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Research Article

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[On Friedman equation, quadratic laws and the geometry of our universe](#)

Einstein's special and general relativity revolutionized physics. The predictions of general relativity are Strong Lensing, Weak Lensing, Microlensing, Black Holes, Relativistic Jets, A Gravitational Vortex, Gravitational Waves, The Sun Delaying Radio Signals, Proof from Orbiting Earth, Expansion of the universe. The density of the universe determines the geometry and fate of the universe. According to Freedman's equations of general relativity published in 1922 and 1924, the geometry of the universe may be closed, open and flat. It all depends upon the curvature of the universe also. Various results of Cosmic Microwave Background Radiation (CMBR), NASA's Wilkinson Microwave Anisotropy Probe (WMAP), and ESA's Planck spacecraft probes found that our universe is flat within a margin of 0.4% error. In this short work, by applying the laws of quadratic equations, we attempt to show that OUR UNIVERSE IS FLAT.

Research Article

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[Working process of steam turbine and establishment of start-up model](#)

In the research of steam turbine rotor, start-up optimization is a very key research problem. A series of start-up optimization research can greatly improve the start-up efficiency of steam turbine and the safety performance of the unit. The start-up optimization of steam turbine is inseparable from the analysis of the start-up process of steam turbine and the mathematical model of the startup process of steam turbine unit, because the optimization of steam turbine unit can be regarded as a function to find the optimal solution. This paper analyzes the start-up process of 300 MW steam turbine, analyzes the start-up process of steam turbine unit through the data used in the actual power plant, and gives the mathematical model of cold start-up of steam turbine according to the start-up process of steam turbine, so as to further study the start-up optimization of steam turbine. Finally, the optimization model is determined by several key parameters, which are three weight coefficients $\gamma_1, \gamma_2, \gamma_3$, the actual damage value D_i and damage limit value D_{lim} , and the start-up time t_i and total start-up time t_0 of each stage.

Research Article

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[Magnetohydrodynamic \(MHD\) stability of wendelstein7-X reactor with resistive wall \(RWMs\)](#)

Plasma stability is the biggest challenge facing the nuclear fusion industry. One of the best methods of stability study is magnetohydrodynamic (MHD) equations, which has two linear and nonlinear states. Usually linear stability analysis is used to describe the MHD state, which is obtained by linearizing nonlinear equations. The reactor under study is the W7-X reactor, which is an optimal example of a stellaratoric system.

The question raised in this research is how to create suitable conditions for the formation of plasma and heat transfer produced by the melting reaction. Many efforts have been made in this direction, but still the record holder for plasma state maintenance belongs to the international ITER project and around 1000. However, IPP researchers at the Max Planck Institute in Germany (maker of the W7-X reactor) predicted that by 2020 they would produce a pulse of 30 minutes.

The numerical method is used to investigate the stability of the reactor. In this paper, boundary conditions were expressed in terms of resistance wall. With the help of the mathematical Matlab software, magnetic field values were obtained from experimental reports extracted from the Max Planck Institute for various values of β . From the values β obtained, it was concluded that the appropriate field value is $\beta = 5$ according to the ideal MagnetoHydroDynamic state and the interval defined by the Max Planck Institute.

[A Time: Philosophy of Science](#)

Dear reader, isn't it time to turn things around and allow TIME to take its rightful place? In a nutshell, I believe Time should be considered as the primary energy that has created the whole material world and governs the continuous changes in it. In my article "An Intelligent Cosmos: Philosophy of Science", I discuss that this primary creative energy is, more generally, the Dark Energy in our Universe. I believe that Dark Energy probably has a variety of specific manifestations, and I assume that one of those manifestations is Time.

This article is a continuation of my article "An Intelligent Cosmos: Philosophy of Science"

Review Article**Published Date:-2021-04-09 00:00:00**[Quantum analysis of sub harmonic generation with two-mode coherent light](#)

In this work the statistical and squeezing properties of light-driven by sub-harmonic generation with two-mode coherent light are studied. With interaction Hamiltonian of both two-mode coherent and sub harmonic generation, we have driven master equation of system under consideration. From the master equation, the solution of the C-number Langevin equation is derived. It helps us to solve quadrature variance, quadrature squeezing, mean, and variance of photon number for light produced by sub-harmonic generation with the two-mode coherent light state. And the result shows that; the squeezing occurs in plus quadrature with the maximum squeezing of 87%. The photon statistics of the system under consideration is subpoissonian in which both mean & variance are increasing as kappa increase.

Review Article**Published Date:-2021-04-07 00:00:00**[Tunable induced transparency and Fano-resonance in double cavity optomechanical system](#)

We analyze optomechanically induced Transparency and asymmetric Fano-line shape Profile in a two-mode cavity system, coupling at weak and strong coupling regimes. The model system consists of one mechanical mode and two optical modes. The transmission shows nonreciprocal behavior. Both the forward transmission and backward reflection for the system are analyzed for both optic-optic and mechanical-optic cavities by considering various system parameters. The output spectra lead to sharp asymmetric Fano-resonance and tunable transparency. Double line-shape profile is observed in the output Spectrum. Our proposal provides a new platform for application in quantum telecommunications and a photonic device like optical Switches.

