabilities of the electron-ion plasma with the heat flux based on not the magnetohydrodynamic (MHD) equations, but using the multicomponent plasma approach when the momentum equations are solved for each species. We consider a geometry in which the background magnetic field, gravity, and stratification are directed along one axis. The nonzero background electron thermal flux is taken into account. Collisions between electrons and ions are included in the momentum equations. No simplifications usual for the one-fluid MHD-approach in studying these instabilities are used. We derive a simple dispersion relation, which shows that the thermal flux perturbation generally stabilizes an instability for the geometry under consideration. This result contradicts to conclusion obtained in the MHD-approach. We show that the reason of this contradiction is the simplified assumptions used in the MHD analysis of buoyancy instabilities and the role of the longitudinal electric field perturbation which is not captured by the ideal MHD equations.

Web link: ***www.IntellectualArchive.com/getfile.php?file=fjhAdBX7ADK&orig_file=Anatoly_Nekrasov__Multicomponent_theory.pdf***

ID #: 769 **Natural Sciences / Mathematics / Algebra**

Submitted on: Sep 10, 2012

Author: **Adi Jarden, Saharon Shelah**

Title: **Weakening the local character**

Abstract: In [Sh E46], Shelah obtained a non-forking relation for an AEC, (K,\preceq), with LST-number at most \lambda, which is categorical in \lambda and \lambda^+ and has less than 2^{\lambda^+} models of cardinality \lambda^{++}, but at least one. This non-forking relation satisfies the main properties of the non-forking relation on stable first order theories, but only a weak version of the local character. Here, we improve this non-forking relation such that it satisfies the local character, too. Therefore it satisfies the main properties of the non-forking relation on superstable first order theories. We conclude that the function \lambda \to I(\lambda,K), which assigns to each cardinal \lambda, the number of models in K of cardinality \lambda, is not arbitrary.

Web link: ***www.IntellectualArchive.com/getfile.php?file=ilZ6opMA4u3&orig_file=Adi_Jarden__Weakening_the_local_character.pdf***

ID #: 770 **Natural Sciences / Computer Sciences / Analysis of algorithms**

Submitted on: Sep 10, 2012

Author: **He Wen, Laszlo B. Kish, Andreas Klappenecker**

Title: **Complex Noise-Bits and Large-Scale Instantaneous Parallel Operations with Low Complexity**

Abstract: We introduce the complex noise-bit as information carrier, which requires noise signals in two parallel wires instead of the single-wire representations of noise-based logic discussed so far. The immediate advantage of this new scheme is that, when we use random telegraph waves as noise carrier, the superposition of the first 2^N integer numbers (obtained by the Achilles heel operation) yields non-zero values. We introduce basic instantaneous operations, with O(1) time and hardware complexity, including bit-value measurements in product states, single-bit and two-bit noise gates (universality exists) that can instantaneously operate over large superpositions with full parallelism. We envision the possibility of implementing instantaneously running quantum algorithms on classical computers while using similar number of classical bits as the number of quantum bits emulated without the necessity of error corrections. Mathematical analysis and proofs are given.

Web link: ***www.IntellectualArchive.com/getfile.php?file=KJnMYNiEfUU&orig_file=Laszlo_Kish__Complex_Noise-Bits.pdf***

ID #: 771 **Natural Sciences / Chemistry / Chemical physics**

Submitted on: Sep 10, 2012

Author: **M. Steglich, F. Huisken, J. E. Dahl, R. M. K. Carlson, Th. Henning**

Title: **Electronic spectroscopy of FUV-irradiated diamondoids: A combined experimental and theoretical study**

Abstract: Irradiation with high energy photons (10.2 - 11.8 eV) was applied to small diamondoids isolated in solid rare gas matrices at low temperature. The photoproducts were traced via UV absorption spectroscopy. We found that upon ionization the smallest of these species lose a peripheral H atom to form a stable closed-shell cation. This process is also likely to occur under astrophysical conditions for gas phase diamondoids and it opens the possibility to detect diamond-like molecules

using their rotational spectrum since the dehydrogenated cations possess strong permanent dipole moments. The lowest-energy electronic features of these species in the UV were found to be rather broad, shifting to longer wavelengths with increasing molecular size. Calculations using time-dependent density functional theory support our experimental findings and extend the absorption curves further into the vacuum ultraviolet. The complete sigma - sigma* spectrum displays surprisingly strong similarities to meteoritic nanodiamonds containing 50 times more C atoms.

Web link: ***www.IntellectualArchive.com/getfile.php?file=EBojSal3icx&orig_file=M_Steglich__Electronic_spectroscopy.pdf***

ID #: 772 **Natural Sciences / Physics / Optics**

Submitted on: Sep 10, 2012

Author: **Jianming Wen**

Title: **Forming positive-negative images using conditioned partial measurements from reference arm in ghost imaging**

Abstract: A recent thermal ghost imaging experiment implemented in Wu's group [Chin. Phys. Lett. 279, 074216 (2012)] showed that both positive and negative images can be constructed by applying a novel algorithm. This algorithm allows us to form the images with the use of partial measurements from the reference arm (even which never passes through the object), conditioned on the object arm. In this paper, we present a simple theory that explains the experimental observation and provides an in-depth understanding of conventional ghost imaging. In particular, we theoretically show that the visibility of formed images through such an algorithm is not bounded by the standard value 1/3. In fact, it can ideally grow up to unity (with reduced imaging quality). Thus, the algorithm described here not only offers an alternative way to decode spatial correlation of thermal light, but also mimics a "bandpass filter" to remove the constant background such that the visibility or imaging contrast is improved. We further show that conditioned on one still object present in the test arm, it is possible to construct the object's image by sampling the available reference data.

Web link: ***www.IntellectualArchive.com/getfile.php?file=RAhsLtZe5LG&orig_file=thermalghostimaging.pdf***

ID #: 773 **Natural Sciences / Mathematics / Algebra**

Submitted on: Sep 11, 2012

Author: **Mohamed Louzari**

Title: **On skew polynomials over p.q.-Baer and p.p.-modules**

Abstract: Let M_R be a module and σ an endomorphism of R. Let $m\in M$ and $a\in R$, we say that M_R satisfies the condition $\mathcal{C}_1$ (respectively, $\mathcal{C}_2$), if $ma=0$ implies $m\sigma(a)=0$ (respectively, $m\sigma(a)=0$ implies $ma=0$). We show that if M_R is p.q.-Baer then so is $M[x;\sigma]_{R[x;\sigma]}$ whenever M_R satisfies the condition $\mathcal{C}_2$, and the converse holds when M_R satisfies the condition $\mathcal{C}_1$. Also, if M_R satisfies $\mathcal{C}_2$ and σ-skew Armendariz, then M_R is a p.p.-module if and only if $M[x;\sigma]_{R[x;\sigma]}$ is a p.p.-module if and only if $M[x,x^{-1};\sigma]_{R[x,x^{-1};\sigma]}$ ($\sigma\in Aut(R)$) is a p.p.-module. Many generalizations are obtained and more results are found when M_R is a semicommutative module.

Web link: ***www.IntellectualArchive.com/getfile.php?file=1jKF3gOQ2xN&orig_file=skew polynomials1.tex***

ID #: 774 **Natural Sciences / Physics / General Physics**

Submitted on: Sep 11, 2012

Author: **Xiong Wang, Guanrong Chen**

Title: **A chaotic system with only one stable equilibrium**

Abstract: If you are given a simple three-dimensional autonomous quadratic system that has only one stable equilibrium, what would you predict its dynamics to be, stable or periodic? Will it be surprising if you are shown that such a system is actually chaotic? Although chaos theory for three-dimensional autonomous systems has been intensively and extensively studied since the time of Lorenz in the 1960s, and the theory has become quite mature today, it seems that no one would anticipate a possibility of finding a three-dimensional autonomous quadratic chaotic system with only one stable equilibrium. The discovery of the new system, to be reported in this Letter, is indeed striking because for a three-dimensional autonomous quadratic system with a single stable node-focus equilibrium, one typically would anticipate non-chaotic and even asymptotically converging behaviors. Although

the new system is not of saddle-focus type, therefore the familiar Silnikov homoclinic criterion is not applicable, it is demonstrated to be chaotic in the sense of having a positive largest Lyapunov exponent, a fractional dimension, a continuous broad frequency spectrum, and a period-doubling route to chaos.

Web link: ***www.IntellectualArchive.com/getfile.php?file=c2ebTijbSO5&orig_file=Xiong_Wang__A_chaotic_system.pdf***

ID #: 775 **Natural Sciences** / **Physics** / **Mathematical Physics**

Submitted on: Sep 11, 2012

Author: **Xiong Wang**

Title: **Can Differentiable Description of Physical Reality be Considered Complete? :toward a Complete Theory of Relativity**

Abstract: How to relate the physical \emph{real} reality with the logical \emph{true} abstract mathematics concepts is nothing but pure postulate. The most basic postulates of physics are by using what kind of mathematics to describe the most fundamental concepts of physics. Main point of relativity theories is to remove incorrect and simplify the assumptions about the nature of space-time. There are plentiful bonus of doing so, for example gravity emerges as natural consequence of curvature of spacetime. We argue that the Einstein version of general relativity is not complete, since it can`t explain quantum phenomenon. If we want to reconcile quantum, we should give up one implicit assumption we tend to forget: the differentiability. What would be the benefits of these changes? It has many surprising consequences. We show that the weird uncertainty principle and non-commutativity become straightforward in the circumstances of non-differentiable functions. It`s just the result of the divergence of usual definition of \emph{velocity}.

Web link: ***www.IntellectualArchive.com/getfile.php?file=YLINAEfi5pp&orig_file=Xiong_Wang__Can_Differentiable_Description.pdf***

ID #: 776 **Natural Sciences** / **Physics** / **Mathematical Physics**

Submitted on: Sep 11, 2012

Author: **Xiong Wang**

Title: **What is Mass? Chapter One: Mass in Newtonian Mechanics and Lagrangian Mechanics**

Abstract: "To see a World in a Grain of Sand, And a Heaven in a Wild" We will try to see the development and the whole picture of theoretical physic through the evolution of the very fundamental concept of mass. 1The inertial mass in Newtonian mechanics 2 The Newtonian gravitational mass 3 Mass in Lagrangian formulism 4 Mass in the special theory of relativity 5 $E = MC^2$ 6 Mass in quantum mechanics 7 Principle of equivalence and general relativity 8 The energy momentum tensor in general relativity 9 Mass in the standard model of particle physics 10 The higgs mechanism

Web link: ***www.IntellectualArchive.com/getfile.php?file=V4TZbe1RrfB&orig_file=Xiong_Wang__What_is_Mass.pdf***

ID #: 777 **Natural Sciences** / **Physics** / **Mathematical Physics**

Submitted on: Sep 11, 2012

Author: **Xiong Wang**

Title: **Fractional Circuit Elements: Memristors, Memcapacitors, Meminductors and Beyond**

Abstract: Memristor was postulated by Chua in 1971 by analyzing mathematical relations between pairs of fundamental circuit variables and realized by HP laboratory in 2008. This relation can be generalized to include any class of two-terminal devices whose properties depend on the state and history of the system. These are called memristive systems, including current-voltage for the memristor, charge-voltage for the memcapacitor, and current-flux for the meminductor. This paper further enlarge the family of elementary circuit elements, in order to model many irregular and exotic nondifferentiable phenomena which are common and dominant to the nonlinear dynamics of many biological, molecular and nanodevices.

Web link: ***www.IntellectualArchive.com/getfile.php?file=LNYWNksKbFA&orig_file=Xiong_Wang__Fractional_Circuit_Elements.pdf***

ID #: 778 **Natural Sciences** / **Physics** / **Mathematical Physics**

Submitted on: Sep 11, 2012

Author: **Xiong Wang**

Title: **A Simple and Compact Approach to Hydrodynamic Using Geometric Algebra**

Abstract: A new simple and compact approach to hydrodynamic is presented using the formalism of geometric algebra (GA).

Web link: ***www.IntellectualArchive.com/getfile.php?file=ftOMjYDliZt&orig_file=Xiong_Wang__A_Simple_Approach.pdf***

ID #: 779 **Natural Sciences / Physics / Mathematical Physics**

Submitted on: Sep 11, 2012

Author: **Xiong Wang**

Title: **Fractional Geometric Calculus: Toward A Unified Mathematical Language for Physics and Engineering**

Abstract: This paper discuss the longstanding problems of fractional calculus such as too many definitions while lacking physical or geometrical meanings, and try to extend fractional calculus to any dimension. First, some different definitions of fractional derivatives, such as the Riemann-Liouville derivative, the Caputo derivative, Kolwankar`s local derivative and Jumarie`s modified Riemann-Liouville derivative, are discussed and conclude that the very reason for introducing fractional derivative is to study nondifferentiable functions. Then, a concise and essentially local definition of fractional derivative for one dimension function is introduced and its geometrical interpretation is given. Based on this simple definition, the fractional calculus is extended to any dimension and the Fractional Geometric Calculus is proposed. Geometric algebra provided an powerful mathematical framework in which the most advanced concepts modern physic, such as quantum mechanics, relativity, electromagnetism, etc., can be expressed in this framework graciously.

Web link: ***www.IntellectualArchive.com/getfile.php?file=lF11MEeli9E&orig_file=Xiong_Wang__Fractional_Geometric_Calculus.pdf***

ID #: 780 **Natural Sciences / Physics / Condensed Matter Physics**

Submitted on: Sep 11, 2012

Author: **Yoshio Kitaoka, Hidekazu Mukuda, Sunao Shimizu, Shin-ichiro Tabata, Parasharam M. Shirage, Akira Iyo**

Title: **Novel Superconducting Phases in Copper Oxides and Iron-oxypnictides: NMR Studies**

Abstract: We reexamine the novel phase diagrams of antiferromagnetism (AFM) and high-Tc$ superconductivity (HTSC) for a disorder-free CuO_2 plane based on an evaluation of local hole density (p) by site-selective Cu-NMR studies on multilayered copper oxides. Multilayered systems provide us with the opportunity to research the characteristics of the disorder-free CuO_2 plane. The site-selective NMR is the best and the only tool used to extract layer-dependent characteristics. Consequently, we have concluded that the uniform mixing of AFM and SC is a general property inherent to a single CuO_2 plane in an underdoped regime of HTSC. The T=0 phase diagram of AFM constructed here is in quantitative agreement with the theories in a strong correlation regime which is unchanged even with mobile holes. This Mott physics plays a vital role for mediating the Cooper pairs to make T_c of HTSC very high.

Web link: ***www.IntellectualArchive.com/getfile.php?file=l9UlSHJe2uZ&orig_file=Yoshio_Kitaoka__Novel_Superconducting_Phases.pdf***

ID #: 781 **Natural Sciences / Physics / Condensed Matter Physics**

Submitted on: Sep 11, 2012

Author: **H. Mukuda, S. Shimizu, A. Iyo, Y. Kitaoka**

Title: **High-Tc Superconductivity and Antiferromagnetism in Multilayered Copper Oxides - A New Paradigm of Superconducting Mechanism**

Abstract: High-temperature superconductivity (HTSC) in copper oxides emerges on a layered CuO2 plane when an antiferromagnetic Mott insulator is doped with mobile hole carriers. We review extensive studies of multilayered copper oxides by site-selective nuclear magnetic resonance (NMR), which have uncovered the intrinsic phase diagram of antiferromagnetism (AFM) and HTSC for a disorder-free CuO2 plane with hole carriers. We present our experimental findings such as the existence of the AFM metallic state in doped Mott insulators, the uniformly mixed phase of AFM and HTSC, and the emergence of d-wave SC with a maximum Tc just outside a critical carrier density, at which the AFM moment on a CuO2 plane disappears. These results can be accounted for by the

Mott physics based on the t-J model. The superexchange interaction J_in among spins plays a vital role as a glue for Cooper pairs or mobile spin-singlet pairs, in contrast to the phonon-mediated attractive interaction among electrons established in the Bardeen-Cooper-Schrieffer (BCS) theory.

