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Research Article

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[A Study of Complete and Incomplete Reactions of \$^{12}\text{C} + ^{169}\text{Tm}\$ System at Energy Range \$4.16 - 7.5\$ MeV/Nucleon](#)

An attempt was made in this study to measure the excitation functions of $^{169}\text{Tm}(^{12}\text{C}, 4n)^{177}\text{Re}$, $^{169}\text{Tm}(^{12}\text{C}, 5n)^{176}\text{Re}$, $^{169}\text{Tm}(^{12}\text{C}, ?n)^{176}\text{Ta}$, $^{169}\text{Tm}(^{12}\text{C}, ?2n)^{175}\text{Ta}$, $^{169}\text{Tm}(^{12}\text{C}, ?3n)^{174}\text{Ta}$, $^{169}\text{Tm}(^{12}\text{C}, ?4n)^{173}\text{Ta}$ and $^{169}\text{Tm}(^{12}\text{C}, 2?2n)^{171}\text{Lu}$ reaction channels populated in the interaction of ^{12}C projectile with ^{169}Tm target were considered in order to investigate the mechanisms of complete and incomplete fusion reactions. The theoretically predicted excitation functions using the PACE4 code were compared with the previously measured excitation functions. For non γ emitting channels cross-section values predicted by PACE4 in general were found to be in good agreement with the experimentally measured values. However, for γ -emitting channels, the measured cross-section values were found to be higher than the values predicted by PACE4. The observed disagreement may be credited to projectile break-up in the vicinity of n-n interaction.

Literature Review

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[Pristine and Fullerene between Hasselmann and Van Hasselt](#)

It was about K3C60 organic superconductors related to a region found in Belgie at least funding & cash case denoted in mathematics dealt with economical realms, instead of econophysics. We also dealt with fusion also discussed in pure mathematics of tensor & Connes fusion as well as μ -catalyzed fusion. Accompany the 'the most economical covering of space by sphere' [the so-called "thinnest covering"] and thus they mainly arrange in a superlattice, - due to the thick organic shell, the orientational ordering of nanocrystals within this type of superlattice is low, therefore this type of crystal is not a monocrystal.

Short Review

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[Alkylation reaction: An essay for Nobel Prize](#)

It was pyrite from Congo which conducts electricity but cannot store it as the existing event of catalytic nanomotors. Herewith provided discussion and description from nanodiamond contained in meteorite to alkylation reaction any catalytic nanomotors proposed to enhance the built-in DNA-wave biocomputer. We found chondrite meteorites in primitive types of space rock.

Short Communication

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[Spin \$\frac{1}{2}\$ model in statistical mechanics and relation to a truncation of the Riemann \$\zeta\$ function in the Riemann Hypothesis](#)

In the search for a solution to the Riemann Hypothesis, we have studied an approach that connects the Riemann Problem with physical modeling that refers to statistical mechanics. Thus, we study the relation between a truncation of the Riemann ζ function in the variable $z = 1-1/s$, where s is the usual complex variable ($s = \text{Re}(s) + i \cdot \text{Im}(s) = \sigma + i \cdot t$) and the partition function of a ferromagnetic spin $1/2$ model on a circle C with long-range interaction, to give a concrete look at a strategy for a possible proof of the Riemann Hypothesis.

[Probing nuclear equation of state with the cdm3y version of B3y-fetal effective interaction](#)

This paper is a study of the nuclear Equation of State (EOS) of cold nuclear matter with the B3Y-Fetal effective interaction in its CDM3Y density-dependent version within the framework of Hartree-Fock approximation. The well-known saturation properties of both symmetric and asymmetric nuclear matter are well-reproduced in this work. Using the CDM3Y-K approach, this study has evolved a new set of user interactions, some of which are CDB3Y1-, CDB3Y2-, CDB3Y3-, CDB3Y4-, CDB3Y5-, CDB3Y6-Fetal interactions with corresponding incompressibilities $K_0 = 188, 204, 217, 228, 241$ and 252 MeV respectively, in excellent agreement with those of the M3Y-Paris and M3Y-Reid effective interactions. For asymmetric nuclear matter, the new set of interactions has produced the symmetry energy $E_{\text{sym}} = 32.00$ MeV with an associated slope parameter $L = 55$ MeV at a saturation density $\rho = 0.17 \text{ fm}^{-3}$ and asymmetry parameter $Q = 1.00$ (pure neutron matter) in good agreement with the standard values obtained from coupled channel analysis of charge exchange reactions, statistical multifragmentation model and terrestrial Nuclear Physics experimental analyses. Furthermore, the new set of interactions has been found to have bright prospects in a nuclear reaction as the real folded potential computed with the CDB3Y6-Fetal interaction within the framework of double folding potential has been found to be good and similar to that of CDB3Y6-Paris whose optical potential has a repulsive direct component.

