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Superrelativity

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Abstract

Did any physics experts expect SUPERRELATIVITY paper, a physics revolution producing the EINSTEIN-RODGERS RELATIVITY EQUATION, producing the HAWKING-RODGERS BLACK HOLE RADIUS, and producing the STEFAN-BOLTZMANN-SCHWARZSCHILD-HAWKING-RODGERS BLACK HOLE RADIATION POWER LAW, as the author gave a solution to The Clay Mathematics Institute's very difficult problem about the Navier-Stokes Equations? The Clay Mathematics Institute in May 2000 offered that great $million prize to the first person providing a solution for a specific statement of the problem: "Prove or give a counter-example of the following statement: In three space dimensions and time, given an initial velocity field, there exists a vector velocity and a scalar pressure field, which are both smooth and globally defined, that solve the Navier-Stokes Equations." Did I, the creator of this paper, expect SUPERRELATIVITY to become a sophisticated conversion of my unified field theory ideas and mathematics into a precious fluid dynamics paper to help mathematicians, engineers and astro-physicists? [1]. Yes, but I did not expect such superb equations that can be used in medicine or in outer space! In this paper, complicated equations for multi-massed systems become simpler equations for fluid dynamic systems. That simplicity is what is great about the Navier-Stokes Equations. Can I delve deeply into adding novel formulae into the famous Schwarzschild's equation? Surprisingly, yes I do! Questioning the concept of reversibility of events with time, I suggest possible 3-dimensional and 4-dimensional co-ordinate systems that seem better than what Albert Einstein used, and I suggest possible modifications to Maxwell's Equations. In SUPERRELATIVITY, I propose that an error exists in Albert Einstein's Special Relativity equations, and that error is significant because it leads to turbulence in the universe's fluids including those in our human bodies. Further, in SUPERRELATIVITY, after I create Schwarzschild-based equations that enable easy derivation of the Navier-Stokes Equations, I suddenly create very interesting exponential energy equations that simplify physics equations, give a mathematical reason for turbulence in fluids, give a mathematical reason for irreversibility of events with time, and enable easy derivation of the Navier-Stokes Equations. Importantly, my new exponential Navier-Stokes Equations are actually wave equations as should be used in Fluid Dynamics. Thrilled by my success, I challenge famous equations by Albert Einstein and Stephen Hawking [2] [3].

Keywords

*BA (Dble Maj Maths); Hon DSc (Taxila Institute for Research), http://institute.iqmind.org/institute/; World Genius Directory 2014 Genius of the Year—Asia, www.psiq.org/home.html.

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Superrelativity, Relativity, Navier-Stokes Equation, Physics, Albert Einstein, Stephen Hawking, Black Hole, Clay Mathematics Institute

1. Introduction

1.1. Introduction: Zero Relativity to Navier-Stokes Equations to Superrelativity

SUPERRELATIVITY is my unified field theory of physics entitled ZERO RELATIVITY, that had possibly taken me eight thousand hours to create, but I improved it as I adapted it for the Navier-Stokes Equations of Fluid Dynamics [4]-[6]. This section of physics extends into many scientific realms including engineering, physiology and cosmology. How the famous Navier-Stokes Equations were constructed, about 180 years ago, before relativity theory existed, seems miraculous, and is evidence of brilliant logic. The Navier-Stokes Equations have been and are extremely useful to scientists and engineers, and will be more useful if we understand them better or improve them. I suggest that you can read what the Navier-Stokes Equations are very well expressed in the academic, mathematical article entitled EXISTENCE AND SMOOTHNESS OF THE NAVIER-STOKES EQUATION by Charles L. Fefferman.