Web link: ***www.IntellectualArchive.com/getfile.php?file=qc8YuP5hNMM&orig_file=Yoshio_Kitaoka__High-Tc_Superconductivity.pdf***

ID #: 782 **Natural Sciences / Physics / Mathematical Physics**

Submitted on: Sep 11, 2012

Author: **Diego F. M. Oliveira, Edson D. Leonel**

Title: **Boundary crisis and suppression of Fermi acceleration in a dissipative two dimensional non-integrable time-dependent billiard**

Abstract: Some dynamical properties for a dissipative time-dependent oval-shaped billiard are studied. The system is described in terms of a four-dimensional nonlinear mapping. Dissipation is introduced via inelastic collisions of the particle with the boundary, thus implying that the particle has a fractional loss of energy upon collision. The dissipation causes profound modifications in the dynamics of the particle as well as in the phase space of the non dissipative system. In particular, inelastic collisions can be assumed as an efficient mechanism to suppress Fermi acceleration of the particle. The dissipation also creates attractors in the system, including chaotic. We show that a slightly modification of the intensity of the damping coefficient yields a drastic and sudden destruction of the chaotic attractor, thus leading the system to experience a boundary crisis.

Web link: ***www.IntellectualArchive.com/getfile.php?file=266rcoKNrH1&orig_file=Edson_Leonel__Boundary_crisis.pdf***

ID #: 783 **Natural Sciences / Astronomy / Astrophysics**

Submitted on: Sep 11, 2012

Author: **P. H. T. Tam, A. K. H. Kong, C. Y. Hui, K. S. Cheng, C. Li, T.-N. Lu**

Title: **Gamma-ray emission from the globular clusters Liller 1, M80, NGC 6139, NGC 6541, NGC 6624, and NGC 6752**

Abstract: Globular clusters (GCs) are emerging as a new class of gamma-ray emitters, thanks to the data obtained from the Fermi Gamma-ray Space Telescope. By now, eight GCs are known to emit gamma-rays at energies >100~MeV. Based on the stellar encounter rate of the GCs, we identify potential gamma-ray emitting GCs out of all known GCs that have not been studied in details before. In this paper, we report the discovery of a number of new gamma-ray GCs: Liller 1, NGC 6624, and NGC 6752, and evidence for gamma-ray emission from M80, NGC 6139, and NGC 6541, in which gamma-rays were found within the GC tidal radius. With one of the highest metallicity among all GCs in the Milky Way, the gamma-ray luminosity of Liller 1 is found to be the highest of all known gamma-ray GCs. In addition, we confirm a previous report of significant gamma-ray emitting region next to NGC 6441. We briefly discuss the observed offset of gamma-rays from some GC cores.

Web link: ***www.IntellectualArchive.com/getfile.php?file=JLfBVsgUDco&orig_file=P_H_T_Tam__Gamma-ray_emission_Liller 1.pdf***

ID #: 784 **Natural Sciences / Astronomy / Astrophysics**

Submitted on: Sep 11, 2012

Author: **P. H. T. Tam, Albert K. H. Kong, C. Y. Hui**

Title: **Gamma-ray emission from globular clusters**

Abstract: Over the last few years, the fruitful data provided by the Large Area Telescope aboard the Fermi Gamma-ray Space Telescope has revolutionized our understanding of high-energy processes in globular clusters, particularly those involving compact objects like millisecond pulsars (MSPs). Gamma-ray emission between 100 MeV to 10 GeV has been detected from more than a dozen globular clusters in our Galaxy, most notably 47 Tucanae and Terzan 5. Based on a sample of known gamma-ray globular clusters, empirical relations between the gamma-ray luminosity and properties of globular clusters such as stellar encounter rate, metallicity, as well as optical and infrared photon energy density in the cluster, have been derived. The gamma-ray spectra are generally described by a power law with a cut-off at a few GeV. Together with the detection of pulsed gamma-rays from a millisecond pulsar in a globular cluster, such spectral signature gives support that gamma-rays from globular clusters are collective curvature emission from magnetospheres of MSPs within the cluster.

Web link: ***www.IntellectualArchive.com/getfile.php?file=LjA4J2qVOVv&orig_file=P_H_T_Tam__Gamma-r***

ay_emission.pdf

ID #: 785 **Natural Sciences / Astronomy / Astrophysics**

Submitted on: Sep 11, 2012

Author: **P. H. T. Tam, Albert K. H. Kong, Yi-Zhong Fan**

Title: **Fermi Large Area Telescope observations of GRB 110625A**

Abstract: Gamma-ray bursts (GRBs) that emit photons at GeV energies form a small but significant population of GRBs. However, the number of GRBs whose GeV-emitting period is simultaneously observed in X-rays remains small. We report gamma-ray observations of GRB 110625A using Fermi`s Large Area Telescope (LAT) in the energy range 100 MeV to 20 GeV. Gamma-ray emission at these energies was clearly detected using data taken between 180s and 580s after the burst, an epoch after the prompt emission phase. The GeV light curve differs from a simple power-law decay, and probably consists of two emission periods. Simultaneous Swift/XRT observations did not show flaring behaviors as in the case of GRB 100728A. We discuss the possibility that the GeV emission is the synchrotron self-Compton radiation of underlying ultraviolet flares.

Web link: ***www.IntellectualArchive.com/getfile.php?file=bMKQKH58q1O&orig_file=P_H_T_Tam__Fermi_Large_Area_Telescope.pdf***

ID #: 786 **Natural Sciences / Mathematics / Algebra**

Submitted on: Sep 12, 2012

Author: **O. V. Ogievetsky, L. Poulain d`Andecy**

Title: **Alternating subalgebras of Hecke algebras and alternating subgroups of braid groups**

Abstract: For a Coxeter system (G,S) the multi-parametric alternating subalgebra H^+(G) of the Hecke algebra and the alternating subgroup B^+(G) of the braid group are defined. Two presentations for H^+(G) and B^+(G) are given; one generalizes the Bourbaki presentation for the alternating subgroups of Coxeter groups, another one uses generators related to edges of the Coxeter graph.

Web link: ***www.IntellectualArchive.com/getfile.php?file=OqOLfRgf6f1&orig_file=O_Ogievetsky__Alternating_subalgebras.pdf***

ID #: 787 **Natural Sciences / Mathematics / Algebra**

Submitted on: Sep 12, 2012

Author: **O. V. Ogievetsky, L. Poulain d`Andecy**

Title: **Jucys-Murphy elements and representations of cyclotomic Hecke algebras**

Abstract: An inductive approach to the representation theory of cyclotomic Hecke algebras, inspired by Okounkov and Vershik, is developed. We study the common spectrum of the Jucys-Murphy elements using representations of the simplest affine Hecke algebra. Representations are constructed with the help of a new associative algebra whose underlying vector space is the tensor product of the cyclotomic Hecke algebra with the free associative algebra generated by standard m-tableaux.

Web link: ***www.IntellectualArchive.com/getfile.php?file=RMCugckuJfg&orig_file=O_Ogievetsky__Jucys-Murphy_elements.pdf***

ID #: 788 **Natural Sciences / Mathematics / Algebra**

Submitted on: Sep 12, 2012

Author: **O. V. Ogievetsky, L. Poulain d`Andecy**

Title: **On representations of complex reflection groups G(m,1,n)**

Abstract: An inductive approach to the representation theory of the chain of the complex reflection groups G(m,1,n) is presented. We obtain the Jucys-Murphy elements of G(m,1,n) from the Jucys--Murphy elements of the cyclotomic Hecke algebra, and study their common spectrum using representations of a degenerate cyclotomic affine Hecke algebra. Representations of G(m,1,n) are constructed with the help of a new associative algebra whose underlying vector space is the tensor product of the group ring of G(m,1,n) with a free associative algebra generated by the standard m-tableaux.

Web link: ***www.IntellectualArchive.com/getfile.php?file=InavjeOicun&orig_file=O_Ogievetsky__On_representations.pdf***

ID #: 789 **Natural Sciences / Mathematics / Algebra**

Submitted on: Sep 12, 2012

Author: **Oleg Ogievetsky, Todor Popov**

Title: **Drinfeld-Jimbo quantum Lie algebra**

Abstract: Quantum Lie algebras related to multi-parametric Drinfeld-Jimbo R-matrices of type GL(m|n) are classified.

Web link: ***www.IntellectualArchive.com/getfile.php?file=dbkx4TXwiVE&orig_file=O_Ogievetsky__Drinfeld-Jimbo_quantum_Lie.pdf***

ID #: 790 **Natural Sciences / Mathematics / Algebra**

Submitted on: Sep 12, 2012

Author: **O. V. Ogievetsky, L. Poulain d`Andecy**

Title: **Alternating subgroups of Coxeter groups and their spinor extensions**

Abstract: Let G be a discrete Coxeter group, G^+ its alternating subgroup and $\tilde{G}^+$ the spinor cover of G^+. A presentation of the groups G^+ and $\tilde{G}^+$ is proved for an arbitrary Coxeter system (G,S); the generators are related to edges of the Coxeter graph. Results of the Coxeter--Todd algorithm - with this presentation - for the chains of alternating groups of types A, B and D are given.

Web link: ***www.IntellectualArchive.com/getfile.php?file=SrkPRKtKXGu&orig_file=O_Ogievetsky__Alternating_subgroups.pdf***

ID #: 791 **Natural Sciences / Mathematics / Algebra**

Submitted on: Sep 12, 2012

Author: **O. V. Ogievetsky, L. Poulain d`Andecy**

Title: **Fusion procedure for Coxeter groups of type B and complex reflection groups G(m,1,n)**

Abstract: A complete system of primitive pairwise orthogonal idempotents for the Coxeter groups of type B and, more generally, for the complex reflection groups G(m,1,n) is constructed by a sequence of evaluations of a rational function in several variables with values in the group ring. The evaluations correspond to the eigenvalues of the two arrays of Jucys-Murphy elements.

Web link: ***www.IntellectualArchive.com/getfile.php?file=kt6RtnbNmNw&orig_file=O_Ogievetsky__Fusion_procedure.pdf***

ID #: 792 **Natural Sciences / Mathematics / Algebra**

Submitted on: Sep 12, 2012

Author: **A. P. Isaev, A. I. Molev, O. V. Ogievetsky**

Title: **Idempotents for Birman-Murakami-Wenzl algebras and reflection equation**

Abstract: A complete system of pairwise orthogonal minimal idempotents for Birman-Murakami-Wenzl algebras is obtained by a consecutive evaluation of a rational function in several variables on sequences of quantum contents of up-down tableaux. A by-product of the construction is a one-parameter family of fusion procedures for Hecke algebras. Classical limits to two different fusion procedures for Brauer algebras are described.

Web link: ***www.IntellectualArchive.com/getfile.php?file=Ggac0Km8b6p&orig_file=O_Ogievetsky__Idempotents.pdf***

ID #: 793 **Natural Sciences / Mathematics / Algebra**

Submitted on: Sep 12, 2012

Author: **S. Khoroshkin, O. Ogievetsky**

Title: **Zero divisors in reduction algebras**

Abstract: We establish the absence of zero divisors in the reduction algebra of a Lie algebra g with respect to its reductive Lie sub-algebra k. The class of reduction algebras include the Lie algebras (they arise when k is trivial) and the Gelfand--Kirillov conjecture extends naturally to the reduction algebras. We formulate the conjecture for the diagonal reduction algebras of sl type and verify it on a simplest example.

Web link: ***www.IntellectualArchive.com/getfile.php?file=klSMXhVclJt&orig_file=O_Ogievetsky__Zero_divisors.pdf***

ID #: 794 **Natural Sciences / Physics / Mathematical Physics**

Submitted on: Sep 12, 2012

Author: **Luis J. Boya**

Title: **Introduction to Sporadic Groups**

Abstract: This is an introduction to finite simple groups, in particular sporadic groups, intended for physicists. After a short review of group theory, we enumerate the $1+1+16=18$ families of finite simple groups, as an introduction to the sporadic groups. These are described next, in three levels of increasing complexity, plus the six isolated "pariah" groups. The (old) five Mathieu groups make up the first, smallest order level. The seven groups related to the Leech lattice, including the three Conway groups, constitute the second level. The third and highest level contains the Monster group $\mathbb M$, plus seven other related groups. Next a brief mention is made of the remaining six pariah groups, thus completing the $5+7+8+6=26$ sporadic groups. The review ends up with a brief discussion of a few of physical applications of finite groups in physics, including a couple of recent examples which use sporadic groups.

Web link: ***www.IntellectualArchive.com/getfile.php?file=E0ADKxh1oFS&orig_file=Luis_Boya__Introduction_to_Sporadic_Groups.pdf***

ID #: 795 **Natural Sciences / Physics / Mathematical Physics**

Submitted on: Sep 12, 2012

Author: **Luis J. Boya, R. Campoamor-Stursberg**

Title: **Composition algebras and the two faces of G_{2}**

Abstract: We consider composition and division algebras over the real numbers: We note two roles for the group G_{2}: as automorphism group of the octonions and as the isotropy group of a generic 3-form in 7 dimensions. We show why they are equivalent, by means of a regular metric. We express in some diagrams the relation between some pertinent groups, most of them related to the octonions. Some applications to physics are also discussed.

Web link: ***www.IntellectualArchive.com/getfile.php?file=1C2oaoRJmWj&orig_file=Luis_Boya__Composition_algebras.pdf***

ID #: 798 **Natural Sciences / Physics / Condensed Matter Physics**

Submitted on: Sep 13, 2012

Author: **E.M. Ganapolskii, Yu.V. Tarasov, L.D. Shostenko**

Title: **Spectral properties of cylindrical quasi-optical cavity resonator with random-inhomogeneous side boundary: correlation between dephasing and dissipation**

Abstract: A rigorous solution for the spectrum of quasioptical cylindrical cavity resonator with a randomly rough side boundary has been obtained for the first time. To accomplish this task, we have developed a novel method for variables separation in wave equation, which enables one, in principle, to rigorously examine any limiting case --- from negligibly weak to arbitrarily strong disorder. It is shown that the effect of disorder-induced scattering can be properly described in terms of two geometric potentials, specifically, the "amplitude" and the "gradient" potentials, which appear in wave equation in the course of conformal smoothing of the resonator boundaries. The scattering resulting from the gradient potential appears to be dominant, and its impact on the whole spectrum is governed by the unique sharpness parameter Ξ, the mean tangent of the asperity slope. ***Article was published in Phys. Rev. E 84, 026209 (2011). Â©2011 American Physical Society. Web page http://pre.aps.org/abstract/PRE/v84/i2/e026209 ***

Web link: ***www.IntellectualArchive.com/getfile.php?file=EBOlJn5N7cu&orig_file=Yu_Tarasov__Spectral_properties.pdf***

ID #: 799 **Natural Sciences / Mathematics / Number theory**

Submitted on: Sep 13, 2012

Author: **Piero Giacomelli**

Title: **Log-concavity of Lucas Sequences of first kind**

Abstract: In these notes we address the study of the log-concave operator acting on Lucas Sequences of first

kind. We will find for which initial values a generic Lucas sequence is log-concave, and using this we show when the same sequence is infinite log-concave. The main result will help to find the log-concavity of some well known recurrent sequences like Fibonacci and Mersenne. Some possible generalization for a complete classification of the log-concave operator applied to general linear recurrent sequences is proposed.

Web link: ***www.IntellectualArchive.com/getfile.php?file=vOSiSlhOcPH&orig_file=Piero_Giacomelli__Log-convavity.pdf***

ID #: 800 **Natural Sciences / Mathematics / Graph theory**

Submitted on: Sep 13, 2012

Author: **Piero Giacomelli**

Title: **Wheel Random Apollonian Graphs**

Abstract: In this paper a subset of High-Dimensional Random Apollonian networks, that we called Wheel Random Apollonian Graphs (WRAG), is considered. We show how to generate a Wheel Random Apollonian Graph from a wheel graph. We analyse some basic graph properties like vertices and edges cardinality, some question concerning cycles and the chromaticity in such type of graphs, we suggest further work on this type of graphs.