[Room temperature organic superconductor compound prediction based on fractals in mesoscopic-scale regime](#)

Based on paraffin-wax include, volcano-based antimony-bearing, phospholipid, antimony found in gold deposit and TIPSb/triisopropylantimony ever predicted as the room temperature organic superconductor compound. Many flourishing explanations have been declared, from variational method to inductive deduction, with all indicating the presence of $\text{C}_9\text{H}_{21}\text{O}_3\text{Sb.PBr}_6$.

We consider that applications in mesoscale regime, at least when using multiscale fractal of critical parameter that affects physical & chemical properties and to adopt "mesoscopic scale" ever stated as "superconductors" by Holmval (2017). Then the mathematical induction of variational method of exploitation on integers & natural numbers herewith paraffin-wax etc can be resembled the ever built antimony containing compounds to keep the realm of predictions.

[The universal impossibility of photonic quantum nonlocality](#)

The theoretical concept of photonic quantum nonlocality cannot be implemented physically because of the quantum Rayleigh scattering of single photons. Physical scrutiny of landmark experiments (December 2015, M. Giustina, et al. Phys. Rev. Lett. 115, 250401, and L. K. Shalm, et al., Phys. Rev. Lett. 115, 250402) is undertaken. These articles reported that measured outcomes were fitted with quantum states possessing a dominant component of non-entangled photons, thereby contradicting their own claim of quantum nonlocality. With probabilities of photon detections lower than 0.1%, the alleged quantum nonlocality cannot be classified as a resource for developing quantum computing devices, despite recent publicity. Experimental evidence of a feasible process for quantum-strong correlations has been identified (M. Iannuzzi, et al., Phys. Lett. A, 384 (9), 126200, 2020) in terms of correlations between independent and multi-photon states evaluated as Stokes vectors on the Poincaré sphere. As single-photon sources are not needed, the design and implementation of quantum computing operations and other devices will be significantly streamlined.

[Forensic seismology vis-à-vis an underwater explosion for the Roks Cheonan sinking in the Yellow Sea of the Korean Peninsula](#)

Most underwater explosions show characteristics of a bubble pulse and reverberation effects. To specifically identify the cause of an underwater explosion, it is most important to find a bubble pulse and reverberation effects using spectral and cepstral analyses. For a very shallow underwater explosion, spectral analysis is preferable to cepstral analysis. Time-domain analyses show bubble pulses as well as positive polarities of the first P-wave arrivals on the vertical component, and frequency-domain spectral analyses also clearly reveal the bubble pulse and reverberation effects. This study includes comparative studies including a Russian underwater nuclear explosion and US Navy shock trials. The ROKS Cheonan sinking was a shallow underwater explosion that occurred near the surface showing a bubble jet characteristic resulting in splitting the ship into two pieces including a bubble pulse and reverberation effects. The findings of a bubble jet and a toroidal bubble deformation including a bubble pulse are highlighted for a shallow underwater explosion in this study. The ROKS Cheonan sinking took place off the Baengnyeong Island in the Yellow Sea of the Korean Peninsula at a depth of about 8 m in the sea depth of 44 m on March 26, 2010. The explosive charge weight was estimated at 136 kg TNT which is equivalent to one of the abandoned land control mines (LCM) that were deployed near the Northern Limited Lines (NLL) in the Yellow Sea in the late 1970s.

Research Article

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[Gyroscope oscillation depends on a rotor speed velocity](#)

In engineering, all moving rotating objects exhibit gyroscopic effects resulting from the action of an external torque on a rotating object. Gyroscopic effects are the action of a set of inertial moments and movements of an object around three axes of a three-dimensional Cartesian coordinate system. Moments of inertia are created by centrifugal and Coriolis forces, as well as the moment of change in angular momentum, which is expressed by their kinetic energy. The values of the moments of inertia directly depend on the speed of rotation of the object and its rotation around the axes. A short-term effect of an external load on a running gyroscope with displaced support can be manifested by its oscillations. The physics of gyroscope oscillations is not well explained in publications. This article describes the oscillations of a gyroscope by the action of the external torque which is its potential energy converting into kinetic energy of the inertial torques of the gyroscope. The conversion is carried out by the principle of mechanical energy conservation which is the same as for oscillations of a spring with a load.

Review Article

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[Spin supercurrent in ecology](#)

Background: This work aims to show that the process of transfer of angular momentum ? spin supercurrent ? may provide the fulfillment of the fundamental law of ecology: "Everything is connected to everything else".
Results: The conducted investigations are based on the following properties of spin supercurrent: the equalization of the characteristics of interacting objects' spins; dissipation-free; inertia-free (it is not accompanied by the emergence of kinetic mass); superluminal speed (there is no contradiction with Special Relativity, as Special Relativity postulates the speed limit only for an inertial process).
The spin supercurrent emerges between virtual photons having a spin and being created by quantum objects of different types: living and non-living, electrically charged and neutral, magnetized and non-magnetized, having non-zero rest mass and having zero rest mass (such as photons).
Conclusion: It is shown in this work that the properties of spin supercurrent may determine the following phenomena in ecology: the mimicry of animals and plants; the contactless (without living pathogenic microorganisms) spread of epidemics; the influence of the terrain relief on the population longevity; the use of water as information matrix; the stabilization of energy in the Earth's core. Since the spin supercurrent possesses such properties as dissipative-free, superluminal speed, the non-electric and non-magnetic nature, it may perform interaction (quantum teleportation) of quantum objects between the Earth and Cosmic bodies. Thus, the extension of the biosphere's border to Outer Space is possible.