1.2. Introduction: Possibly the Schwarzschild's Metric Equation for Navier-Stokes Equations

Obstructive problems, for mathematicians attempting to understand or improve the Navier-Stokes Equations, are many. Without realizing the fact, mathematicians, for nearly two hundred years, have been confused about what the dimensions are that should be used in Navier-Stokes Equations. Schwarzschild's metric equation can be used to give dramatic changes that should be made to the Navier-Stokes Equations [7]-[9]. The Schwarzschild's equation is used for gravitational effects, but that concept could be used for electromagnetic effects or gravito-electro-magnetic effects, and that concept would therefore be used for viscosity. If the Klein-Gordon equation is for a wave, is it suitable for this fluid of the Navier Stokes Equations? Is an exponential better for giving a wave equation for Fluid Dynamics? Is a significant problem for understanding or improving the Navier Stokes Equations that mathematicians and physicists place too much belief in the antiquated f = ma being correct? Further, the Laplacian is very concise mathematics, but is not perfectly correct.

1.3. Introduction: What Are the Best Co-Ordinates to Use?

In the 17th century, Rene Descartes created the very useful Cartesian coordinates. Points on the Cartesian plane can be identified with n real numbers with the Cartesian product R^n. Mathematics students usually understand Cartesian coordinates. Some understand complex numbers in the form a + bi in which i is the imaginary number so $i^2 = -1$. Mathematicians can create infinite coordinate systems. Co-ordinates matter for reversibility or irreversibility of events with time. Should we use a 3-D, 4-D, or 12-D system? [10] [11].

1.4. Introduction: How to Solve the Navier-Stokes Problem

A major problem for mathematical physicists has been that they do not have an adequate theoretical generalization from which the current NAVIER-STOKES EQUATION, for fluid dynamics, can be derived.

For more than a hundred years, most physicists have followed Albert Einstein who chose to use dimensions in coordinate systems for reversibility of events with time. Do you believe in reversibility of events with time? Or do you believe in irreversibility of events with time? Because I believe in irreversibility of events with time, in this paper, I give dimensions in coordinate systems that give the popular reversibility, then dimensions in coordinate systems that give the less popular irreversibility, and expand upon the mathematics to give equations similar to the Navier-Stokes Equations [12]. The equations of Schwarzschild and Klein-Gordon both go beyond what are merely three spatial dimensions and a temporal dimension, but can be reduced to basic dimensions. The Schwarzschild equations are very impressive, so have inspired creation of more advanced equations developed in this paper. For reversibility and for irreversibility of events with time, a vector equation and a scalar equation, definitely existing, smooth and globally defined, help us understand and solve the Navier-Stokes equations.

1.5. Introduction: Maxwell-Rodgers Equations from My Zero Relativity Paper

What are also very interesting are my changes to Maxwell's Equations in my unified field theory of physics entitled ZERO RELATIVITY [13] [14]. Now, my SUPERRELATIVITY is my new, greater unified field theory of physics because it has surpassed even my previous pride and joy, ZERO ELATIVITY, but after immense intellectual effort. Here are my MAXWELL-RODGERS Equations for particle a:

$$\int B_a \cdot \delta A_{ab} = 0. \tag{I}$$

$$\begin{aligned}\int E_a \cdot \delta A_{ab} &= \delta\left\{Q_a Q_b \varepsilon_{ab}^{-1} - (1/4) Q_a^2 Q_b^2 \varepsilon_{ab}^{-2}\right\} \big/ \delta Q_b \\ &= \delta\left\{\left(Q_a Q_b \varepsilon_o^{-1} - 4\pi G M_a M_b\right) - (1/4)\left(Q_a Q_b \varepsilon_o^{-1} - 4\pi G M_a M_b\right)^2\right\} \big/ \delta Q_b .\end{aligned} \tag{II}$$