Research Article**Published Date:-2021-04-05 01:00:00**[Influence of high frequency rotating magnetic field on the effect of heating magnetic fluid](#)

The article describes the necessary conditions for the phenomenon of thermal energy release in a magnetic fluid placed in a high-frequency rotating magnetic field. The minimum amplitude of the magnetic field was calculated and the thermal power released (by the rotating spherical nanoparticles in the viscous medium) was estimated. The estimations were based on the assumption that the magnetic relaxation times (τ_N and τ_B) and the magnetic field rotation period (τ_{rot}) meet the condition: $\tau_N \gg \tau_{rot} \gg \tau_B$. The principle of operation and construction of the device generating a high-frequency rotating magnetic field is described. Preliminary experimental studies were carried out using a magnetic fluid with magnetite nanoparticles that indicated magnetic relaxation as the cause of the released heat. The value of the absorption rate in the experiment and its dependence on the strength of the magnetic field were determined.

Research Article**Published Date:-2021-04-05 00:00:00**[Radionuclide contents in yam samples and health risks assessment in Oguta oil producing locality Imo State Nigeria](#)

Oguta LGA is surrounded by 44 oil wells located around different communities. Preliminary investigations indicated that crude wastes were not properly managed and oil spillage occurred regularly in the LGA. Therefore, assessment of both radionuclide contents in yam matrix and health risks in Oguta was carried out to determine possible radiological health risks associated with improper management of crude wastes, and also evaluate haematological health profile in the LGA for future reference and research. A well calibrated NaI (TI) detector was deployed for the radiological investigation, and about 5 ml of blood samples were collected from 190 participants each from Oguta and the control LGAs for haematological assessment. Mean activity concentrations due to ^{40}K , ^{226}Ra and ^{232}Th in yam samples from Oguta LGA were $189.99 \pm 59.14 \text{ Bqkg}^{-1}$, $23.75 \pm 5.69 \text{ Bqkg}^{-1}$ and $30.99 \pm 9.51 \text{ Bqkg}^{-1}$, respectively while mean activity concentrations due to natural radionuclides in yam samples from control LGA were $110.40 \pm 78.53 \text{ Bqkg}^{-1}$, $10.12 \pm 3.34 \text{ Bqkg}^{-1}$ and $18.39 \pm 8.74 \text{ Bqkg}^{-1}$ for ^{40}K , ^{226}Ra and ^{232}Th , respectively. Committed effective dose equivalent values in Oguta and the control LGAs were $704.95 \pm 183.30 \text{ } \mu\text{Sv}^{-1}$ and $403.65 \pm 172.19 \text{ } \mu\text{Sv}^{-1}$, respectively which are less than world average value of 1.1 mSv^{-1} . Crucially, one-way ANOVA at $\alpha=0.05$ has indicated that effects of radiological parameters due to natural radionuclides in yam from Oguta are significantly different from effects of radiological parameters due to natural radionuclides in yam from the control LGA. However, the percentage contributions of natural radiation exposures to incidence of cancer in Oguta and the control LGAs are just 1.7% and 1.4%, respectively, and haematological investigations have shown that overall health of the communities in the study LGAs has not been compromised due to environmental and human factors. Hence, natural radioactivity may have been elevated in Oguta but the concentration levels are not yet alarming. Radiological health risks could result from consistent exposure to those natural radionuclides in the long term.

Research Article

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[Experimental research on the mechanism of chemical energy conversion to light energy under thermal induction](#)

Since the discovery of glare illuminators, considerable efforts have been devoted to achieving a breakthrough of high light intensity on the order of magnitude. In this paper, we prepared strong flash blinding agents for the first time by using aluminum powder, oxidant, and adhesive as the main materials, and tris-(8-hydroxyquinolino) aluminum (Al_2Q_3), triazindolizine, or nano zinc oxide, etc. as electronic output brightener after mixing and granulation according to the developed formulation. It was discovered that the luminescence intensity was related to the thermal effect of the substance while the brightener only served as an auxiliary brightening effect to achieve energy non-destructive conversion. With the same formula, the luminescence intensities of glaze agents with ADN and potassium perchlorate as oxidants were slightly higher than that of ammonium perchlorate oxidant; the brightening effect of nano-zinc oxide was slightly higher than those of tris-(8-hydroxyquinolino) aluminum (Al_2Q_3) and triazindolizine. The luminescence intensity of the substance with a high thermal effect value was high, but the luminescence time was slightly short. Under identical conditions, the luminescence effect of nano-aluminum powder was obviously better than that of micro-aluminum powder with the highest luminescence intensity of $3.9 \times 10^{10} \sim 1.9 \times 10^{11} \text{ cd}$ and the luminescence time of 39 - 48 ms. The effects of shell material and structure and the effect of heat-induced mode on the luminescence intensity were also investigated. The luminescence intensity of the glare agent with a high shell strength was high, but the luminescence time was slightly short. Moreover, the energy level of the brightener is excited under the induction of high temperatures, which leads to a blue shift to promote the chemical reaction of the material in a favorable direction. Finally, the optical radiation of the thermally induced high-temperature combustion system was analyzed from the aspects of thermal effect, combustion temperature, and chemiluminescence effect. A way to improve the optical radiation intensity of a high-temperature combustion system was proposed.