Research Article

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[Research into the fundamental building block of quantum theorem of the unified force field](#)

This is a work based on the extension of the work of Professor James Clerk Maxwell and Albert Einstein into a new framework of science built on provable mathematical theorem which serves as a basis for unifications of the fundamental forces which all together have become impossible to unify under the current framework of General relativity and Quantum Field theory.

It is to be used as a piece for inspiring new innovations, discovering and exploring the terrains of the difficult pathways in physics where our modern physical theories have failed.

This work is meant to be adapted and used by various physics professionals who are working on extending the frontiers of physics or providing solutions to problems that cannot be handled by current physics framework. In summary it is an inspirational tool that hopefully will help our professional in physics out there.

Its interpretations and applications is subject to the personal inspirations the reader who is a professional can derive from the work for his or her personal usage.

Mini Review

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[Modeling of low calorific gas burning in a deficient oxygen environment and high-temperature oxidizer](#)

It is planned to carry out a comprehensive experimental and theoretical study on the high temperature of low calorific gas combustion with oxygen-deficient oxidizers. The experimental research will be performed using the experimental facility with a combustion chamber. The oxygen concentration in combustion oxidizers will be varied from 21% by volume (normal) air to 2%. The test combustion chamber will be fed with propane or methane as the reference fuel, then with low calorific fuels as test gases obtained by mixing various combustible components, e.g. H₂, CH₄, CO, and neutral gases, e.g. N₂, CO₂. Gaseous fuels prepared in this way will be burned in the atmosphere of a deficient oxidizer with a temperature changing from 800 °C to 1100 °C. Oxidizers will be heated up to a certain temperature using two methods: by flue gas heat exchanger and kanthal rod electric preheater. Different burner geometry will be used. The burner will be equipped with annular swirl vanes for co-axial or under different angles, fuel, and oxidizers flow to have a high swirl number achieved by flow aerodynamics and mixing. Experimental data will be verified with numerical simulations with the use of ANSYS CFD Fluent code.

Research Article

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[The time and the growth in physics](#)

In this article, we made a research on the subject of Time and Growth. In the life, the Growth is seen as the increase of mass which operates during a certain period. In physics, it is the same. By the Growth, a physical body gets its density increased. The goal of this article is to calculate or predict the energy and force that a physical system can have at its total Growth. To study the Growth, we have defined some equations which help to evaluate the Growth internal force and energy. By the same way, we have also discovered that all physical systems in the Universe are connected by the same interaction. This interaction leads to the loss of density or mass. The Time is the consequence of its manifestation. For studying the effect of this interaction, we have calculated the density of the Universe. We found that the density of the Universe is equal to the density of a photon. In other words, the Universe is a huge photon. That means, like a photon, the Universe does not know the Time. It also means that the Universe is eternal. Its Expansion (not its growth) is due by the fact that, at the moment small systems inside to it grow, the Universe maintains its density constant like a photon. Do not confuse Growth and Expansion. The Growth is the increase of the density; and the Expansion is the increase of the volume without the change of density. The Universe does not know the Growth, it knows the Expansion. All these conclusions are detailed in the development of this article.

Research Article

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[Failure-oriented-accelerated-testing \(FOAT\) and its role in assuring electronics reliability: review](#)

A highly focused and highly cost-effective failure-oriented-accelerated-testing (FOAT) suggested about a decade ago as an experimental basis of the novel probabilistic design for reliability (PDfR) concept is intended to be carried out at the design stage of a new electronic packaging technology and when high operational reliability (like the one required, e.g., for aerospace, military, or long-haul communication applications) is a must. On the other hand, burn-in-testing (BIT) that is routinely conducted at the manufacturing stage of almost every IC product is also of a FOAT type: it is aimed at eliminating the infant mortality portion (IMP) of the bathtub curve (BTC) by getting rid of the low reliability "freaks" prior to shipping the "healthy" products, i.e., those that survived BIT, to the customer(s). When FOAT is conducted, a physically meaningful constitutive equation, such as the multi-parametric Boltzmann-Arrhenius-Zhurkov (BAZ) model, should be employed to predict, from the FOAT data, the probability of failure and the corresponding useful lifetime of the product in the field, and, from the BIT data, as has been recently demonstrated, - the adequate level and duration of the applied stressors, as well as the (low, of course) activation energies of the "freaks". Both types of FOAT are addressed in this review using analytical ("mathematical") predictive modeling. The general concepts are illustrated by numerical examples. It is concluded that predictive modeling should always be conducted prior to and during the actual testing and that analytical modeling should always complement computer simulations. Future work should be focused on the experimental verification of the obtained findings and recommendations.