Web link: ***www.IntellectualArchive.com/getfile.php?file=0clILriNlc1&orig_file=Piero_Giacomelli__Wheel_Random.pdf***

ID #: 801 **Natural Sciences / Physics / Condensed Matter Physics**

Submitted on: Sep 13, 2012

Author: **Andrey Milchev, Jaroslaw Paturej, Vakhtang G. Rostiashvili, Thomas A. Vilgis**

Title: **Thermal Degradation of Adsorbed Bottle-Brush Macromolecules: Molecular Dynamics Simulation**

Abstract: The scission kinetics of bottle-brush molecules in solution and on an adhesive substrate is modeled by means of Molecular Dynamics simulation with Langevin thermostat. Our macromolecules comprise a long flexible polymer backbone with L segments, consisting of breakable bonds, along with two side chains of length N, tethered to each segment of the backbone. In agreement with recent experiments and theoretical predictions, we find that bond cleavage is significantly enhanced on a strongly attractive substrate even though the chemical nature of the bonds remains thereby unchanged.

Web link: ***www.IntellectualArchive.com/getfile.php?file=rlf4OOEY4th&orig_file=Andrey_Milchev__Thermal_Degradation.pdf***

ID #: 802 **Natural Sciences / Astronomy / Astrophysics**

Submitted on: Sep 13, 2012

Author: **Hiroshi Tsunemi, Hiroshi Tomida, Haruyoshi Katayama, Masashi Kimura, Arata Daikyuji, Kazuhisa Miyaguchi, Kentaro Maeda**

Title: **In Orbit Performance of the MAXI/SSC onboard the ISS**

Abstract: We report here the in orbit performance of the CCD camera (MAXI/SSC) onboard the International Space Station (ISS). It was commissioned in August, 2009. This is the first all-sky survey mission employing X-ray CCDs. It consists of 32 CCDs each of which is 1 inch square. It is a slit camera with a field of view of 1deg.5x 90deg and scans the sky as the rotation of the ISS. The CCD on the SSC is cooled down to the working temperature around -60degC by the combination of the peltier cooler, a loop heat pipe and a radiator. The standard observation mode of the CCD is in a parallel sum mode (64-binning). The CCD functions properly although it suffers an edge glow when the Sun is near the field of view (FOV) which reduces the observation efficiency of the SSC down to about 30%. The performance of the CCD is continuously monitored both by the Mn-K X-rays and by the Cu-K X-rays. There are many sources detected, not only point sources but extended sources.

Web link: ***www.IntellectualArchive.com/getfile.php?file=AGT6j7hhJhq&orig_file=Hiroshi_Tsunemi__In_Orbit_Performance.pdf***

ID #: 803 **Natural Sciences / Computer Sciences / Network topology**

Submitted on: Sep 13, 2012

Author: **Kun Peng**

Title: **Failure of A Mix Network**

Abstract: A mix network by Wikstrom fails in correctness, provable privacy and soundness. Its claimed advantages in security and efficiency are compromised. The analysis in this paper illustrates that although the first two failures may be fixed by modifying the shuffling protocol, the last one is too serious to fix at a tolerable cost. Especially, an attack is proposed to show how easily soundness of the shuffling scheme can be compromised. Moreover, the most surprising discovery in this paper is that it is formally illustrated that in practice it is impossible to fix soundness of the shuffling scheme by Wikstrom.

Web link: ***www.IntellectualArchive.com/getfile.php?file=XeNGDb3RnLw&orig_file=Kun_Peng__Failure_of_A_Mix_Network.pdf***

ID #: 804 **Natural Sciences** / **Physics** / **Mathematical Physics**

Submitted on: Sep 13, 2012

Author: **Andre L. P. Livorati, Tiago Kroetz, Carl P. Dettmann, Ibere Luiz Caldas, Edson D. Leonel**

Title: **Stickiness in a bouncer model: A slowing mechanism for Fermi acceleration**

Abstract: Some phase space transport properties for a conservative bouncer model are studied. The dynamics of the model is described by using a two-dimensional measure preserving mapping for the variables velocity and time. The system is characterized by a control parameter ϵ and experiences a transition from integrable ($\epsilon=0$) to non integrable ($\epsilon\ne 0$). For small values of ϵ, the phase space shows a mixed structure where periodic islands, chaotic seas and invariant tori coexist. As the parameter ϵ increases and reaches a critical value ϵ_c all invariant tori are destroyed and the chaotic sea spreads over the phase space leading the particle to diffuse in velocity and experience Fermi acceleration (unlimited energy growth). During the dynamics the particle can be temporarily trapped near periodic and stable regions. We use the finite time Lyapunov exponent to visualize this effect. The survival probability was used to obtain some of the transport properties in the phase space.

Web link: ***www.IntellectualArchive.com/getfile.php?file=LSpehjUt0aA&orig_file=Edson_Leonel__Stickiness_in_a_bouncer_model.pdf***

ID #: 805 **Natural Sciences** / **Physics** / **Mathematical Physics**

Submitted on: Sep 13, 2012

Author: **Tiago Botari, Edson Denis Leonel**

Title: **A one-dimensional Fermi accelerator model with moving wall described by a nonlinear van der Pol oscillator**

Abstract: A modification of the one-dimensional Fermi accelerator model is considered in this work. The dynamics of a classical particle of mass m, confined to bounce elastically between two rigid walls where one is described by a non-linear van der Pol type oscillator while the other one is fixed, working as a re-injection mechanism of the particle for a next collision, is carefully made by the use of a two-dimensional non-linear mapping. Two cases are considered: (i) the situation where the particle has mass negligible as compared to the mass of the moving wall and does not affect the motion of it; (ii) the case where collisions of the particle does affect the movement of the moving wall. For case (i) the phase space is of mixed type leading us to observe a scaling of the average velocity as a function of the parameter ($\c{hi}$) controlling the non-linearity of the moving wall. For large $\c{hi}$, a diffusion on the velocity is observed leading us to conclude that Fermi acceleration is taking place.

Web link: ***www.IntellectualArchive.com/getfile.php?file=MLbEVt90SOb&orig_file=Edson_Leonel__A_one-dimensional_Fermi.pdf***

ID #: 806 **Natural Sciences** / **Physics** / **Mathematical Physics**

Submitted on: Sep 13, 2012

Author: **Edson D. Leonel, Carl P. Dettmann**

Title: **Recurrence of particles in static and time varying oval billiards**

Abstract: Dynamical properties are studied for escaping particles, injected through a hole in an oval billiard. The dynamics is considered for both static and periodically moving boundaries. For the static boundary, two different decays for the recurrence time distribution were observed after exponential decay for short times: A changeover to: (i) power law or; (ii) stretched exponential. Both slower decays are due to sticky orbits trapped near KAM islands, with the stretched exponential apparently associated with a single group of large islands. For time dependent case, survival probability leads to

the conclusion that sticky orbits are less evident compared with the static case.

Web link: ***www.IntellectualArchive.com/getfile.php?file=3dxSalx6wKw&orig_file=Edson_Leonel__Recurrence_of_particles.pdf***

ID #: 807 **Natural Sciences / Physics / Mathematical Physics**

Submitted on: Sep 13, 2012

Author: **Andre L. P. Livorati, Alexander Loskutov, Edson D. Leonel**

Title: **Deceleration mechanism of Fermi acceleration in a time-dependent stadium billiard**

Abstract: The dynamics of a time-dependent stadium-like billiard are studied by a four dimensional nonlinear mapping. We have shown that even without any dissipation, the particle experiences a decrease on its velocity. Such condition is related with a critical resonance velocity, where if the initial velocity has a higher value than the resonant one, we can observe Fermi acceleration, however, if the initial velocity has a initial value smaller than the critical one, the particle is temporarily trapped surrounding the stability islands, in a stickiness regime. We believe that this sticky orbits can act as deceleration mechanism for Fermi Acceleration.

Web link: ***www.IntellectualArchive.com/getfile.php?file=MnUHKuwsKcj&orig_file=Edson_Leonel__Deceleration_mechanism.pdf***

ID #: 808 **Natural Sciences / Physics / Nuclear physics**

Submitted on: Sep 13, 2012

Author: **V.S. Filinov, Yu.B. Ivanov, M. Bonitz, P.R. Levashov, V.E. Fortov**

Title: **Quantum simulations of thermodynamic properties of strongly coupled quark-gluon plasma**

Abstract: A strongly coupled quark-gluon plasma (QGP) of heavy constituent quasi-particles is studied by a path-integral Monte-Carlo method. This approach is a quantum generalization of the model developed by Gelman, Shuryak and Zahed. It is shown that this method is able to reproduce the QCD lattice equation of state and also yields valuable insight into the internal structure of the QGP. The results indicate that the QGP reveals liquid-like rather than gas-like properties. At temperatures just above the critical one it was found that bound quark-antiquark states still survive. These states are bound by effective string-like forces and turns out to be colorless. At the temperature as large as twice the critical one no bound states are observed. Quantum effects turned out to be of prime importance in these simulations.

Web link: ***www.IntellectualArchive.com/getfile.php?file=p7YT1X4XDr6&orig_file=V_Filinov__Quantum_simulations.pdf***

ID #: 809 **Natural Sciences / Astronomy / Stellar astronomy**

Submitted on: Sep 13, 2012

Author: **Natalia A. Virnina, Ivan L. Andronov, Maxim V. Mogoryan**

Title: **A Hot Spot and Mass Transfer of the Algol-type Binary System WZ Crv**

Abstract: We present the results of two color VR observation of the Algol-type binary system WZ Crv (12h44m15.19s, -21d25m35.4s) which were obtained using the remotely controlled telescope TOA-150 of Tzec Maun Observatory. We determined the moments of individual minima, the orbital period and its derivative, the initial epoch, color indices V-R and temperature estimates of the components. Also we noticed that the phase curve is asymmetric: the second maximum is higher than the first one. It indicates that there is a spot in the photosphere of one of the stars in this system.

Web link: ***www.IntellectualArchive.com/getfile.php?file=RuPFfFfOe2F&orig_file=M_Mogoryan__A_Hot_Spot.pdf***

ID #: 810 **Natural Sciences / Mathematics / Algebra**

Submitted on: Sep 13, 2012

Author: **Gabor Braun, Sebastian Pokutta**

Title: **Rigid abelian groups and the probabilistic method**

Abstract: The construction of torsion-free abelian groups with prescribed endomorphism rings starting with Corner`s seminal work is a well-studied subject in the theory of abelian groups. Usually these construction work by adding elements from a (topological) completion in order to get rid of (kill) unwanted homomorphisms. The critical part is to actually prove that every unwanted homomorphism

can be killed by adding a suitable element. We will demonstrate that some of those constructions can be significantly simplified by choosing the elements at random. As a result, the endomorphism ring will be almost surely prescribed, i.e., with probability one. ***Article was originally published in Contemporary Mathematcs 576 (2012), 17-30***

Web link: ***www.IntellectualArchive.com/getfile.php?file=P7XWELKFGri&orig_file=Gabor_Braun__Rigid_abelian_groups.pdf***

ID #: 811 **Natural Sciences / Physics / Gravitation Theory (Relativity)**

Submitted on: Sep 13, 2012

Author: **Yu. F. Pirogov**

Title: **Unimodular bimode gravity and the coherent scalar-graviton field as galaxy dark matter**

Abstract: The explicit violation of the general gauge invariance/relativity is adopted as the origin of dark matter and dark energy of the gravitational nature. The violation of the local scale invariance alone, with the residual unimodular one, is considered. Besides the four-volume preserving deformation mode -- the transverse-tensor graviton -- the metric comprises a compression mode -- the scalar graviton, or the systolon. A unimodular invariant and general covariant metric theory of the bimode/scalar-tensor gravity is consistently worked out. To reduce the primordial ambiguity of the theory a dynamical global symmetry is imposed, with its subsequent spontaneous breaking revealed. The static spherically symmetric case in the empty, but possibly for the origin, space is studied. A three-parameter solution describing a new static space structure -- the dark lacuna -- is constructed. It enjoys the property of gravitational confinement, with the logarithmic potential of gravitational attraction at the periphery, and results in the asymptotically flat rotation curves.

Web link: ***www.IntellectualArchive.com/getfile.php?file=LKMsroZOJOM&orig_file=Yu_Pirogov__Unimodular_bimode_gravity.pdf***

ID #: 812 **Natural Sciences / Physics / Condensed Matter Physics**

Submitted on: Sep 13, 2012

Author: **Yury I. Dikansky, Alexander N. Tyatyushkin, Arthur R. Zakinyan**

Title: **Anisotropy of magnetic emulsions induced by magnetic and electric fields**

Abstract: The anisotropy of magnetic emulsions induced by simultaneously acting electric and magnetic fields is theoretically and experimentally investigated. Due to the anisotropy, the electric conductivity and magnetic permeability of a magnetic emulsion are no longer scalar coefficients, but are tensors. The electric conductivity and magnetic permeability tensors of sufficiently diluted emulsions in sufficiently weak electric and magnetic fields are found as functions of the electric and magnetic intensity vectors. The theoretically predicted induced anisotropy was verified experimentally. The experimental data are analyzed and compared with theoretical predictions. The results of the analysis and comparison are discussed.

Web link: ***www.IntellectualArchive.com/getfile.php?file=LQUqAXYYW91&orig_file=Arthur_Zakinyan__Anisotropy.pdf***

ID #: 813 **Natural Sciences / Physics / Gravitation Theory (Relativity)**

Submitted on: Sep 13, 2012

Author: **Lionel Mason, Jean-Philippe Nicolas**

Title: **Peeling of Dirac and Maxwell fields on a Schwarzschild background**

Abstract: We study the peeling of Dirac and Maxwell fields on a Schwarzschild background following the approach developed by the authors in Mason-Nicolas 2009 for the wave equation. The method combines a conformal compactification with vector field techniques in order to work out the optimal space of initial data for a given transverse regularity of the rescaled field across null infinity. The results show that analogous decay and regularity assumptions in Minkowski and in Schwarzschild produce the same regularity across null infinity. The results are valid also for the classes of asymptotically simple spacetimes constructed by Corvino-Schoen / Chrusciel-Delay.

Web link: ***www.IntellectualArchive.com/getfile.php?file=DTsOMMC5fmT&orig_file=Jean-Philippe_Nicolas__Peeling.pdf***

ID #: 814 **Natural Sciences / Physics / Mathematical Physics**

Submitted on: Sep 13, 2012

Author: **Igor V. Ovchinnikov**

Title: **Topological field theory of dynamical systems**

Abstract: Here, it is shown that the path-integral representation of any stochastic or deterministic continuous-time dynamical model is a cohomological or Witten-type topological field theory, i.e., a model with global topological supersymmetry (Q-symmetry). As many other supersymmetries, Q-symmetry must be perturbatively stable due to what is generically known as non-renormalization theorems. As a result, all (equilibrium) dynamical models are divided into three major categories: Markovian models with unbroken Q-symmetry, chaotic models with Q-symmetry spontaneously broken on the mean-field level by, e.g., fractal invariant sets (e.g., strange attractors), and intermittent or self-organized critical (SOC) models with Q-symmetry dynamically broken by the condensation of instanton-antiinstanton configurations (earthquakes, avalanches etc.) SOC is a full-dimensional phase separating chaos and Markovian dynamics. In the deterministic limit, however, antiinstantons disappear and SOC collapses into the "edge of chaos".

