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Mini Review

Published Date:-2020-12-11 00:00:00

[Metal-carbon mesocomposites application possibilities as the medicine magnetic transport within an organism](#)

The paper is dedicated to the consideration of the metal-carbon mesocomposites application possibilities for the medicine magnetic transport. This trend is determined by correspondent peculiarities of content and structure of mesoscopic composites. The main peculiarities of these nanosized particles are the following: a) the presence of unpaired electrons on the carbon shell; b) the structure of carbon shell from poly acetylene and carbene fragments; c) the atomic magnetic moment of inner metal is equaled to more than  $1-3 \mu_B$ . The creation of reactive mesoscopic materials with regulated magnetic characteristics which can find application as medicine magnetic transport within an organism is very topical. The present investigation has fundamental character. It's based on the ideas concerning to the change of metal-carbon mesocomposites reactivity. The use is possible as metal-carbon mesocomposites both and they are modified analogously.

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Research Article

Published Date:-2020-08-20 00:00:00

[A study of  \$^{12}\text{C} + ^{12}\text{C}\$  nuclear reaction using a new M3Y-type effective interaction](#)

This paper is a study of nuclear reactions involving  $^{12}\text{C} + ^{12}\text{C}$  nuclei carried out with a heavy-ion nucleus-nucleus optical potential derived from a new M3Y-type effective interaction, called B3Y-Fetal, within the framework of optical model at the incident energies of 112, 126.7, 240, 300, 1016 MeV. Folding analyses of the differential cross sections associated with the elastic scattering of the nuclear system, determined at these incident energies with four B3Y-Fetal-based folded potentials constructed from double folding model, have shown the DDB3Y1- and BDB3Y1-Fetal potentials to be the best in excellent agreement with previous work done with the M3Y-Reid. The agreement of the B3Y-Fetal with the famous M3Y-Reid effective interaction, which is also used for folding analysis in this work, is further buttressed and well-established by the findings of this study. Herein, the values of the renormalization factor, NR ranging from 1.1117 to 0.8121, obtained with the B3Y-Fetal have been found to be slightly higher, with lower reaction cross sections,  $\sigma_R = 1418 - 1047$  millibarns, than  $\text{NR} = 0.9971 - 0.8108$  obtained with the M3Y-Reid effective interaction whose accompanying reaction cross sections, being higher, range from 1431 to 1050 millibarns. This depicts the B3Y-Fetal as having a better performance. Additionally, results of folding analyses have shown the best-fit folded potentials, DDB3Y1- and BDB3Y1-Fetal potentials to be in agreement at all incident energies, implying that the cold nuclear matter has an underlying soft equation of state.

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Research Article

Published Date:-2020-08-14 00:00:00

[High energy lasers and new applications](#)

In the beginning of 1973 in the USSR the study of possibility of LJE designing was conducted. The reflector, located in the tail of the rocket prototype, concentrated the obtained radiation in air and ensured micro-burst that the reactive thrust was created. The successful results of different models of the reflectors tests, which were at the same time the laser light receivers, had been obtained. One should note that all experiments pointed out above were conducted with the use of electric discharge  $\text{CO}_2$ - lasers with power up to 10 kW, while for the injection into orbit of different highly and technologically effective equipment (global network connections, Internet, photo-monitoring of Earth surface, debris cleaning) the radiated power substantially higher is required. Thus, for example, for SC launching with the weight 1000 kg the laser with power not less than 15 MW is necessary [1,2].

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Opinion

Published Date:-2020-08-13 00:00:00

From the energy involved in a physical or chemical process, part of it cannot be utilised as work. Entropy  $S$  is the thermodynamic quantity that is the measure of this energy where the concept of entropy was first introduced by Rudolf Clausius (1822-1888) in 1865. Entropy is also a basic and general conception that deals with “order” (low entropy) and “disorder” (high entropy) of all systems in the universe from human body and up to the star systems. With the development of science entropy deviates from treatment of subjects related to heat and work and currently it is used also to analyse knowledge as well as in economics.

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**Research Article**                      **Published Date:-2020-07-31 00:00:00**

[Natural ferromagnetic resonance in cast microwires and its application to the safety control of infrastructures](#)

The natural ferromagnetic resonance (NFMR) in cast glass-coated amorphous magnetic microwires has been studied theoretically and experimentally. The NFMR reveals large residual stresses appearing in the microwire core in the course of casting. These stresses, together with the magnetostriction, determine the magnetoelastic anisotropy. Beside the residual internal stresses, the NFMR frequency is influenced by external stresses applied to the microwire or to the composite containing the latter (the so-called stress effect).

The dependence of the NFMR frequency on the deformation of the microwires is proposed to be used in the distant diagnostics of dangerous deformations of critical infrastructure objects such as bridges, dams, wind turbine towers, skyscrapers, stack-furnaces, embankments, etc. To this end, fragments of magnetic microwires will be embedded in the bulk of concrete structures or fixed on their surface during construction or after it by means of coating with a special concrete-adhesive plaster. Further, these structures are periodically irradiated with microwaves from a radar at frequencies close to the original NFMR, and the presence of latent dangerous deformations of the concrete structure is judged by the NFMR frequency shift.