$$\begin{aligned}&\int B_i \cdot \delta l_{ij} \\ &= \mu\left(I_a + \varepsilon \delta F_{Ea} \delta t_a^{-1}\right) \\ &= \mu\left(I_a + \left\{\varepsilon_o^{-1} - 4\pi G M_a M_b Q_a^{-1} Q_b^{-1} - (1/4) Q_a Q_b \varepsilon_o^{-2} + \varepsilon_o^{-1} \pi G M_a M_b - 4\pi^2 G^2 M_a^2 M_b^2 Q_a^{-1} Q_b^{-1}\right\} \delta F_{Ea} \delta t_a^{-1}\right).\end{aligned} \tag{III}$$

$$\int E_a \cdot \Delta l_{ab} = -\delta F_{Ba} \left(\delta t_b\right)^{-1}. \tag{IV}$$

$$\left(\delta t_a\right)^2 = \left(\delta t\right)^2 \left[1 - Q_a Q_b \left(4\pi \varepsilon_{ab}\right)^{-1} \left(M_a\right)^{-1} r_a r_{ab}^{-2} c_a^{-2}\right]^{-2} = \left(\delta t\right)^2 \gamma_a^{-2}. \tag{V}$$

$$\left(\delta r_a\right)^2 = \left(\delta r\right)^2 \left[1 - Q_a Q_b \left(4\pi \varepsilon_{ab}\right)^{-1} \left(M_a\right)^{-1} r_a r_{ab}^{-2} c_a^{-2}\right]^{2} = \left(\delta r\right)^2 \gamma_a^{2} \tag{VI}$$

$$\varepsilon_{ab}^{-1} = \left(\varepsilon_0^{-1} - 4\pi G M_a M_b Q_a^{-1} Q_b^{-1}\right). \tag{VII}$$

$$M_a = \rho_a V_a = \rho_a x_a y_a z_a \;\;\&\;\; M_b = \rho_b V_b = \rho_b x_b y_b z_b \tag{VIII}$$

Maxwell's Equations are not fully correct for many reasons. Appropriate mathematics would explain why attractive interactions become repulsive, and why repulsive interactions become attractive, at short radii if (δt_a) and (δr_a) are modified. Light-rays are bent by gravity, but light-rays are also bent by a charge. Above, I unify Coulomb and gravitational interactions by introducing variable permittivity ε_{ab}. In Zero Relativity, I improved Schwarzschild's equations for (δt_a) and (δr_a) so they produced reversals in effects of gravity and charge interactions at very short distances. By modifying Maxwell's Equations and adding four equations, in my unified physics paper Zero Relativity,

REFINEMENTS TO MAXWELL'S EQUATIONS apply to a multi-particled system of charged particles, use the centre-of-mass of the entire system as the reference point for distances involved in the equations. Include variables μ and ε rather than the constants μ_o and ε_o, because it is known that permeability and per- mittivity are variable. Predict a variable velocity-of-light that accords with the photon moving at different velocities, and the velocity-of-light changing during history. Include separate equations for each of particle a & particle b. Use $\left(\delta S_{ab}\right)^2 = \delta S_{ab} \cdot \delta S_{ab} = \delta\left(S_b - S_a\right) \cdot \delta\left(S_b - S_a\right)$ & $\left(\delta S_{ba}\right)^2 = \delta S_{ba} \cdot \delta S_{ba} = \delta\left(S_a - S_b\right) \cdot \delta\left(S_a - S_b\right)$. …include the gravitational components as in Schwarzschild's equation to predict gravitational bending of the space-time continuum. Mathematically explain why particles with similar charges attract each other when at very short distances apart. Include different times for different charged particles. Include the fully correct r_{ab} between the particles. Mathematically explain why mass, like energy, is variable with charge. When I created the eight Maxwell-Rodgers Equations, I spent a lot of time and effort on their modification or creation. That does not mean that they are perfect. But they are very useful, thought-provoking equations. Some of them are not fully necessary for this Navier-Stokes paper. Intellectually delving into those basic equations has helped me understand topics to greater depth in this paper.