Web link: ***www.IntellectualArchive.com/getfile.php?file=4SWGl9OIGNU&orig_file=Igor_Ovchinnikov__Topological_field_theory.pdf***

ID #: 815 **Natural Sciences / Physics / Condensed Matter Physics**

Submitted on: Sep 13, 2012

Author: **Kwai-Kong Ng, Min-Fong Yang**

Title: **Thermal Phase transitions in attractive extended Bose-Hubbard Model with three-body constraint**

Abstract: By means of quantum Monte Carlo simulations implemented with a two-loop update scheme, the finite-temperature phase diagram of a three-body constrained attractive Bose lattice gas is investigated. The nature of the thermal phase transitions around the dimer superfluid and the atomic superfluid is unveiled. We find that the Z_2 symmetry-breaking transitions between these two superfluid phases are of first order even at nonzero temperatures. More interestingly, the thermal transition from the dimer superfluid to the normal fluid is found to be consistent with the Kosterlitz-Thouless type but giving an anomalous universal stiffness jump. It demonstrates that this transition is driven by unbinding of pairs of fractional vortices. *** Article was originally published in Phys. Rev. B 83, 100511(R) (2011). Web page http://prb.aps.org/abstract/PRB/v83/i10/e100511 ***

Web link: ***www.IntellectualArchive.com/getfile.php?file=gv5JewmCVna&orig_file=Kwai-Kong_Ng__Thermal_Phase_transitions.pdf***

ID #: 831 **Natural Sciences / Biology / Ecology**

Submitted on: Sep 13, 2012

Author: **J.C. Hodge**

Title: **How are white squirrels able to survive in a forest?**

Abstract: The white squirrels' (Sciurus carolinensis) causes of success in a preditory environment and causes of the apparent population equilibrium with gray squirrels are mysteries. White squirrels of Brevard, NC are thought to be a color variant of the Eastern gray squirrels. White and gray squirrels were observed from 2001 to May 2010. The squirrel population in the observation area has changed from predominantly gray to predominantly white. The observations suggest white squirrels have many physical and culture characteristics that differ from gray squirrels. These characteristics favor white squirrels over gray in a substantial feral and stray cat (Felis catus) predation and human environment. That Brevard white squirrels may be at an evolutionary branching point is suggested.

Web link: ***www.IntellectualArchive.com/getfile.php?file=hUQIJ2KV5fh&orig_file=ws.pdf***

ID #: 818 **Natural Sciences / Physics / General Physics**

Submitted on: Sep 14, 2012

Author: **Edward KapuÅ›cik**

Title: **On the velocity tensor**

Abstract: A new object, called the velocity tensor, is introduced. It allows to formulate a generally covariant mechanics. Some properties of the velocity tensor are described.

Web link: ***www.IntellectualArchive.com/getfile.php?file=Q8MMwogKZMK&orig_file=YaF.pdf***

ID #: 820 **Natural Sciences / Physics / Condensed Matter Physics**

Submitted on: Sep 14, 2012

Author: **Pierre Carrier, Jok M. Tang, Yousef Saad, James K. Freericks**

Title: **Lanczos-based Low-Rank Correction Method for Solving the Dyson Equation in Inhomogenous Dynamical Mean-Field Theory**

Abstract: Inhomogeneous dynamical mean-field theory has been employed to solve many interesting strongly interacting problems from transport in multilayered devices to the properties of ultracold atoms in a trap. The main computational step, especially for large systems, is the problem of calculating the inverse of a large sparse matrix to solve Dyson`s equation and determine the local Green`s function at each lattice site from the corresponding local self-energy. We present a new efficient algorithm, the Lanczos-based low-rank algorithm, for the calculation of the inverse of a large sparse matrix which yields this local (imaginary time) Green`s function. The Lanczos-based low-rank algorithm is based on a domain decomposition viewpoint, but avoids explicit calculation of Schur complements and relies instead on low-rank matrix approximations derived from the Lanczos algorithm, for solving the Dyson equation.

Web link: ***www.IntellectualArchive.com/getfile.php?file=DNkUhN1EA4h&orig_file=Pierre_Carrier__Lanczos-based_Low-Rank.pdf***

ID #: 821 **Natural Sciences / Other / Meteorology**

Submitted on: Sep 14, 2012

Author: **Jan Mandel, Jonathan D. Beezley, Adam K. Kochanski**

Title: **Coupled atmosphere-wildland fire modeling with WRF-Fire**

Abstract: We describe the physical model, numerical algorithms, and software structure of WRF-Fire. WRF-Fire consists of a fire-spread model, implemented by the level-set method, coupled with the Weather Research and Forecasting model. In every time step, the fire model inputs the surface wind, which drives the fire, and outputs the heat flux from the fire into the atmosphere, which in turn influences the atmosphere. The level-set method allows submesh representation of the burning region and flexible implementation of various ignition modes. WRF-Fire is distributed as a part of WRF and it uses the WRF parallel infrastructure for parallel computing. ***Originally published in Geoscientific Model Development 4, 591-610, 2011***

Web link: ***www.IntellectualArchive.com/getfile.php?file=VZOmNg4rW3P&orig_file=Jan_Mandel__Coupled_atmosphere-wildland.pdf***

ID #: 823 **Social Sciences / Communication / Sociolinguistics**

Submitted on: Sep 14, 2012

Author: **Animesh Mukherjee, Francesca Tria, Andrea Baronchelli, Andrea Puglisi, Vittorio Loreto**

Title: **Aging in language dynamics**

Abstract: Human languages evolve continuously, and a puzzling problem is how to reconcile the apparent robustness of most of the deep linguistic structures we use with the evidence that they undergo possibly slow, yet ceaseless, changes. Is the state in which we observe languages today closer to what would be a dynamical attractor with statistically stationary properties or rather closer to a non-steady state slowly evolving in time? Here we address this question in the framework of the emergence of shared linguistic categories in a population of individuals interacting through language games. The observed emerging asymptotic categorization, which has been previously tested - with success - against experimental data from human languages, corresponds to a metastable state where global shifts are always possible but progressively more unlikely and the response properties depend on the age of the system. *** Journal reference: PLoS ONE 6(2): e16677, 2011 ***

Web link: ***www.IntellectualArchive.com/getfile.php?file=Emc0Dl3c4iV&orig_file=Vittorio_Loreto__Aging.pdf***

ID #: 824 **Natural Sciences / Physics / General Physics**

Submitted on: Sep 14, 2012

Author: **Yves Gaspar, Giovanni Acquaviva**

Title: **A Gedankenexperiment in Gravitation**

Abstract: In this paper we consider a thought experiment involving the effect of gravitation on an ideal scale containing a photon. If the tidal forces inherent to a gravitational field are neglected, then one is led

to scenario which seems to bring about perpetual motion violating the first and second principle of thermodynamics. The tidal effects of gravity must neccessarily be included in order to obtain a consistent physical theory. As a result, Albert Einstein`s thought experiments according to which the physical effects of inertia in an accelerated reference frame are equivalent to the effects of gravity in a frame at rest on the surface of a massive body must be reconsidered, since linearly accelerated frames do not produce tidal effects. We argue that the equivalence between inertial effects and gravitation can be restored for rotating frames and in this context a relation with the possible nature of quantum gravity is conjectured. *** Journal reference: "Nuovo Cim.B125:1201-1208,2010", ***

Web link: ***www.IntellectualArchive.com/getfile.php?file=XjxHMff1Lwu&orig_file=Yves_Gaspar__A_Gedankenexperiment.pdf***

ID #: 825 **Natural Sciences / Physics / Gravitation Theory (Relativity)**

Submitted on: Sep 14, 2012

Author: **Yves Gaspar, Giovanni Acquaviva**

Title: **Gravity and complexity**

Abstract: We present a heuristic analysis of the dynamics of general solutions to the Einstein Field Equations which highlights the possibility that such systems could possess a degree of unpredictability stronger than that which characterises chaotic systems. Questions regarding features of the complex dynamics of such cosmological models can be undecidable. These systems could be qualitatively compared with Turing machines in the sense that even if initial conditions for a dynamical system associated to general solutions to the Einstein Field Equations were known exactly, then the subsequent evolution could still be unpredictable. *** Journal reference: "The European Physical Journal Plus Volume 127, Number 6 (2012), 65, DOI: 10.1140/epjp/i2012-12065-3" ***

Web link: ***www.IntellectualArchive.com/getfile.php?file=FhEnRoG7P7a&orig_file=Yves_Gaspar__GravCompl.pdf***

ID #: 826 **Natural Sciences / Computer Sciences / Relational databases**

Submitted on: Sep 14, 2012

Author: **David I. Spivak, Robert E. Kent**

Title: **Ologs: a categorical framework for knowledge representation**

Abstract: In this paper we introduce the olog, or ontology log, a category-theoretic model for knowledge representation (KR). Grounded in formal mathematics, ologs can be rigorously formulated and cross-compared in ways that other KR models (such as semantic networks) cannot. An olog is similar to a relational database schema; in fact an olog can serve as a data repository if desired. Unlike database schemas, which are generally difficult to create or modify, ologs are designed to be user-friendly enough that authoring or reconfiguring an olog is a matter of course rather than a difficult chore. It is hoped that learning to author ologs is much simpler than learning a database definition language, despite their similarity. We describe ologs carefully and illustrate with many examples. As an application we show that any primitive recursive function can be described by an olog. We also show that ologs can be aligned or connected together into a larger network using functors. The various methods of information flow and institutions can then be used to integrate local and global world-views.

Web link: ***www.IntellectualArchive.com/getfile.php?file=uChSj2CBc7U&orig_file=David_Spivak__Ologs.pdf***

ID #: 827 **Natural Sciences / Computer Sciences / Relational databases**

Submitted on: Sep 14, 2012

Author: **David I. Spivak**

Title: **Database queries and constraints via lifting problems**

Abstract: Previous work has demonstrated that categories are useful and expressive models for databases. In the present paper we build on that model, showing that certain queries and constraints correspond to lifting problems, as found in modern approaches to algebraic topology. In our formulation, each so-called SPARQL graph pattern query corresponds to a category-theoretic lifting problem, whereby the set of solutions to the query is precisely the set of lifts. We interpret constraints within the same formalism and then investigate some basic properties of queries and constraints. In particular, to any database π we can associate a certain derived database $\Qry(\pi)$ of queries on π. As an application, we explain how giving users access to certain parts of $\Qry(\pi)$, rather than direct access to π, improves ones ability to manage the impact of schema evolution.

Web link: ***www.IntellectualArchive.com/getfile.php?file=2MMpn7LAmt4&orig_file=David_Spivak__Database_queries.pdf***

ID #: 828 **Natural Sciences / Computer Sciences / Relational databases**

Submitted on: Sep 14, 2012

Author: **David I. Spivak**

Title: **Kleisli Database Instances**

Abstract: We use monads to relax the atomicity requirement for data in a database. Depending on the choice of monad, the database fields may contain generalized values such as lists or sets of values, or they may contain exceptions such as various types of nulls. The return operation for monads ensures that any ordinary database instance will count as one of these generalized instances, and the bind operation ensures that generalized values behave well under joins of foreign key sequences. Different monads allow for vastly different types of information to be stored in the database. For example, we show that classical concepts like Markov chains, graphs, and finite state automata are each perfectly captured by a different monad on the same schema.

Web link: ***www.IntellectualArchive.com/getfile.php?file=WIBXM8k8GbG&orig_file=David_Spivak__Kleisli_Database_Instances.pdf***

ID #: 829 **Natural Sciences / Physics / Quantum field theory**

Submitted on: Sep 14, 2012

Author: **Antonia Karamatskou, Hagen Kleinert**

Title: **Quantum Maupertuis Principle**

Abstract: According to the Maupertuis principle, the movement of a classical particle in an external potential $V(x)$ can be understood as the movement in a curved space with the metric $g_{\mu\nu}(x)=2M[V(x)-E]\delta_{\mu\nu}$. We show that the principle can be extended to the quantum regime, i.e., we show that the wave function of the particle follows a Schr\"odinger equation in curved space where the kinetic operator is formed with the {\it Weyl--invariant Laplace-Beltrami} operator. As an application, we use DeWitt`s recursive semiclassical expansion of the time-evolution operator in curved space to calculate the semiclassical expansion of the particle density $\rho(x;E)=<x|\delta(E-\hat H)|x>$.

Web link: ***www.IntellectualArchive.com/getfile.php?file=FsEOOANA8Pc&orig_file=Antonia_Karamatskou__Quantum_Maupertuis_Principle.pdf***

ID #: 830 **Natural Sciences / Physics / Biophysics**

Submitted on: Sep 15, 2012

Author: **Alexander Egoyan**

Title: **On the Influence of Air Resistance and Wind during Long Jump**

Abstract: In this article we perform theoretical analysis of long jumps with the purpose to find contribution of air resistance and wind into final results. It appears that in the absence of wind the drag effect during a long-jump would reduce the jump by no more than 1%. The wind has a significant effect mainly because of changes in take-off values. The faster the athlete runs, the greater the horizontal velocity at the instant he/she touches the take-off board and the greater the take-off velocity. The model predicts an increase in jump distance up to 23 cm from a jump on a still day to a jump by the same athlete with 2 ms-1 tailwind (the allowable limit for records).

Web link: ***www.IntellectualArchive.com/getfile.php?file=VcdwM0AwhlA&orig_file=On the Influence of Air Resistance and Wind during Long Jump.pdf***

ID #: 832 **Natural Sciences / Physics / Particle physics**

Submitted on: Sep 15, 2012

Author: **Y. D. Chen, C. F. Qiao**

Title: **Baryonium Study in Heavy Baryon Chiral Perturbation Theory**

Abstract: To see whether heavy baryon and anti-baryon can form a bound state, the heavy baryonium, we study the interaction potential between them in terms of heavy baryon perturbation theory. The obtained potential is applied to calculate the heavy baryonium masses by solving Schrodinger equation. We find it is true that the heavy baryonium may exist in a reasonable choice of input parameters. The uncertainties remaining in the potential and their influences on the heavy baryonium

mass spectrum are discussed. *** Journal reference: "Phys.Rev. D85 (2012) 034034", http://prd.aps.org/ ***

Web link: ***www.IntellectualArchive.com/getfile.php?file=PmilMgBe1Kg&orig_file=C_F_Qiao__Baryonium_Study.pdf***

ID #: 833 **Natural Sciences / Mathematics / Geometry**

Submitted on: Sep 15, 2012

Author: **Michael F. Barnsley, Brendan Harding, Konstantin Igudesman**

Title: **How to Transform and Filter Images using Iterated Function Systems**

Abstract: We present a general theory of fractal transformations and show how it leads to a new type of method for filtering and transforming digital images. This work substantially generalizes earlier work on fractal tops. The approach involves fractal geometry, chaotic dynamics, and an interplay between discrete and continuous representations. The underlying mathematics is established and applications to digital imaging are described and exemplified.

Web link: ***www.IntellectualArchive.com/getfile.php?file=UKNYZKfINL5&orig_file=K_Igudesman__How_to_Transform_Images.pdf***

ID #: 834 **Natural Sciences / Physics / Particle physics**

Submitted on: Sep 15, 2012

Author: **Feng-Jun Ge, Shao-Zhou Jiang, Qing Wang**

Title: **Electroweak Chiral Lagrangian from TC2 Model with nontrivial TC fermion condensation and walking**

Abstract: The electroweak chiral Lagrangian for the topcolor assisted technicolor model proposed by K. Lane, which uses nontrivial patterns of techniquark condensation and walking, was investigated in this study. We found that the features of the model are qualitatively similar to those of Lane`s previous natural TC2 prototype model, but there is no limit on the upper bound of the Z` mass. We discuss the phase structure and possible walking behavior of the model. We obtained the values of all coefficients of the electroweak chiral Lagrangian up to an order of p4. We show that although the walking effect reduces the S parameter to half its original value, it maintains an order of 2. Moreover, a special hyper-charge arrangement is needed to achieve further reductions in its value.

Web link: ***www.IntellectualArchive.com/getfile.php?file=eer6wiZPMOW&orig_file=Qing_Wang__Electroweak_Chiral_Lagrangian.pdf***

ID #: 835 **Natural Sciences / Physics / Particle physics**

Submitted on: Sep 15, 2012

Author: **Ying Zhang, Shao-Zhou Jiang, Qing Wang**

Title: **The Global Electroweak Fit and its Implication to Z-prime**

Abstract: Among the Z-pole observables, $A_{FB}^{(0,b)}$ and A_e suffer moderately-large standard deviations from the Standard Model predictions. Fine-tuning of the unknown Higgs mass only reduces the deviation of one of them at the expense of increasing the deviation of the other observable. If we take this fact seriously, the result can be interpreted as independent experimental evidence of existing new physics beyond SM, even if a 125GeV Higgs on the LHC is finally confirmed to be SM Higgs. We show in this paper that the existence of a $Z`$ boson mixing with Z and γ and with generation-dependent anomaly-free charge assignments, helps to suppress $A_{FB}^{(0,b)}$ and A_e at Z-pole simultaneously and dose reduce the largest deviation from 2.7σ in SM predictions to 1.2σ in our scenario. The global electroweak fit does not prefer $Z`$ coupling to the second-generation quarks and the first-generation left-handed lepton and right-handed electron.