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**Research Article**                      **Published Date:-2020-07-15 00:00:00**

[Ground-state bands of doubly even  \$^{166}\text{Hf}\$  Nucleus](#)

This study was carried out to investigate the rotational structure of even-even  $^{166}\text{Hf}$  isotopes using the phenomenological fitting, Sood's semi-empirical formula. The rotational energies from the calculated values were compared to the experimental spectrum. The result shows that in  $^{166}\text{Hf}$ , calculated energies fit the experimental values to a remarkable degree of accuracy.

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**Research Article**                      **Published Date:-2020-07-13 17:16:47**

[Non-force electromagnetic fields in nature and experiments on earth: Part 2](#)

The manifestation of non-force electromagnetic fields in nature and in experiments on Earth is interesting and important in the part that would confirm the numerous physical models that have been calculated and presented in the scientific literature [5,6,15,17].

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**Research Article**                      **Published Date:-2020-05-25 00:00:00**

[Measurement of background ionizing radiation in the federal university of technology owerri, Nigeria using calibrated digital geiger counter](#)

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The measurement of the natural ionizing radiation in the Federal University of Technology Owerri, Nigeria was carried out using a well calibrated Digital Geiger Muller counter models GCA – 04w. Measurements were taken randomly in thirty (30) different locations outside the building and thirty (30) locations inside different buildings in the University. Results obtained for outdoor Dose rate ranges from 0.07  $\mu$ Sv/hr to 0.23  $\mu$ Sv/hr with a mean value of 0.144  $\mu$ Sv/hr. While the result for the indoor dose rate ranges from 0.08  $\mu$ Sv/hr to 0.21  $\mu$ Sv/hr with a mean of 0.14  $\mu$ Sv/hr. The highest value recorded for the outdoor radiation is from the university front gate which is .023 $\mu$ Sv/hr. While the highest value recorded inside the buildings is from the School of Agriculture and Agricultural Technology (SAAT) which is 0.21  $\mu$ Sv/hr. All these values are lower than the world safely limits of 0.247  $\mu$ Sv/hr. This shows that the risk of ionizing radiation on the staff and students of the Federal University of Technology is minimal.

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## Short Communication

Published Date:-2020-04-16 00:00:00

### [Detection limit of a lutetium based non-paralizable PET-like detector](#)

The effect of the intrinsic lutetium radioactivity on the detection performances of a LYSO based in-beam PET-like prototype used for quality control of hadrontherapy treatments is studied. This radioactivity leads to a background that degrades the measurement of the  $\gamma^+$  signal. In particular, it prevents the measurement of faint signals originating from low activity  $\gamma^+$  sources. This paper presents a method to estimate the minimum  $\gamma^+$  activity that can be measured for any acquisition time taking into account the non-extensible dead time of the detector. This method is illustrated with experimental data collected with the in-beam PET-like prototype. The results presented in this paper are therefore specific to this detector. The method can however be applied in other contexts, either to other lutetium based PET detectors or even to non-PET detectors affected by lutetium radioactivity. The dead time correction formalism can also be used generally to scale signal and background yields in any non-paralizable detector, even those in which the background is not due to the presence of intrinsic radioactivity.

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## Research Article

Published Date:-2020-03-26 00:00:00

### [Evaluation of Uranium in Organs of Residents from an Uranium-Rich Region using Teeth as Bioindicators](#)

The Uranium extraction and processing plant of INB (Brazilian Nuclear Industries) is in Caetité, a city located in a region hosting the largest Uranium reserve of the country. The degree of Uranium contamination in the Caetité population was investigated before using teeth as bioindicator, where a quite high Uranium concentration was measured in this region, about 160 times higher than the world-wide average. Radiobiological risks are here evaluated from Uranium burdens in organs as skeleton, kidneys, liver, tissues and blood, which were estimated from transfer coefficients and effective internal doses. This was accomplished by means of calculations with the use of the STATFLUX/ICRP approach, plus a set of Uranium transfer rate parameters as function of individual's age assuming an uninterrupted exposure over a period of 60 years. It was found that U ingestion rates by residents of Caetité are three orders of magnitude higher than worldwide average, indicating that food and water would exhibit high levels of contamination. Calculated effective internal doses range from a minimum of one to a maximum of three orders of magnitude higher than background doses, for blood and bones respectively. The likelihood that this circumstance could lead to serious health problems as e.g. neoplasia is addressed. The methodology presented in this work offers subsidies for further studies on environmental pollution by radionuclides.

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## Research Article

Published Date:-2020-03-09 01:00:00

### [A quantum mechanical model for hole transport through DNA: predicting conditions for oscillatory/non-oscillatory behavior](#)

A quantum mechanical model that considers tunneling and inelastic scattering has been applied to explain the hole transfer reaction from a G (Guanine) base to a GGG base cluster through a barrier of Adenine bases, (A)<sub>n</sub> (n = 1-16). For n = 1, the ratio of tunneling to inelastic scattering is about 6, which is sharply decreased to around 0.23 and  $5.23 \times 10^{-8}$  for n = 4 and 16 respectively, suggesting dominance of inelastic scattering for n  $\geq$  4. As in experiment, the calculated product yield ratios (PGGG) exhibit a strong distance dependence for n < 4, and a weak distance dependence for n  $\geq$  4. We also predict conditions under which oscillatory or non-oscillatory charge transfer (CT) yield are expected.