1.6. Introduction: Superrelativity for Navier-Stokes Equations

The Clay Mathematics Institute in May 2000 offered that great $million prize to the first person providing a solution for a specific statement of the problem: "Prove or give a counter-example of the following statement: In three space dimensions and time, given an initial velocity field, there exists a vector velocity and a scalar pressure field, which are both smooth and globally defined, that solve the Navier-Stokes Equations." This is an extremely advanced mathematical topic to be solved, because it has not been solved during the last 180 years, but I comprehend what the topic is about because I have created a unified field theory of physics entitled Zero Relativity. In fact, my unified field theory of physics includes different attractive and repulsive forces between atoms or molecules. Lucky for me, I created advanced multi-massed equations, long ago. To solve this, I require many complicated equations beyond mainstream comprehension of relativity and other formulae that cannot be expressed easily in words. While creating this SUPERRELATIVITY paper, I have very often, maybe for about twenty hours, looked at the Navier-Stokes Equations in an internet website's NASA Navier-Stokes Equations for 3-dimensional—unsteady. This Nasa display of equations has helped me immensely to comprehend the difficult Navier-Stokes Equations.

In SUPERRELATIVITY, I give several different examples of possible co-ordinate systems that all include three space dimensions, and all include time. My equation constructed from the Schwarzschild equation is very impressive, but my exponential energy equation excites more. The vector velocity in the equation similar to the Schwarzschild equation or the vector velocity in the exponential energy equation are both smooth and globally defined. The scalar pressure field for both comes from the kinetic molecular theory of gases where it is smooth and globally defined. They fit into a more complicated equation that can be simplified into the Navier-Stokes Equations.

2. Materials and Methods

When I was young, isolated, and mathematically semi-qualified, from 1980 to 1988, I sent six handwritten mathematical, theoretical physics papers about variable velocity of light, changes to Maxwell's Equations, cosmology, and lasers and masers, from Australia to overseas universities where my ideas were stolen or mocked as not being the ideas of Stephen Hawking and Albert Einstein [15]-[19]. Upset, I diverged to write thousands of poems and hundreds of surrealistic and abstract paintings. Those creative techniques helped me to independently create a unified field theory of physics that resulted in my Zero Relativity. On the internet's Mind Magazine, a thought-provoking website, very supportive Richard Lawrence Norman progressively published each of my papers for free. Progression of papers by Peter Donald Rodgers: "Beyond Albert Einstein's Relativity: UFT Physics", 2008 & revised 2011. "Einstein Wrong: UFT Physics", 2013. "Could Albert Einstein's Special Relativity Be Correct?", 15th June 2014, in Mind Magazine, "Do Stephen Hawking's Black Holes Exist?", 13th July 2014, in Mind Magazine, "No Hawking's Black Hole", 19th July 2014, in Mind Magazine, 'Relativity Black Hole Truth', 29th July 2014, in Mind Magazine. "Navier-Stokes Physics", 2nd August 2014, in Mind Magazine. "NAVIER-STOKES EQUATION", 4th August 2014, in Mind Magazine. "WHY NAVIER-STOKES EQUATION", 7th August 2014, in Mind Magazine. "RELATIVITY TO NAVIER-STOKES EQUATION", 26th September 2014, in Mind Magazine. "RELATIVITY TO IRREVERSIBILITY". 28th October 2014, in Mind Magazine. "ENTANGLEMENT EXISTS", 12th November 2014, in Mind Magazine. "ZERO RELATIVITY", 14th December 2014, in Mind Magazine. "NAVIER-STOKES EXISTENCE AND SMOOTHNESS", 31st January 2016. "EINSTEIN'S RELATIVITY SHOCK IN NAVIER-STOKES EQUATIONS", 14th February 2016. "SUPER-RELATIVITY", 1st March 2016. My mathematical, theoretical SUPERRELATIVITY paper comes after my progression of independent mathematical, theoretical papers. In an elite genius society, a member suggested to all members that, instead of boasting about our IQs, we could each attempt mathematical problems of Clay Mathematics Institute for major prizes. I read the Navier-Stokes problem and believed that I had already developed unified field theory mathematics leading to the correct solution. Note that my 2014 papers about Navier-Stokes equations really only mentioned that my UFT equations should give the Navier- Stokes Equations. During the last two months, I have been concentrating on this topic by creating in-depth, relevant equations, and papers becoming this SUPERRELATIVITY paper that is about relativity, cosmology, and Navier-Stokes Equations because they are all fluid dynamics.