Web link: ***www.IntellectualArchive.com/getfile.php?file=ucd02ILiBgw&orig_file=Qing_Wang__The_Global_Electroweak_Fit.pdf***

ID #: 836 **Natural Sciences / Physics / Particle physics**

Submitted on: Sep 15, 2012

Author: **Shao-Zhou Jiang, Qing Wang**

Title: **Computation of the p^6 order low-energy constants with tensor sources**

Abstract: We present the results of computing the p^4 and p^6 order low-energy constants of the chiral

Lagrangian with tensor sources for both two and three flavors pseudoscalar mesons. This is a generalization of our previous work on calculating the p^4 and p^6 order coefficients of the chiral Lagrangian without tensor sources in terms of the quark self-energy $\Sigma(p^2)$. We find that some p^6 order operators with tenor sources used in the literature are related to each other with the help of some epsilon relations. There leaves 100 independent terms for n-flavor, 94 terms for 3-flavor, and 67 terms for 2-flavor cases. We also find that the odd-intrinsic-parity chiral Lagrangian with tensor sources can not exist.

Web link: ***www.IntellectualArchive.com/getfile.php?file=ZiFE9Gicdu3&orig_file=Qing_Wang__Computation_of_the_p-6.pdf***

ID #: 837 **Natural Sciences / Physics / Condensed Matter Physics**

Submitted on: Sep 15, 2012

Author: **Nickolay Korabel, Eli Barkai**

Title: **Anomalous Infiltration**

Abstract: Infiltration of anomalously diffusing particles from one material to another through a biased interface is studied using continuous time random walk and Levy walk approaches. Subdiffusion in both systems may lead to a net drift from one material to another (e.g. <x(t)> > 0) even if particles eventually flow in the opposite direction (e.g. number of particles in x>0 approaches zero). A weaker paradox is found for a symmetric interface: a flow of particles is observed while the net drift is zero. For a subdiffusive sample coupled to a superdiffusive system we calculate the average occupation fractions and the scaling of the particles distribution. We find a net drift in this system, which is always directed to the superdiffusive material, while the particles flow to the material with smaller sub or superdiffusion exponent. We report the exponents of the first passage times distribution of Levy walks, which are needed for the calculation of anomalous infiltration *** Journal reference: " J. Stat. Mech. (2011) P05022", ***

Web link: ***www.IntellectualArchive.com/getfile.php?file=Np86pciJaPv&orig_file=Nickolay_Korabel__Anomalous_Infiltration.pdf***

ID #: 838 **Natural Sciences / Physics / Condensed Matter Physics**

Submitted on: Sep 15, 2012

Author: **Song Zhang, Jie Ren, Baowen Li**

Title: **Multi-resonance of energy transport and absence of heat pump in a force-driven lattice**

Abstract: Energy transport control in low dimensional nano-scale systems has attracted much attention in recent years. In this paper, we investigate the energy transport properties of Frenkel-Kontorova lattice subject to a periodic driving force, in particular, the resonance behavior of the energy current by varying the external driving frequency. It is discovered that in certain parameter ranges, multiple resonance peaks, instead of a single resonance, emerge. By comparing the nonlinear lattice model with a harmonic chain, we unravel the underlying physical mechanism for such resonance phenomenon. Other parameter dependencies of the resonance behavior are examined as well. Finally, we demonstrate that heat pumping is actually absent in this force-driven model. *** Journal reference: "Physical Review E 84, 031122 (2011)", http://prd.aps.org/ ***

Web link: ***www.IntellectualArchive.com/getfile.php?file=sN4wDscfFBc&orig_file=Jie_Ren__Multi-resonance.pdf***

ID #: 839 **Natural Sciences / Physics / Condensed Matter Physics**

Submitted on: Sep 15, 2012

Author: **R. E. Walstedt, T. E. Mason, G. Aeppli, S. M. Hayden, H. A. Mook**

Title: **A pseudogap term in the magnetic response of the cuprate superconductors**

Abstract: We combine neutron scattering (INS) and NMR/NQR nuclear spin lattice relaxation rate data to deduce the existence of a new contribution to the magnetic response (dynamic susceptibility) in cuprate superconductors. This contribution, which has yet to be observed with INS, is shown to embody the magnetic pseudogap effects. As such, it explains the long-standing puzzle of pseudogap effects missing from cuprate INS data, dominated by stripe fluctuations, for the dynamic susceptibility at low energies. For La_(1.86)Sr_(0.14)CuO_(4) and YBa_(2)Ba_(3)O_(6.5), the new term is the chief contributor to nuclear spin lattice relaxation at T >> T_(c). *** Journal reference: "Phys. Rev. B84, 024530 (2011)", http://prd.aps.org/ ***

Web link: ***www.IntellectualArchive.com/getfile.php?file=NrLYs7loGJw&orig_file=R_E_Walstedt__A_pseudogap_term.pdf***

ID #: 840 **Natural Sciences / Mathematics / Geometry**

Submitted on: Sep 15, 2012

Author: **Inasa Nakamura**

Title: **Triple linking numbers and triple point numbers of certain T^2-links**

Abstract: The triple linking number of an oriented surface link was defined as an analogical notion of the linking number of a classical link. We consider a certain m-component T^2-link ($m \geq 3$) determined from two commutative pure m-braids a and b. We present the triple linking number of such a T^2-link, by using the linking numbers of the closures of a and b. This gives a lower bound of the triple point number. In some cases, we can determine the triple point numbers, each of which is a multiple of four. *** Journal reference: "Top. Appl. 159 (2012) 1439-1447", ***

Web link: ***www.IntellectualArchive.com/getfile.php?file=siiNgOQ2KPg&orig_file=Inasa_Nakamura__Triple_linking_numbers.pdf***

ID #: 841 **Natural Sciences / Physics / Particle physics**

Submitted on: Sep 15, 2012

Author: **Mariano Cadoni, Salvatore Mignemi**

Title: **Phase transition and hyperscaling violation for scalar Black Branes**

Abstract: We investigate the thermodynamical behavior and the scaling symmetries of the scalar dressed black brane (BB) solutions of a recently proposed, exactly integrable Einstein-scalar gravity model [1], which also arises as compactification of (p-1)-branes with a smeared charge. The extremal, zero temperature, solution is a scalar soliton interpolating between a conformal invariant AdS vacuum in the near-horizon region and a scale covariant metric (generating hyperscaling violation on the boundary field theory) asymptotically. We show explicitly that for the boundary field theory this implies the emergence of an UV length scale (related to the size of the brane), which decouples in the IR, where conformal invariance is restored. We also show that at high temperatures the system undergoes a phase transition. Whereas at small temperature the Schwarzschild-AdS BB is stable, above a critical temperature the scale covariant, scalar-dressed BB solution, becomes energetically preferred.

Web link: ***www.IntellectualArchive.com/getfile.php?file=RCDmFCbgMAN&orig_file=M_Cadoni__Phase_transition.pdf***

ID #: 842 **Natural Sciences / Physics / Particle physics**

Submitted on: Sep 15, 2012

Author: **Mariano Cadoni, Salvatore Mignemi, Matteo Serra**

Title: **Black brane solutions and their solitonic extremal limit in Einstein-scalar gravity**

Abstract: We investigate static, planar, solutions of Einstein-scalar gravity admitting an anti-de Sitter (AdS) vacuum. When the squared mass of the scalar field is positive and the scalar potential can be derived from a superpotential, minimum energy theorems indicate the existence of a scalar soliton. On the other hand, for these models, no-hair theorems forbid the existence of hairy black brane solutions with AdS asymptotics. By considering a specific example (an exact integrable model which has the form of a Toda molecule) and by deriving explicit exact solution, we show that these models allow for hairy black brane solutions with non-AdS domain wall asymptotics, whose extremal limit is a scalar soliton. The soliton smoothly interpolates between a non-AdS domain wall solution at $r=\infty$ and an AdS solution near $r=0$.

Web link: ***www.IntellectualArchive.com/getfile.php?file=HLFSpTJYnJ0&orig_file=M_Cadoni__Black_brane_solutions.pdf***

ID #: 843 **Natural Sciences / Physics / Gravitation Theory (Relativity)**

Submitted on: Sep 15, 2012

Author: **Mariano Cadoni, Salvatore Mignemi, Matteo Serra**

Title: **Exact solutions with AdS asymptotics of Einstein and Einstein-Maxwell gravity minimally coupled to a scalar field**

Abstract: We propose a general method for solving exactly the static field equations of Einstein and Einstein-Maxwell gravity minimally coupled to a scalar field. Our method starts from an ansatz for the scalar field profile, and determines, together with the metric functions, the corresponding form of the scalar self-interaction potential. Using this method we prove a new no-hair theorem about the

existence of hairy black-hole and black-brane solutions and derive broad classes of static solutions with radial symmetry of the theory, which may play an important role in applications of the AdS/CFT correspondence to condensed matter and strongly coupled QFTs. These solutions include: 1) four- or generic $(d+2)$-dimensional solutions with planar, spherical or hyperbolic horizon topology; 2) solutions with AdS, domain wall and Lifshitz asymptotics; 3) solutions interpolating between an AdS spacetime in the asymptotic region and a domain wall or conformal Lifshitz spacetime in the near-horizon region.

Web link: ***www.IntellectualArchive.com/getfile.php?file=MjGe6N5R3XA&orig_file=M_Cadoni__Exact_solutions.pdf***

ID #: 844 **Natural Sciences / Physics / Particle physics**

Submitted on: Sep 15, 2012

Author: **Mariano Cadoni, Paolo Pani**

Title: **Holography of charged dilatonic black branes at finite temperature**

Abstract: We investigate bulk and holographic features of finite-temperature black brane solutions of 4D anti-de Sitter Einstein-Maxwell-dilaton-gravity (EMDG). We construct, numerically, black branes endowed with non trivial scalar hairs for broad classes of EMDG. We consider both exponential and power-law forms for the coupling functions, as well as several charge configurations: purely electric, purely magnetic and dyonic solutions. At finite temperature the field theory holographically dual to these black brane solutions has a rich and interesting phenomenology reminiscent of electron motion in metals: phase transitions triggered by nonvanishing VEV of scalar operators, non-monotonic behavior of the electric conductivities as function of the frequency and of the temperature, Hall effect and sharp synchrotron resonances of the conductivity in presence of a magnetic field. *** Journal reference: "JHEP 1104:049,2011", ***

Web link: ***www.IntellectualArchive.com/getfile.php?file=3bsxlgBpF6f&orig_file=M_Cadoni__Holography.pdf***

ID #: 845 **Natural Sciences / Computer Sciences / Artificial intelligence**

Submitted on: Sep 15, 2012

Author: **L.A. Belanche, F.F. González**

Title: **Review and Evaluation of Feature Selection Algorithms in Synthetic Problems**

Abstract: The main purpose of Feature Subset Selection is to find a reduced subset of attributes from a data set described by a feature set. The task of a feature selection algorithm (FSA) is to provide with a computational solution motivated by a certain definition of relevance or by a reliable evaluation measure. In this paper several fundamental algorithms are studied to assess their performance in a controlled experimental scenario. A measure to evaluate FSAs is devised that computes the degree of matching between the output given by a FSA and the known optimal solutions. An extensive experimental study on synthetic problems is carried out to assess the behaviour of the algorithms in terms of solution accuracy and size as a function of the relevance, irrelevance, redundancy and size of the data samples. The controlled experimental conditions facilitate the derivation of better-supported and meaningful conclusions.

Web link: ***www.IntellectualArchive.com/getfile.php?file=1vBqQo6hGVh&orig_file=L_A_Belanche__Review_and_Evaluation.pdf***

ID #: 847 **Natural Sciences / Physics / General Physics**

Submitted on: Sep 16, 2012

Author: **Edward Kapuscik, Tomasz Lanczewski**

Title: **On the Velocity Tensors**

Abstract: A new object, called the velocity tensor, is introduced. It allows to formulate a generally covariant mechanics. Some properties of the velocity tensor are derived. *** Journal reference: "Physics of Atomic Nuclei, vol. 72, no. 5, 2009, 809-812", ***

Web link: ***www.IntellectualArchive.com/getfile.php?file=XDsetxbYxVK&orig_file=Edward_Kapuscik__On_the_Velocity_Tensors.pdf***

ID #: 848 **Natural Sciences / Physics / Gravitation Theory (Relativity)**

Submitted on: Sep 16, 2012

Author: **Mustapha Azreg-Ainou, Gerard Clement, Julio C. Fabris, Manuel E. Rodrigues**

Title: **Phantom Black Holes and Sigma Models**

Abstract: We construct static multicenter solutions of phantom Einstein-Maxwell-dilaton theory from null geodesics of the target space, leading to regular black holes without spatial symmetry for certain discrete values of the dilaton coupling constant. We also discuss the three-dimensional gravitating sigma models obtained by reduction of phantom Einstein-Maxwell, phantom Kaluza-Klein and phantom Einstein-Maxwell-dilaton-axion theories. In each case, we generate by group transformations phantom charged black hole solutions from a neutral seed.

Web link: ***www.IntellectualArchive.com/getfile.php?file=39rNPjhATQA&orig_file=M_Azreg-Ainou__Phantom_Black_Holes.pdf***

ID #: 849 **Natural Sciences** / **Physics** / **Gravitation Theory (Relativity)**

Submitted on: Sep 16, 2012

Author: **Mustapha Azreg-Ainou, Gerard Clement, Dmitri V. Galtsov**

Title: **All extremal instantons in Einstein-Maxwell-dilaton-axion theory**

Abstract: We construct explicitly all extremal instanton solutions to $\cN=4,\, D=4$ supergravity truncated to one vector field (Einstein-Maxwell-dilaton-axion (EMDA) theory). These correspond to null geodesics of the target space of the sigma-model $G/H=Sp(4,\mathbb{R})/GL(2,\R)$ obtained by compactification of four-dimensional Euclidean EMDA on a circle. They satisfy a no-force condition in terms of the asymptotic charges and part of them (corresponding to nilpotent orbits of the $Sp(4,\mathbb{R})$ U-duality) are presumably supersymmetric. The space of finite action solutions is found to be unexpectedly large and includes, besides the Euclidean versions of known Lorentzian solutions, a number of new asymptotically locally flat (ALF) instantons endowed with electric, magnetic, dilaton and axion charges. We also describe new classes of charged asymptotically locally Euclidean (ALE) instantons as well as some exceptional solutions.

Web link: ***www.IntellectualArchive.com/getfile.php?file=eS21EOWOwvR&orig_file=M_Azreg-Ainou__All_extremal_instantons.pdf***

ID #: 850 **Natural Sciences** / **Physics** / **Quantum field theory**

Submitted on: Sep 16, 2012

Author: **Qian-Heng Duan, Ping-Xing Chen, Wei Wu**

Title: **Adiabatic Conditions and the Uncertainty Relation**

Abstract: The condition for adiabatic approximation are of basic importance for the applications of the adiabatic theorem. The traditional quantitative condition was found to be necessary but not sufficient, but we do not know its physical meaning and the reason why it is necessary from the physical point of view. In this work, we relate the adiabatic theorem to the uncertainty relation, and present a clear physical picture of the traditional quantitative condition. It is shown that the quantitative condition is just the amplitude of the probability of transition between two levels in the time interval which is of the order of the time uncertainty of the system. We also present a new sufficient condition with clear physical picture.