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[Non-force electromagnetic fields](#)

The non-force magnetic fields were first predicted by Chandrasekhar in 1956 in his well-known published work [1]. Since then there have appeared a large number of theoretical studies [5,6,15,17] with the research into various aspects of physical manifestations of non-force magnetic fields. However by now their existence in the technical physics and in laboratory experiments has not been experimentally confirmed [30]. Nevertheless the indistinct presence on the Earth of such fields was, in a sense, discovered in the natural electromagnetic field much earlier.

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**Short Communication****Published Date:-2020-02-19 00:00:00**[Raw materials criticalities in material selection & design](#)

Circular Economy, Sustainability, Design for Environment are some of the keywords that identify new formidable challenges to be faced in the next years. Raw materials have a dominant role in reaching that goal. Green energy, electric vehicles, communication, etc. depends on raw materials labeled as critical because of their economic importance coupled with high supply risk. For this reason, mitigating actions need to be used in materials selection and design such as material substitution, improved materials efficiency and recycling. In this technical communication, a method to implement raw materials criticality issues in materials selection is described according to the recent literature. The strategy is based on Ashby's approach and the definition of the alloy criticality index quantifying the criticality per unit of mass of the material.

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**Review Article****Published Date:-2020-01-13 00:00:00**[The Neppe-Close triadic dimensional vortical paradigm: An invited summary](#)

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Physicists are generally trained in the Standard Model of Physics (SMP). This implies that they perceive and account for only 3 dimensions of space in a moment in time (3S-1t) (a 4-dimensional [4D] model). However, applying the SMP, more than fifty significant conundrums have arisen that are unexplained or incomplete. Explaining these within the SMP 4D fabric led to hypothesizing a 'fifth force', most recently the hypothetical 'X17 particle'. We propose this hypothetical X17 may better be explained by a 9-dimensional model (9D) with gimmel. Our model, the Neppe-Close Triadic Dimensional Vortical Paradigm (TDVP) has amplified the 'physics' from 4 dimensions to 9D, specifically first postulating and then further demonstrating mathematically—starting with derivations of the Cabibbo angle—that 9 dimensions must exist. Moreover, this data is empirically demonstrated because the neutron, proton and electron mass-energy-gimmel equivalence in the Triadic Rotational Units of Equivalence (TRUE) as part of the TDVP model, exactly corresponds with the normalized data for the mass-energy equivalence volumetric data for these particles in the CERN Large Hadron Collider. This data shows definitively that we exist in a 9-dimensional finite, quantized, volumetric, spinning reality. This is, furthermore, embedded in an infinite continuity (9D+). Mathematically, applying this 9D+ model definitively requires an extra third component that is massless and energyless ('gimmel'). Without gimmel, no particle in the universe would be stable. TDVP unifies nature because the same laws apply across the quantum, macro-world and cosmological reality. Our 4D experience is simply the physical component of 9D+ existence.

Summary Amplification: At all levels, there is the consistent application of a 9-Dimensional quantized finite reality embedded within an infinite continuity. The application of gimmel specifically requires applying the 9-dimensional model and is based on necessary mathematical calculations not only at the quantal level (where the fifty plus unsolved, unexplained or contradictory conundrums can be explained somewhat, and there is no longer 'quantum weirdness'), but at the macroscale level with more gimmel in the life elements (which, additionally, are consistently all cubic multiples of 108 cubed), as well as cosmologically, where the correlations with proportionate Dark Matter and Dark Energy are overwhelming. Moreover, these 9-dimensional plus factors together with Triadic Rotational Units of Equivalence (TRUE) and gimmel, allow numerous solutions that couldn't otherwise be solved. For example, importantly, applying the simple mathematics of TRUE, we can demonstrate why gluons, while adequate in 4D, are impossible applying 9D. These solutions are simpler because we have markedly adapted George Spencer-Brown's 'Laws of Form' to applying a new method of mathematical calculation, Edward Close's 'Calculus of Distinctions' (COD) which recognizes quantal limits and that the nature of finite reality is quantized and volumetric. The COD includes distinguishing between content, extent, and impact. We emphasize the pioneering works of Wolfgang Pauli with his multidimensional model and his 'Pauli Exclusion Principle', Alfred Whitehead with 'Process Philosophy' and his 'Principia Mathematica' (with Bertrand Russell), Georg Cantor with Set Theory, and Roger Penrose with spinors and twistors. TDVP is a prime example of our broad new specialty of 'Dimensional Biopsychophysics' (DBP). DBP extends physics, consciousness, and the biopsychosocial to extra dimensions and applies mathematics empirically. Like Max Tegmark, we recognize the key role of mathematics as fundamental in nature, not just for application in calculation and operations.

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