3. Results

SUPERRELATIVITY gives a major reason why Albert Einstein's special relativity mathematics might be incorrect. SUPERRELATIVITY's new three-dimensional and four-dimensional coordinate equations that can replace the four-dimensional coordinate equations of special relativity and general relativity are very exciting for theoretical physics. Not only do the equations lead to interesting mathematics of turbulence, but they lead to an inherent existence of kinetic energy from basics and significant implications about rarity of anti-matter. In SUPERRELATIVITY, I derived a very significant equation, involving a two-massed system, then involving a multi-massed system, by expanding the mathematics of Schwarzchild's metric for a light-ray from a star bending as it passes by the sun during an eclipse. SUPERRELATIVITY gives the Total Energy E of a multi- massed system, the Total Kinetic Energy KE of a multi-massed system, the Total Momentum of a multi-massed system, and the Total Mass of a multi-massed system. Possible irreversibility equations and possible exponential equations leading to the Navier-Stokes Equations are given and discussed. The use of the exponential equations would lead to new explanations for sub-atomic particles and planetary positions. I am extremely proud of my new RODGERS'S EXPONENTIAL ENERGY EQUATION. Also, the equation for a force is very com- prehensive and necessary in mathematics, physics and engineering. In this paper, I explain where the $(1-v_{isc}t/\rho x_j^2+P/\rho v_j^2$) in the Navier-Stokes Equations comes from and derive the Navier-Stokes Energy Equation, Navier-Stokes Momentum Equation, and Navier-Stokes Continuity Equation. In SUPERRELATI- VITY, I show existence and smoothness of the Navier-Stokes Equations.

4. Discussions

4.1. Discussions: Einstein-Rodgers Relativity Equation

NEW FOUR-DIMENSIONAL CO-ORDINATES—As I delved deeply into Navier-Stokes Equations, a surpris- ing intellectual event happened. Despite famous Albert Einstein's great intuition and his meticulous approach, I discovered one reason why Einstein's special relativity mathematics might be incorrect. Einstein related the moving mass to the resting mass as $M^2=M_o^2\left(1-v^2/c^2\right)^{-1}$. That equation led to a universe of reversibility of events with time. On 06/02/2016, I discovered a much better equation, the Einstein-Rodgers Relativity Equation:

$$M=M_o\left(1-v^2/\left(2c^2\right)\right)^{-1} \tag{1}$$

… or squared as ….. $M^2=M_o^2\left(1-v^2/\left(2c^2\right)\right)^{-2}=M_o^2\left(1-v^2/c^2+v^4/4c^4\right)^{-1}$.

4.2. Discussions: Turbulence

This equation leads to a section about Turbulence. During my life, I lived by rivers and the ocean. During thousands of hours, I watched flowing currents of salt water and could not understand the remarkable variety in turbulences creating whirlpools. Nature seemed to be far beyond any rational mathematician's predictions. Now, I believe I have intellectually grasped the mathematical magic causing the universe's turbulence. MATHEMATICS OF TURBULENCE: Where k is a specific unknown number between 2 and infinity,

$$\left(M^{1/k}\left(1+i\delta x/\left(k^2-k\right)^{1/2}c\delta t\right)\right)^k=M\left(1-\delta x^2/2c^2\delta t^2\right)=M\left(1-v^2/2c^2\right). \tag{2}$$