Web link: ***www.IntellectualArchive.com/getfile.php?file=NEUPNt2egQ9&orig_file=Ping-Xing_Chen__Adiabatic_Conditions.pdf***

ID #: 851 **Natural Sciences** / **Physics** / **Condensed Matter Physics**

Submitted on: Sep 16, 2012

Author: **Kikuo Harigaya, Hiroshi Imamura, Katsunori Wakabayashi, Osman Ozsoy**

Title: **Edge States and Stacking Effects in Nanographene Systems**

Abstract: Bilayer graphene nanoribbon with zigzag edge is investigated with the tight binding model. Two stacking structures, alpha and beta, are considered. The band splitting is seen in the alpha structure, while the splitting in the wave number direction is found in the beta structure. The local density of states in the beta structure tend to avoid sites where inter-layer hopping interactions are present.

Web link: ***www.IntellectualArchive.com/getfile.php?file=L2e3QMNl2Jf&orig_file=Kikuo_Harigaya__Edge_States.pdf***

ID #: 852 **Natural Sciences** / **Physics** / **Condensed Matter Physics**

Submitted on: Sep 16, 2012

Author: **Tomoaki Kaneko, Kikuo Harigaya, Hiroshi Imamura**

Title: **Appearance of Flat Bands and Edge States in Boron-Carbon-Nitride Nanoribbons**

Abstract: Presence of flat bands and edge states at the Fermi level in graphene nanoribbons with zigzag edges is one of the most interesting and attracting properties of nanocarbon materials but it is believed that they are quite fragile states and disappear when B and N atoms are doped at around the edges. In this paper, we theoretically investigate electronic and magnetic properties of boron-carbon-nitride (BCN) nanoribbons with zigzag edges where the outermost C atoms on the edges are alternately replaced with B and N atoms using the first principles calculations. We show that BCN nanoribbons have the flat bands and edge states at the Fermi level in both H_2 rich and poor environments. The flat bands are similar to those at graphene nanoribbons with zigzag edges, but the distributions of charge and spin densities are different between them. A tight binding model and the Hubbard model analysis show that the difference in the distribution of charge and spin densities is caused by the different site energies of B and N atoms compared with C atoms.

Web link: ***www.IntellectualArchive.com/getfile.php?file=pjd0CfIGxgW&orig_file=Kikuo_Harigaya__Appearance_of_Flat_Bands.pdf***

ID #: 853 **Natural Sciences / Physics / Condensed Matter Physics**

Submitted on: Sep 16, 2012

Author: **Satoshi Kokado, Masakiyo Tsunoda, Kikuo Harigaya, Akimasa Sakuma**

Title: **Anisotropic Magnetoresistance Effects in Fe, Co, Ni, Fe_4N, and Half-Metallic Ferromagnet: A Systematic Analysis**

Abstract: We theoretically analyze the anisotropic magnetoresistance (AMR) effects of bcc Fe (+), fcc Co (+), fcc Ni (+), Fe$_4$N (-), and a half-metallic ferromagnet (-). The sign in each ( ) represents the sign of the AMR ratio observed experimentally. We here use the two-current model for a system consisting of a spin-polarized conduction state and localized d states with spin--orbit interaction. From the model, we first derive a general expression of the AMR ratio. The expression consists of a resistivity of the conduction state of the σ spin ($\sigma=\uparrow$ or $\downarrow$), $\rho_{s \sigma}$, and resistivities due to s--d scattering processes from the conduction state to the localized d states. On the basis of this expression, we next find a relation between the sign of the AMR ratio and the s--d scattering process. In addition, we obtain expressions of the AMR ratios appropriate to the respective materials.

Web link: ***www.IntellectualArchive.com/getfile.php?file=fX8AkrgYhJi&orig_file=Kikuo_Harigaya__Anisotropic_Magnetoresistance.pdf***

ID #: 857 **Natural Sciences / Computer Sciences / Computer architecture**

Submitted on: Sep 17, 2012

Author: **Wenbo He, Xue Liu, Mai Ren**

Title: **Location Cheating: A Security Challenge to Location-based Social Network Services**

Abstract: Location-based mobile social network services such as foursquare and Gowalla have grown exponentially over the past several years. These location-based services utilize the geographical position to enrich user experiences in a variety of contexts, including location-based searching and location-based mobile advertising. To attract more users, the location-based mobile social network services provide real-world rewards to the user, when a user checks in at a certain venue or location. This gives incentives for users to cheat on their locations. In this report, we investigate the threat of location cheating attacks, find the root cause of the vulnerability, and outline the possible defending mechanisms. We use foursquare as an example to introduce a novel location cheating attack, which can easily pass the current location verification mechanism (e.g., cheater code of foursquare). We also crawl the foursquare website. By analyzing the crawled data, we show that automated large scale cheating is possible.

Web link: ***www.IntellectualArchive.com/getfile.php?file=NCxOvpNxrMq&orig_file=Wenbo_He__Location_Cheating.pdf***

ID #: 858 **Natural Sciences / Astronomy / Cosmology**

Submitted on: Sep 17, 2012

Author: **U. D. Machado, R. Opher**

Title: **Generalized Non-Commutative Inflation**

Abstract: Non-commutative geometry indicates a deformation of the energy-momentum dispersion relation

$f(E)\equiv\frac{E}{pc}(\neq 1)$ for massless particles. This distorted energy-momentum relation can affect the radiation dominated phase of the universe at sufficiently high temperature. This prompted the idea of non-commutative inflation by Alexander, Brandenberger and Magueijo (2003, 2005 and 2007). These authors studied a one-parameter family of non-relativistic dispersion relation that leads to inflation: the α family of curves $f(E)=1+(\lambda E)^{\alpha}$. We show here how the conceptually different structure of symmetries of non-commutative spaces can lead, in a mathematically consistent way, to the fundamental equations of non-commutative inflation driven by radiation. *** Journal reference: Class. Quantum Grav. 29 (2012) 065003 ***

Web link: ***www.IntellectualArchive.com/getfile.php?file=e55f9KdZpEU&orig_file=U_D_Machado__Generalized_Non-Commutative_Inflation.pdf***

ID #: 859 **Natural Sciences / Physics / Optics**

Submitted on: Sep 17, 2012

Author: **Ming Jie Zheng, Yun San Chan, Kin Wah Yu**

Title: **Photonic Bloch-dipole-Zener Oscillations in Binary Parabolic Optical Waveguide Arrays**

Abstract: We have studied the propagation and Zener tunneling of light in the binary parabolic optical waveguide array (BPOWA), which consists of two evanescently coupled dissimilar optical waveguides. Due to Bragg reflections, BPOWA attains two minibands separated by a minigap at the zone boundary. Various coherent superpositions of optical oscillations and Zener tunneling occur for different parameters on the phase diagram. In particular, Bloch-Zener oscillation and a different type of Bloch-dipole-Zener oscillation are obtained by the field-evolution analysis. The results may have potential applications in optical splitting and waveguiding devices and shed light on the coherent phenomena in optical lattices. *** Journal reference: J. Opt. Soc. Am. B 28, 1339 (2011) ***

Web link: ***www.IntellectualArchive.com/getfile.php?file=5dLEVoZTFOn&orig_file=Ming_Jie_Zheng__Photonic_Oscillations.pdf***

ID #: 860 **Natural Sciences / Physics / Fluid Dynamics**

Submitted on: Sep 17, 2012

Author: **C. Gruber, S. D. Brechet**

Title: **Lagrange equations coupled to a thermal equation: mechanics as consequence of thermodynamics**

Abstract: Following the analytic approach to thermodynamics developed by Stueckelberg, we study the evolution equations of a closed thermodynamic system consisting of point particles in a fluid. We obtain a system of coupled differential equations describing the mechanical and the thermal evolution of the system. The coupling between these evolution equations is due to the action of a viscous friction term. Finally, we apply our coupled evolution equations to study the thermodynamics of an isolated system consisting of identical point particles interacting through a harmonic potential. *** Journal reference: Entropy 2011, 13(2), 367-378 ***

Web link: ***www.IntellectualArchive.com/getfile.php?file=Lfhx3JEKiqo&orig_file=C_Gruber__Lagrange_equations.pdf***

ID #: 861 **Natural Sciences / Physics / Fluid Dynamics**

Submitted on: Sep 17, 2012

Author: **Paul Manneville**

Title: **Spatiotemporal perspective on the decay of turbulence in wall-bounded flows**

Abstract: Using a reduced model focusing on the in-plane dependence of plane Couette flow, it is shown that the turbulent-to-laminar relaxation process can be understood as a nucleation problem similar to that occurring at a thermodynamic first-order phase transition. The approach, apt to deal with the large extension of the system considered, challenges the current interpretation in terms of chaotic transients typical of temporal chaos. The study of the distribution of the sizes of laminar domains embedded in turbulent flow proves that an abrupt transition from sustained spatiotemporal chaos to laminar flow can take place at some given value of the Reynolds number R_{low}, whether or not the local chaos lifetime, as envisioned within low-dimensional dynamical systems theory, diverges at finite R beyond R_{low}. *** Journal reference: Phys. Rev. E 79 (2009) 025301 [R]; Phys. Rev. E 79 039904 [E] ***

Web link: ***www.IntellectualArchive.com/getfile.php?file=9Vv8q9luKgg&orig_file=Paul_Manneville__Spatiotemporal_perspective.pdf***

ID #: 862 **Natural Sciences / Physics / Fluid Dynamics**

Submitted on: Sep 17, 2012

Author: **Paul Manneville**

Title: **Turbulent patterns in wall-bounded flows: a Turing instability?**

Abstract: In their way to/from turbulence, plane wall-bounded flows display an interesting transitional regime where laminar and turbulent oblique bands alternate, the origin of which is still mysterious. In line with Barkley`s recent work about the pipe flow transition involving reaction-diffusion concepts, we consider plane Couette flow in the same perspective and transform Waleffe`s classical four-variable model of self-sustaining process into a reaction-diffusion model. We show that, upon fulfillment of a condition on the relative diffusivities of its variables, the featureless turbulent regime becomes unstable against patterning as the result of a Turing instability. A reduced two-variable model helps us to delineate the appropriate region of parameter space. An intrinsic status is therefore given to the pattern`s wavelength for the first time. Virtues and limitations of the model are discussed, calling for a microscopic support of the phenomenological approach.

Web link: ***www.IntellectualArchive.com/getfile.php?file=BILAGHjmiXc&orig_file=Paul_Manneville__Turbulent_patterns.pdf***

ID #: 863 **Natural Sciences / Physics / Fluid Dynamics**

Submitted on: Sep 17, 2012

Author: **Paul Manneville**

Title: **On the growth of laminar-turbulent patterns in plane Couette flow**

Abstract: The growth of laminar-turbulent band patterns in plane Couette flow is studied in the vicinity of the global stability threshold R_g below which laminar flow ultimately prevails. Appropriately tailored direct numerical simulations are performed to manage systems extended enough to accommodate several bands. The initial state or germ is an oblique turbulent patch of limited extent. The growth is seen to result from several competing processes: (i) nucleation of turbulent patches close to or at the extremities of already formed band segments, with the same obliquity as the germ or the opposite one, and (ii) turbulence collapse similar to gap formation for band decay. Growth into a labyrinthine pattern is observed as soon as spanwise expansion is effective. An ideally aligned pattern is usually obtained at the end of a long and gradual regularisation stage when R is large enough. Stable isolated bands can be observed slightly above R_g.

Web link: ***www.IntellectualArchive.com/getfile.php?file=c99D3Mkjvje&orig_file=Paul_Manneville__On_the_growth.pdf***

ID #: 864 **Natural Sciences / Physics / Fluid Dynamics**

Submitted on: Sep 17, 2012

Author: **Paul Manneville**

Title: **On the decay of turbulence in plane Couette flow**

Abstract: The decay of turbulent and laminar oblique bands in the lower transitional range of plane Couette flow is studied by means of direct numerical simulations of the Navier--Stokes equations. We consider systems that are extended enough for several bands to exist, thanks to mild wall-normal under-resolution considered as a consistent and well-validated modelling strategy. We point out a two-stage process involving the rupture of a band followed by a slow regression of the fragments left. Previous approaches to turbulence decay in wall-bounded flows making use of the chaotic transient paradigm are reinterpreted within a spatiotemporal perspective in terms of large deviations of an underlying stochastic process. *** Journal reference: ETC13 Conference Proceedings ***

Web link: ***www.IntellectualArchive.com/getfile.php?file=qsF2SBnDked&orig_file=Paul_Manneville__On_the_decay.pdf***

ID #: 865 **Natural Sciences / Physics / General Physics**

Submitted on: Sep 17, 2012

Author: **Maxi San Miguel, Jeffrey H. Johnson, Janos Kertesz, Kimmo Kaski, Albert DÃ-az-Guilera, Robert S. MacKay, Vittorio Loreto, Peter Erdi, Dirk Helbing**

Title: **Challenges in Complex Systems Science**

Abstract: FuturICT foundations are social science, complex systems science, and ICT. The main concerns and challenges in the science of complex systems in the context of FuturICT are laid out in this paper

with special emphasis on the Complex Systems route to Social Sciences. This include complex systems having: many heterogeneous interacting parts; multiple scales; complicated transition laws; unexpected or unpredicted emergence; sensitive dependence on initial conditions; path-dependent dynamics; networked hierarchical connectivities; interaction of autonomous agents; self-organisation; non-equilibrium dynamics; combinatorial explosion; adaptivity to changing environments; co-evolving subsystems; ill-defined boundaries; and multilevel dynamics. In this context, science is seen as the process of abstracting the dynamics of systems from data.

Web link: ***www.IntellectualArchive.com/getfile.php?file=haJW9iPJluj&orig_file=Vittorio_Loreto__Challenges.pdf***

ID #: 866 **Natural Sciences / Physics / General Physics**

Submitted on: Sep 17, 2012

Author: **Simone Pompei, Vittorio Loreto, Francesca Tria**

Title: **On the accuracy of language trees**

Abstract: Historical linguistics aims at inferring the most likely language phylogenetic tree starting from information concerning the evolutionary relatedness of languages. The available information are typically lists of homologous (lexical, phonological, syntactic) features or characters for many different languages. From this perspective the reconstruction of language trees is an example of inverse problems: starting from present, incomplete and often noisy, information, one aims at inferring the most likely past evolutionary history. A fundamental issue in inverse problems is the evaluation of the inference made. A standard way of dealing with this question is to generate data with artificial models in order to have full access to the evolutionary process one is going to infer. This procedure presents an intrinsic limitation: when dealing with real data sets, one typically does not know which model of evolution is the most suitable for them. A possible way out is to compare algorithmic inference with expert classifications.

Web link: ***www.IntellectualArchive.com/getfile.php?file=DgMBfqak2MV&orig_file=Vittorio_Loreto__On_the_accuracy.pdf***

ID #: 867 **Natural Sciences / Physics / Mathematical Physics**

Submitted on: Sep 17, 2012

Author: **Francesca Tria, Animesh Mukherjee, Andrea Baronchelli, Andrea Puglisi, Vittorio Loreto**

Title: **A fast no-rejection algorithm for the Category Game**

Abstract: The Category Game is a multi-agent model that accounts for the emergence of shared categorization patterns in a population of interacting individuals. In the framework of the model, linguistic categories appear as long lived consensus states that are constantly reshaped and re-negotiated by the communicating individuals. It is therefore crucial to investigate the long time behavior to gain a clear understanding of the dynamics. However, it turns out that the evolution of the emerging category system is so slow, already for small populations, that such an analysis has remained so far impossible. Here, we introduce a fast no-rejection algorithm for the Category Game that disentangles the physical simulation time from the CPU time, thus opening the way for thorough analysis of the model. We verify that the new algorithm is equivalent to the old one in terms of the emerging phenomenology and we quantify the CPU performances of the two algorithms, pointing out the neat advantages offered by the no-rejection one.

Web link: ***www.IntellectualArchive.com/getfile.php?file=T3f7lgFTuK6&orig_file=Vittorio_Loreto__A_fast_no-rejection_algorithm.pdf***

ID #: 868 **Natural Sciences / Physics / General Physics**

Submitted on: Sep 17, 2012

Author: **Xiaolei Zhang**

Title: **The Emergence of Consciousness in the Quantum Universe**

Abstract: It is argued that human consciousness is likely to have emerged during the self-consistent evolution of the physical universe, through the gradual accumulation of biological entities` ability to tap into the intrinsic non-deterministic potentiality in the global nonequilibrium phase transitions occurring continually in the quantum universe. Due to the fact that the matter and energy content participating in these global phase transitions is a continuum, there are in effect infinite degrees-of-freedom in the substratum, which invalidate the usual deterministic laws of the mechanical evolution, and allow chance factors to appear in the emergent properties of resonantly-formed quantum particles, especially in the acquired phases of their wavefunctions. Such chance factors, though occurring

mostly randomly during the early cosmic evolution phase, can be harnessed more "purposefully" by the biological entities co-evolving with the physical universe, due in part to the globally-entangled nature of quantum interactions.

Web link: ***www.IntellectualArchive.com/getfile.php?file=TUBh7OltGJ1&orig_file=Xiaolei_Zhang__The_Emergence_of_Consciousness.pdf***

ID #: 869 **Natural Sciences / Physics / Quantum field theory**

Submitted on: Sep 17, 2012

Author: **Xiaolei Zhang**

Title: **On the Nature of Quantum Phenomena**

Abstract: It is shown that a coherent understanding of all quantized phenomena, including those governed by unitary evolution equations as well as those related to irreversible quantum measurements, can be achieved in a scenario of successive nonequilibrium phase transitions, with the lowest hierarchy of these phase transitions occurring in a "resonant cavity" formed by the entire matter and energy content of the universe. In this formalism, the physical laws themselves are resonantly-selected and ordered in the universe cavity in a hierarchical manner, and the values of fundamental constants are determined through a Generalized Mach`s Principle. The existence of a preferred reference frame in this scenario is shown to be consistent with the relational nature of the origin of physical laws. Covariant unitary evolution is shown to connect smoothly with the reduction of wavefunction in the preferred frame during quantum measurement.

Web link: ***www.IntellectualArchive.com/getfile.php?file=jfvnnKWLBv4&orig_file=Xiaolei_Zhang__On_the_Nature.pdf***

ID #: 872 **Natural Sciences / Mathematics / Geometry**

Submitted on: Sep 18, 2012

Author: **Louis H. Kauffman, Sofia Lambropoulou**

Title: **A Categorical Model for the Virtual Braid Group**

Abstract: This paper gives a new interpretation of the virtual braid group in terms of a strict monoidal category SC that is freely generated by one object and three morphisms, two of the morphisms corresponding to basic pure virtual braids and one morphism corresponding to a transposition in the symmetric group. The key to this approach is to take pure virtual braids as primary. The generators of the pure virtual braid group are abstract solutions to the algebraic Yang-Baxter equation. This point of view illuminates representations of the virtual braid groups and pure virtual braid groups via solutions to the algebraic Yang-Baxter equation. In this categorical framework, the virtual braid group is a natural group associated with the structure of algebraic braiding. We then point out how the category SC is related to categories associated with quantum algebras and Hopf algebras and with quantum invariants of virtual links.

Web link: ***www.IntellectualArchive.com/getfile.php?file=jOoLo9x8BDl&orig_file=L_Kauffman__A_Categorical_Model.pdf***

ID #: 873 **Natural Sciences / Mathematics / Geometry**

Submitted on: Sep 18, 2012

Author: **Slavik Jablan, Louis H. Kauffman, Pedro Lopes**

Title: **Equivalence Classes of Colorings: the Topological Viewpoint**

Abstract: We introduce the notion of equivalence classes of Fox colorings from the topological point of view. We develop the preliminaries that allow the correct formulation of these equivalence classes and enumerate them in a number of instances.

Web link: ***www.IntellectualArchive.com/getfile.php?file=eO8XEIWPiXo&orig_file=L_Kauffman__Equivalence_Classes.pdf***

ID #: 874 **Natural Sciences / Mathematics / Geometry**

Submitted on: Sep 18, 2012

Author: **Slavik Jablan, Louis H. Kauffman, Pedro Lopes**

Title: **On the Maximum Number of Colors for Links**

Abstract: For each odd prime p, and for each non-split link admitting non-trivial p-colorings, we prove that the

maximum number of Fox colors is p. We also prove that we can assemble a non-trivial p-coloring with any number of colors, from the minimum to the maximum number of colors. Furthermore, for any rational link, we prove that there exists a non-trivial coloring of a 2-bridge diagram of it, modulo its determinant, which uses all colors available. If this determinant is an odd prime, then any non-trivial coloring of the 2-bridge diagram, modulo the determinant, uses all available colors. Facts about torus links and their colorability are also proved.

Web link: ***www.IntellectualArchive.com/getfile.php?file=9pclfETvp4K&orig_file=L_Kauffman__On_the_Maximum_Number.pdf***

ID #: 875 **Natural Sciences** / **Mathematics** / **Geometry**

Submitted on: Sep 18, 2012

Author: **Louis Kauffman, Pedro Lopes**

Title: **The Teneva Game**

Abstract: For each prime p > 7 we obtain the expression for an upper bound on the minimum number of colors needed to non-trivially color T(2, p), the torus knots of type (2, p), modulo p. This expression is t + 2 l -1 where t and l are extracted from the prime p. It is obtained from iterating the so-called Teneva transformations which we introduced in a previous article. With the aid of our estimate we show that the ratio "number of colors needed vs. number of colors available" tends to decrease with increasing modulus p. For instance as of prime 331, the number of colors needed is already one tenth of the number of colors available. Furthermore, we prove that 5 is minimum number of colors needed to non-trivially color T(2, 11) modulo 11. Finally, as a preview of our future work, we prove that 5 is the minimum number of colors modulo 11 for two rational knots with determinant 11.

Web link: ***www.IntellectualArchive.com/getfile.php?file=RENh07SJoPm&orig_file=L_Kauffman__The_Teneva_Game.pdf***

ID #: 876 **Natural Sciences** / **Mathematics** / **Geometry**

Submitted on: Sep 18, 2012

Author: **Louis H. Kauffman**

Title: **Following Knots Down Their Energy Gradients**

Abstract: This paper details a series of experiments in searching for minimal energy configurations for knots and links using the computer program KnotPlot. The most interesting phenomena found in these experiments is the dependence of the trajectories of energy descent upon the initial geometric conditions of the knotted embedding.

Web link: ***www.IntellectualArchive.com/getfile.php?file=wKDelKljbGG&orig_file=L_Kauffman__Following_Knots.pdf***

ID #: 877 **Natural Sciences** / **Mathematics** / **Algebra**

Submitted on: Sep 18, 2012

Author: **Louis H. Kauffman, Rama Mishra**

Title: **Nodal Parity Invariants of Knotted Rigid Vertex Graphs**

Abstract: This paper introduces new invariants of rigid vertex graph embeddings by using non-local combinatorial information that is available at each graphical node. The new non-local information that we use in this paper involves parity in the Gauss code of the underlying graph. We apply these methods to graphs in classical and virtual knot theory, and we give formulations for applications to the topology of protein folding.

Web link: ***www.IntellectualArchive.com/getfile.php?file=BbfrL5fRfuf&orig_file=L_Kauffman__Nodal_Parity_Invariants.pdf***

ID #: 878 **Natural Sciences** / **Mathematics** / **Geometry**

Submitted on: Sep 18, 2012

Author: **Aaron Kaestner, Louis H. Kauffman**

Title: **Parity, Skein Polynomials and Categorification**

Abstract: We investigate an application of crossing parity for the bracket expansion of the Jones polynomial for virtual knots. In addition we consider an application of parity for the arrow polynomial as well as for the categorifications of both polynomials. We present a number of examples found through our calculations. We provide tables of calculations for these invariants on virtual knots with at most 4 real

crossings.

Web link: ***www.IntellectualArchive.com/getfile.php?file=TwOOEMsRGKp&orig_file=L_Kauffman__Parity_Skein_Polynomials.pdf***

ID #: 879 **Natural Sciences / Physics / Mathematical Physics**

Submitted on: Sep 18, 2012

Author: **Louis H. Kauffman**

Title: **Eigenforms and Quantum Physics**

Abstract: This essay is a discussion of Heinz von Foerster`s concept of eigenform and its relationship with the foundations of physics.

Web link: ***www.IntellectualArchive.com/getfile.php?file=B7gfiO5QJuj&orig_file=L_Kauffman__Eigenforms.pdf***

ID #: 880 **Natural Sciences / Physics / Mathematical Physics**

Submitted on: Sep 18, 2012

Author: **Louis H. Kauffman**

Title: **Non-Commutative Worlds and Classical Constraints**

Abstract: This paper shows how discrete measurement leads to commutators and how discrete derivatives are naturally represented by commutators in a non-commutative extension of the calculus in which they originally occurred. We show how the square root of minus one (i) arises naturally as a time-sensitive observable for an elementary oscillator. In this sense the square root of minus one is a clock and/or a clock/observer. This sheds new light on Wick rotation, which replaces t (temporal quantity) by it. In this view, the Wick rotation replaces numerical time with elementary temporal observation. The relationship of this remark with the Heisenberg commutator [P,Q]=ihbar is explained in the Introduction. After a review of previous work, the paper begins with a section of iterants - a generalization of the complex numbers as described above. This generalization includes all of matrix algebra in a temporal interpretation. We then give a generalization of the Feynman-Dyson derivation of electromagnetism in the context of non-commutative worlds.

Web link: ***www.IntellectualArchive.com/getfile.php?file=Cl5NNjLSPis&orig_file=L_Kauffman__Non-Commutative_Worlds.pdf***

ID #: 881 **Natural Sciences / Mathematics / Geometry**

Submitted on: Sep 18, 2012

Author: **Louis H. Kauffman**

Title: **Khovanov Homology**

Abstract: This paper is an introduction to Khovanov homology.

Web link: ***www.IntellectualArchive.com/getfile.php?file=woYLIgG2q7l&orig_file=L_Kauffman__Khovanov_Homology.pdf***

ID #: 884 **Natural Sciences / Mathematics / Algebra**

Submitted on: Sep 18, 2012

Author: **Chiara Marcolla, Emmanuela Orsini, Massimiliano Sala**

Title: **Improved decoding of affine-variety codes**

Abstract: General error locator polynomials are polynomials able to decode any correctable syndrome for a given linear code. Such polynomials are known to exist for all cyclic codes and for a large class of linear codes. We provide some decoding techniques for affine-variety codes using some multidimensional extensions of general error locator polynomials. We prove the existence of such polynomials for any correctable affine-variety code and hence for any linear code. We propose two main different approaches, that depend on the underlying geometry. We compute some interesting cases, including Hermitian codes. To prove our coding theory results, we develop a theory for special classes of zero-dimensional ideals, that can be considered generalizations of stratified ideals. Our improvement with respect to stratified ideals is twofold: we generalize from one variable to many

variables and we introduce points with multiplicities.

Web link: ***www.IntellectualArchive.com/getfile.php?file=rARJ4sOphIt&orig_file=Chiara_Marcolla__Improved_decoding.pdf***

ID #: 885 **Natural Sciences / Physics / Condensed Matter Physics**

Submitted on: Sep 18, 2012

Author: **Dima Bolmatov, Kostya Trachenko**

Title: **Liquid heat capacity in the approach from the solid state: anharmonic theory**

Abstract: Calculating liquid energy and heat capacity in general form is an open problem in condensed matter physics. We develop a recent approach to liquids from the solid state by accounting for the contribution of anharmonicity and thermal expansion to liquid energy and heat capacity. We subsequently compare theoretical predictions to the experiments results of 5 commonly discussed liquids, and find a good agreement with no free fitting parameters. We discuss and compare the proposed theory to previous approaches. *** Journal reference: Physical Review B 84, 054106 (2011), http://prb.aps.org/abstract/PRB/v84/i5/e054106 ***

Web link: ***www.IntellectualArchive.com/getfile.php?file=J8KMgf9JaNr&orig_file=Dima_Bolmatov__Liquid_heat_capacity.pdf***

ID #: 886 **Natural Sciences / Physics / Condensed Matter Physics**

Submitted on: Sep 18, 2012

Author: **Eric R Bittner, Svitlana Zaster, Carlos Silva**

Title: **Dynamics of a Polariton Condensate in an Organic Semiconducting Microcavity**

Abstract: Recent experiments on thin-film microcavities give evidence of Bose condensation of exciton-polariton states. Inspired by these observations, we consider the possibility that such exotic "half-light/half matter" states could be observed in thin-film organic semiconductors where the oscillator strength is generally stronger than in inorganic systems. Here we present a theoretical model and simulations of macroscopic exciton-polartiton condensates in thracene thin films sandwiched within a micro-meter scale resonant cavity and establish criteria for the conditions under which BEC could be achieved in these systems. We consider the effect of lattice disorder on the threshold intensities necessary to create polartion superfluid states and conclude that even allowing for up to 5% angular disorder of the molecules within the crystal lattice, the superfluid transition remains sharp.

Web link: ***www.IntellectualArchive.com/getfile.php?file=NPNcZeLbL8m&orig_file=Eric_Bittner__Dynamics_of_a_Condensate.pdf***

ID #: 887 **Natural Sciences / Physics / Condensed Matter Physics**

Submitted on: Sep 18, 2012

Author: **Jie Ren, Sha Liu, Baowen Li**

Title: **Geometric Heat Flux of Classical Thermal Transport in Interacting Open Systems**

Abstract: We study classical heat conduction in a dissipative open system composed of interacting oscillators. By exactly solving a twisted Fokker-Planck equation which describes the full counting statistics of heat flux flowing through the system, we identify the geometric-phase-like effect and examine its impact on the classical heat transport. Particularly, we find that the nonlinear interaction as well as the closely related temperature-dependence of system-parameters are crucial in manifesting the geometric-phase contribution of heat flux. Finally, we propose an electronic experiment based on RC circuits to verify our theoretical predictions. *** Journal reference: Phys. Rev. Lett. 108, 210603 (2012) ***

Web link: ***www.IntellectualArchive.com/getfile.php?file=kNPN40DSgLK&orig_file=Jie_Ren__Geometric_Heat_Flux.pdf***

ID #: 888 **Natural Sciences / Physics / Gravitation Theory (Relativity)**

Submitted on: Sep 18, 2012

Author: **Morgan Le Delliou, Filipe C. Mena, Jose Pedro Mimoso**

Title: **The role of shell crossing on the existence and stability of trapped matter shells in spherical inhomogeneous /\-CDM models**

Abstract: We analyse the dynamics of trapped matter shells in spherically symmetric inhomogeneous

\Lambda-CDM models. The investigation uses a Generalised Lema\^itre-Tolman-Bondi description with initial conditions subject to the constraints of having spatially asymptotic cosmological expansion, initial Hubble-type flow and a regular initial density distribution. We discuss the effects of shell crossing and use a qualitative description of the local trapped matter shells to explore global properties of the models. Once shell crossing occurs, we find a splitting of the global shells separating expansion from collapse into, at most, two global shells: an inner and an outer limit trapped matter shell. In the case of expanding models, the outer limit trapped matter shell necessarily exists. We also study the role of shear in this process, compare our analysis with the Newtonian framework and give concrete examples using density profile models of structure formation in cosmology. *** Phys.Rev.D83:103528,2011 http://prd.aps.org/abstract/PRD/v83/i10/e103528 ***

Web link: ***www.IntellectualArchive.com/getfile.php?file=mNad2JHOeLw&orig_file=Morgan_Le_Delliou__The_role_of_shell_crossing.pdf***

ID #: 891 **Natural Sciences / Mathematics / Geometry**

Submitted on: Sep 19, 2012

Author: **Inasa Nakamura**

Title: **Surface links with free abelian link groups**

Abstract: It is known that if a classical link group is a free abelian group, then its rank is at most two, and a μ-component 2-link group for $\mu>1$ is not a free abelian group. In this paper we give examples of surface links whose link groups are free abelian groups of rank three or four. Moreover we show that the examples of rank three are infinitely many and one of them has the triple point number four.