$$\delta \underline{s}=2^{-1/2}\delta x\underline{k}_1+2^{-1/2}\delta y\underline{k}_2+2^{-1/2}\delta z\underline{k}_3+i\delta(ct)\underline{k}_4. \tag{3}$$

$$\left(M_a^{1/2}\delta\underline{s}_a\right)=\left(M_a^{1/2}\left(2^{-1/2}\delta x_a\underline{k}_1+2^{-1/2}\delta y_a\underline{k}_2+2^{-1/2}\delta z_a\underline{k}_3+i\delta\left(c_at_a\right)\underline{k}_4\right)\right). \tag{4}$$

$$\left(\left(\rho_a x_a y_a z_a\right)^{1/2}\delta\underline{s}_a\right)=\left(\left(\rho_a x_a y_a z_a\right)^{1/2}\left(2^{-1/2}\delta x_a\underline{k}_1+2^{-1/2}\delta y_a\underline{k}_2+2^{-1/2}\delta z_a\underline{k}_3+i\delta\left(c_at_a\right)\underline{k}_4\right)\right). \tag{5}$$

$$\left(\left(\rho_a x_a y_a z_a\right)^{1/2}\delta\underline{s}_a\right)\cdot\left(\left(\rho_a x_a y_a z_a\right)^{1/2}\delta\underline{s}_a\right)=\left(\rho_a x_a y_a z_a\right)\left(\left(2^{-1/2}\delta x_a\right)^2+\left(2^{-1/2}\delta y_a\right)^2+\left(2^{-1/2}\delta z_a\right)^2-\left(\delta\left(c_at_a\right)\right)^2\right). \tag{6}$$

My mathematics of turbulence is very interesting, but $M_a\left(1-v_a^2/2c_a^2\right)$ is the most important formula. This equation is a slight modification of Albert Einstein's equation that did not include the $v^4/4c^4$. Does this component ensure this universe's irreversibility of events with time? At present, I believe so! Note that this equation is for constant velocity of light, but, soon, I introduce equations suitable for constant velocity of light or variable velocity of light. When a mass moves at a very slow velocity, it seems that Albert Einstein's equation is correct. But, as the mass moves at a very fast velocity close to the velocity of light, Einstein's equation becomes incorrect. My modification to Einstein's equation is very important because it mathematically explains the per- ceived inherent existence of kinetic energy from basics. Further, this equation seems to have implications about rarity of anti-matter and the square-root of matter [20]-[24].

4.3. Discussions: Pressure Component in Fluids

Fluids Are Like Gases; The interactions between atoms or molecules in fluids are similar to those in gases. From my ZERO RELATIVITY paper, I now copy and paste the following relevant section about my past conjectures: RODGERS'S KINETIC MOLECULAR THEORY OF GASES … Rodgers's Theory of Gases is a development from the Kinetic Molecular Theory for Gases, and requires most of the latter assumptions. In Rodgers's Theory of Gases: ●The interactions between molecules are NOT negligible. ●Relativistic effects are NOT negligible. ●Quantum-mechanical effects are NOT negligible. ●The total volume of the individual gas molecules added up is NOT negligible compared to the volume of the container. Where pressure equals P, volume equals V, and v equals velocity, the Kinetic Molecular Theory of Gases gives that $3PV/N_m = M\left(v_{rms}\right)^2$. I decide to use V_{Ti} for total volume, and V_{Mi} for the volume of a molecule of mass M_i. I introduce Kinetic Energy as K. For my system with variable velocity-of-light, $K/c_{io} = M_i c_i - M_{io} c_{io}$. But, $(3/2)P_i\left[V_{Ti} - \sum V_{Mi}\right]/\left(c_i N_{Mi}\right) = \left(\text{total } K\right)/N_m = KE$. Energy density of the gas system is $w_i = 3P_i\left[V_{Ti} - \sum V_{Mi}\right]$. The mathematics pertaining to a Carnot engine is as follows: $Q = \int \delta Q = \int \delta U + \int \delta W = \int w_i \delta V + \int p_i \delta V = (4/3)\left\{w_b\left[V_{Tb} - \sum V_{Mb}\right] - w_a\left[V_{Ta} - \sum V_{Ma}\right]\right\}$. …These ideas about gas pressure have led to the $P_a/\rho_a v_{xaj}^2$ component in the equations following this in SUPERRELATIVITY.