Web link: ***www.IntellectualArchive.com/getfile.php?file=9bjMJfqLBwe&orig_file=Inasa_Nakamura__Surface_links.pdf***

ID #: 892 **Natural Sciences / Physics / Condensed Matter Physics**

Submitted on: Sep 19, 2012

Author: **Tomasz Dietl, Dariusz Sztenkiel**

Title: **Reconciling results of tunnelling experiments on (Ga,Mn)As**

Abstract: A theoretical model is presented which allows to reconcile findings of scanning tunnelling spectroscopy for (Ga,Mn)As [Richardella et al. Science 327, 66 (2010)] with results for tunneling across (Ga,Mn)As thin layers [Ohya et al. Nature Phys. 7, 342 (2011); Phys. Rev. Lett. 104, 167204 (2010)]. According to the proposed model, supported by a self-consistent solution of the Poisson and Schroedinger equations, a nonmonotonic behaviour of differential tunnel conductance as a function of bias is associated with the appearance of two-dimensional hole subbands rather in the GaAs:Be electrode than in the (Ga,Mn)As layer.

Web link: ***www.IntellectualArchive.com/getfile.php?file=kKhvXcVN5gN&orig_file=Tomasz_Dietl__Reconciling_results.pdf***

ID #: 893 **Natural Sciences / Physics / Nuclear physics**

Submitted on: Sep 19, 2012

Author: **Dong-Rui Zhang, Ping-Liang Yin, Wei Wang, Qi-Chao Wang, Wei-Zhou Jiang**

Title: **Effects of a weakly interacting light U boson on the nuclear equation of state and properties of neutron stars in relativistic models**

Abstract: We investigate the effects of the light vector U-boson that couples weakly to nucleons in relativistic mean-field models on the equation of state and subsequently the consequence in neutron stars. It is analyzed that the U-boson can lead to a much clearer rise of the neutron star maximum mass in models with the much softer equation of state. The inclusion of the U-boson may thus allow the existence of the non-nucleonic degrees of freedom in the interior of large mass neutron stars initiated with the favorably soft EOS of normal nuclear matter. In addition, the sensitive role of the U-boson in the neutron star radius and its relation to the test of the non-Newtonian gravity that is herein addressed by the light U-boson are discussed. *** Journal reference: Phys.Rev.C83:035801,2011 http://prc.aps.org/abstract/PRC/v83/i3/e035801 ***

Web link: ***www.IntellectualArchive.com/getfile.php?file=gl1YXNOIqaf&orig_file=Wei-Zhou_Jiang__Effects.pdf***

ID #: 894 **Natural Sciences / Physics / Condensed Matter Physics**

Submitted on: Sep 19, 2012

Author: **Z. D. Dimitrov, S. K. Varbev, K. J. Omar, A. A. Stefanov, E. S. Penev, T. M. Mishonov**

Title: **Correlation between T_c and the Cu 4s level reveals the mechanism of high-temperature superconductivity**

Abstract: Band structure trends in hole-doped cuprates and correlations with T_c are interpreted within the s--d exchange mechanism of high-T_c superconductivity. The dependence of T_c on the position of the copper 4s level finds a natural explanation in the generic Cu 3d, Cu 4s, O 2p_x and O 2p_y four-band model. The Cu 3d--Cu 4s intra-atomic exchange interaction is incorporated in the standard BCS scheme. This dependence of T_c in the whole interval of 25--125 K has no alternative explanation at present, and possibly this quarter of a century standing puzzle is already solved. *** Journal reference: Bulgarian Journal of Physics, vol. 38 (2011) 106-112 ***

Web link: ***www.IntellectualArchive.com/getfile.php?file=NwOvLC66L1w&orig_file=T_M_Mishonov__Correlation.pdf***

ID #: 895 **Natural Sciences / Physics / Quantum field theory**

Submitted on: Sep 19, 2012

Author: **N. Delis, C. Efthymiopoulos, G. Contopoulos**

Title: **Quantum vortices and trajectories in particle diffraction**

Abstract: We investigate the phenomenon of the diffraction of charged particles by thin material targets using the method of the de Broglie-Bohm quantum trajectories. The particle wave function can be modeled as a sum of two terms $\psi=\psi_{ingoing}+\psi_{outgoing}$. A thin separator exists between the domains of prevalence of the ingoing and outgoing wavefunction terms. The structure of the quantum-mechanical currents in the neighborhood of the separator implies the formation of an array of \emph{quantum vortices}. The flow structure around each vortex displays a characteristic pattern called `nodal point - X point complex`. The X point gives rise to stable and unstable manifolds. We find the scaling laws characterizing a nodal point-X point complex by a local perturbation theory around the nodal point. We then analyze the dynamical role of vortices in the emergence of the diffraction pattern. In particular, we demonstrate the abrupt deflections, along the direction of the unstable manifold, of the quantum trajectories approaching an X-point along its stable manifold.

Web link: ***www.IntellectualArchive.com/getfile.php?file=ZItef4ugWBS&orig_file=G_Contopoulos__Quantum_vortices.pdf***

ID #: 897 **Natural Sciences / Physics / Particle physics**

Submitted on: Sep 20, 2012

Author: **E. Shintani, S. Aoki, S. Hashimoto, T. Onogi, N. Yamada**

Title: **Two-photon decay of pi^0 from two-flavor lattice QCD**

Abstract: We study the correction to the radiative π^0 decay width due to finite light quark mass. Using lattice QCD with the overlap fermion formulation, we calculate the three-point function of the form $<PV_\mu V_\nu>$ in the (Euclidean) momentum space, which corresponds to the $\pi^0\rightarrow \gamma^*\gamma^*$ amplitude. To fit the lattice data, we use two different modifications of vector meson dominance (VMD) ansatz. One is a combined form of VMD with the next-to-leading order (NLO) chiral perturbation theory (ChPT), and the other is a resummed form of pion-loop diagrams. We extract one of the low energy constants in NLO ChPT, and estimate $\pi^0\rightarrow \gamma\gamma$ decay width including finite mass correction. *** Journal reference: PoS(Lattice 2010)159 ***

Web link: ***www.IntellectualArchive.com/getfile.php?file=La79Ln7PaNe&orig_file=E_Shintani__Two-photon_decay.pdf***

ID #: 898 **Natural Sciences / Physics / Particle physics**

Submitted on: Sep 20, 2012

Author: **E. Shintani, S. Aoki, S. Hashimoto, T. Onogi, N. Yamada**

Title: **Pi^0 to two-photon decay in lattice QCD**

Abstract: We calculate the neutral pion (π^0) to off-shell two photon ($\gamma^*\gamma^*$) transition form factor in lattice QCD. The transition form factor can be extracted from the three-point function of the form (axial-vector)-(vector)-(vector) as a function of off-shell two-photon momentum. Since the

axial-anomaly plays an important role in the $\pi^0\to\gamma\gamma$ decay process, we employ the overlap fermion, which preserves the exact chiral symmetery on the lattice. After extrapolating to the chiral and the vanishing photon momentum limit with a fit function based on vector meson dominance (VMD) model, we find that the Adler-Bell-Jackiw anomaly is correctly reproduced. *** Journal reference: PoS LAT2009:246,2009 ***

Web link: ***www.IntellectualArchive.com/getfile.php?file=OJ7CihrNujG&orig_file=E_Shintani__to_two-photon_decay.pdf***

ID #: 899 **Natural Sciences / Mathematics / Topology**

Submitted on: Sep 20, 2012

Author: **Petr M. Akhmet`ev**

Title: **Geometric approach to stable homotopy groups of spheres, III. Abelian, cyclic and quaternionic structure for mappings with singularities**

Abstract: Collection of (equivariant) $\rm{PL}$-mappings admitting a relative abelian, cyclic, quaternionic, bicyclic, and quaternionic-cyclic structures are constructed.

Web link: ***www.IntellectualArchive.com/getfile.php?file=lCvCiq0jeie&orig_file=Petr_Akhmetev__Geometric_approach.pdf***

ID #: 900 **Natural Sciences / Physics / Fluid Dynamics**

Submitted on: Sep 20, 2012

Author: **Paul Manneville**

Title: **Turbulent patterns in wall-bounded flows: a Turing instability?**

Abstract: In their way to/from turbulence, plane wall-bounded flows display an interesting transitional regime where laminar and turbulent oblique bands alternate, the origin of which is still mysterious. In line with Barkley`s recent work about the pipe flow transition involving reaction-diffusion concepts, we consider plane Couette flow in the same perspective and transform Waleffe`s classical four-variable model of self-sustaining process into a reaction-diffusion model. We show that, upon fulfillment of a condition on the relative diffusivities of its variables, the featureless turbulent regime becomes unstable against patterning as the result of a Turing instability. A reduced two-variable model helps us to delineate the appropriate region of parameter space. An intrinsic status is therefore given to the pattern`s wavelength for the first time. Virtues and limitations of the model are discussed, calling for a microscopic support of the phenomenological approach.

Web link: ***www.IntellectualArchive.com/getfile.php?file=YNJgVOOKWtr&orig_file=Paul_Manneville__Turbulent_patterns.pdf***

ID #: 901 **Natural Sciences / Physics / Fluid Dynamics**

Submitted on: Sep 20, 2012

Author: **Paul Manneville**

Title: **On the growth of laminar-turbulent patterns in plane Couette flow**

Abstract: The growth of laminar-turbulent band patterns in plane Couette flow is studied in the vicinity of the global stability threshold R_g below which laminar flow ultimately prevails. Appropriately tailored direct numerical simulations are performed to manage systems extended enough to accommodate several bands. The initial state or germ is an oblique turbulent patch of limited extent. The growth is seen to result from several competing processes: (i) nucleation of turbulent patches close to or at the extremities of already formed band segments, with the same obliquity as the germ or the opposite one, and (ii) turbulence collapse similar to gap formation for band decay. Growth into a labyrinthine pattern is observed as soon as spanwise expansion is effective. An ideally aligned pattern is usually obtained at the end of a long and gradual regularisation stage when R is large enough. Stable isolated bands can be observed slightly above R_g. When growth rates are not large enough, the germ decays at the end of a long transient, similar to what was observed in experiments.

Web link: ***www.IntellectualArchive.com/getfile.php?file=MEFOJ5mDdoL&orig_file=Paul_Manneville__On_the_growth.pdf***

ID #: 902 **Natural Sciences / Physics / Fluid Dynamics**

Submitted on: Sep 20, 2012

Author: **Paul Manneville**

Title: **On the decay of turbulence in plane Couette flow**

Abstract: The decay of turbulent and laminar oblique bands in the lower transitional range of plane Couette flow is studied by means of direct numerical simulations of the Navier--Stokes equations. We consider systems that are extended enough for several bands to exist, thanks to mild wall-normal under-resolution considered as a consistent and well-validated modelling strategy. We point out a two-stage process involving the rupture of a band followed by a slow regression of the fragments left. Previous approaches to turbulence decay in wall-bounded flows making use of the chaotic transient paradigm are reinterpreted within a spatiotemporal perspective in terms of large deviations of an underlying stochastic process.

Web link: ***www.IntellectualArchive.com/getfile.php?file=cfhYeSedDJK&orig_file=Paul_Manneville__On_the_decay.pdf***

ID #: 904 **Natural Sciences** / **Physics** / **General Physics**

Submitted on: Sep 22, 2012

Author: **Alexander L. Dmitriev**

Title: **WEIGHT OF THE THERMO-INSULATED CONTAINER EQUIPPED WITH ELECTRIC HEATER**

Abstract: Experiment with weighing of the thermo-insulated container in form of three tight metal vessels, in which the internal one is heated up by an electric spiral, is briefly described. Results of the experiment show a rather strong temperature reduction of weight of the vessel made from titan with a relative value in the order of 10^-6 K^-1

Web link: ***www.IntellectualArchive.com/getfile.php?file=ueSLj97NCAp&orig_file=A_Dmitriev__Weight.pdf***

ID #: 905 **Natural Sciences** / **Mathematics** / **Geometry**

Submitted on: Sep 25, 2012

Author: **Alexander Krasulin**

Title: **Five-Dimensional Tangent Vectors in Space-Time: IV. Generalization of Exterior Calculus**

Abstract: This part of the series is devoted to the generalization of exterior differential calculus. I give definition to the integral of a five-vector form over a limited space-time volume of appropriate dimension; extend the notion of the exterior derivative to the case of five-vector forms; and formulate the corresponding analogs of the generalized Stokes theorem and of the Poincare theorem about closed forms. I then consider
the five-vector generalization of the exterior derivative itself; prove a statement similar to the Poincare theorem; define the corresponding five-vector generalization of flux; and derive the analog of the formula
for integration by parts. I illustrate the ideas developed in this paper by reformulating the Lagrange formalism for classical scalar fields in terms of five-vector forms. In conclusion, I briefly discuss the five-vector
analog of the Levi-Civita tensor and dual forms.

Web link: ***www.IntellectualArchive.com/getfile.php?file=iPHBWVkP711&orig_file=5D_tangent_vectors_Part_4.tex***

ID #: 906 **Social Sciences** / **Communication** / **Linguistics**

Submitted on: Sep 25, 2012

Author: **Alena Soloshenko**

Title: **A Cognitive Study on Conceptual Metaphors of Emotion**

Abstract: The present paper explores the cognitive and emotional organization of a conceptual metaphor and its components, in particular, the concept of Fear. Nowadays metaphor is presented as one of the significant mental operations, the tool of perception, and understanding of a reality we live in. Conceptual metaphor research is considered as one of the favorable and effective in various areas of cognitive science. The article deals with the implication of a Qualitative Data Analysis (QDA) and research software into a conceptual metaphor investigation, focusing on the legal thematic texts with emotional content. The data collected via a qualitative research helps to semantically enrich the domains of a conceptual metaphor, to expand the basic understanding of this mental notion, to enlarge and specify a set of modern conceptual metaphors.

Web link: ***www.IntellectualArchive.com/getfile.php?file=OiR30OkgeT6&orig_file=Alena_Soloshenko__A_Cognitive_Study.pdf***

ID #: 907 **Social Sciences / Economics / Marketing**

Submitted on: Sep 25, 2012

Author: **N.Skrygun, O.Krainyuchenko, O.Bezpalko**

Title: **Customers` Motivation as the Basis of Effective Forming of Communication Mix**

Abstract: Essence of complex of promotion and his elements is considered, grounded necessity account of type and level motivation of consumer at forming of communication mix, the types of consumers are selected taking into account the level of their motivation, which allows developing effective strategy advancement of the product.

Web link: ***www.IntellectualArchive.com/getfile.php?file=2YAKsNk4i9f&orig_file=N_Skrygun__Customers_Motivation.doc***

ID #: 908 **Social Sciences / History / Cultural history**

Submitted on: Sep 26, 2012

Author: **Azizova Nasiba**

Title: **Globalization and Problems of Development of the Uzbek language.**

Abstract: The article is devoted to the question of the influence of globalization on the development of languages and cultures. Glottometriya (social weight) is deeply considered in this case, i.e. increasing social importance of the Uzbek language in globalization.

Web link: ***www.IntellectualArchive.com/getfile.php?file=Tjs8fX9JiUt&orig_file=Azizova N Globalisation and Problems of Development of the Uzbek Lanquaqe.doc***

ID #: 909 **Natural Sciences / Physics / Particle physics**

Submitted on: Sep 27, 2012

Author: **Miroslav Pardy**

Title: **The two-dimensional Vavilov-Cherenkov radiation**

Abstract: We derive the power spectrum of photons generated by charged particle moving in parallel direction to the graphene-like structure with index of refraction n. Some graphene-like structures, for instance graphene with implanted ions, or, also 2D-glasses, are dielectric media, and it means that it enables the experimental realization of the Vavilov-Cherenkov radiation. We calculate it from the viewpoint of the Schwinger theory of sources.

Web link: ***www.IntellectualArchive.com/getfile.php?file=cFECvop2ukj&orig_file=cerenk2D.pdf***

End of September 2012 bulletin