4.4. Discussions: Navier-Stokes-Schwarzschild-Rodgers Equations

EXISTENCE AND SMOOTHNESS OF THE NAVIER-STOKES EQUATIONS; USING $M\left(c^2 - 1/2\,v^2\right) = M_o\left(c_o^2 - 1/2\,v_o^2\right)$ TO GIVE NAVIER-STOKES EQUATIONS: From the above equation, I derive a very significant equation, involving two masses, by expanding the mathematics of Schwarzschild's metric for a light-ray passing the sun during a solar eclipse.

$$\begin{aligned} &M_a\left(\delta s_a\right)^2 \\ &= \sum_{j:1}^4\left(1 - GM_b/r_{ab}c_a^2\right)^{-1}\left(1 + Q_aQ_b/4\pi\varepsilon_o r_{ab}M_a c_a^2\right)^{-1}\left(1 - h/\lambda_a M_a c_a\right)^{-1}\left(1 + P_a/\rho_a v_{xaj}^2\right)^{-1}\left(M_a c_a^2\left(\delta t_a\right)^2\right) \\ &\quad - \sum_{j:1}^4\left(1 - GM_b/r_{ab}c_a^2\right)\left(1 + Q_aQ_b/4\pi\varepsilon_o r_{ab}M_a c_a^2\right)\left(1 - h/\lambda_a M_a c_a\right)\left(1 + P_a/\rho_a v_{xaj}^2\right)\left(1/2\,M_a\left(\delta x_{aj}\right)^2\right). \end{aligned} \tag{7}$$

$$\begin{aligned} M_a\left(\delta s_a\right)^2 &= \sum_{j:1}^4\left(1 - GM_b/r_{ab}c_a^2 + Q_aQ_b/4\pi\varepsilon_o r_{ab}M_a c_a^2 - h/\lambda_a M_a c_a + P_a/\rho_a v_{xaj}^2\right)^{-1}\left(M_a c_a^2\left(\delta t_a\right)^2\right) \\ &\quad - \sum_{j:1}^4\left(1 - GM_b/r_{ab}c_a^2 + Q_aQ_b/4\pi\varepsilon_o r_{ab}M_a c_a^2 - h/\lambda_a M_a c_a + P_a/\rho_a v_{xaj}^2\right)\left(1/2\,M_a\left(\delta x_{aj}\right)^2\right). \end{aligned} \tag{8}$$

For a multi-massed system:

$$\begin{aligned} &\sum_{a:1}^n\left(M_a\left(\delta s_a\right)^2\right) \\ &= \left(\sum_{a:1}^n\sum_{b:1}^n\sum_{j:1}^4\left(1 - GM_b/r_{ab}c_a^2 + Q_aQ_b/4\pi\varepsilon_o r_{ab}M_a c_a^2 - h/\lambda_a M_a c_a + P_a/\rho_a v_{xaj}^2\right)^{-1}\left(M_a {c_a}^2\left(\delta t_a\right)^2\right)\right) \\ &\quad - \left(\sum_{a:1}^n\sum_{b:1}^n\sum_{j:1}^4\left(1 - GM_b/r_{ab}c_a^2 + Q_aQ_b/4\pi\varepsilon_o r_{ab}M_a c_a^2 - h/\lambda_a M_a c_a + P_a/\rho_a v_{xaj}^2\right)\left(1/2\,M_a\left(\delta x_{aj}\right)^2\right)\right) \\ &= \left(\sum_{a:1}^n\sum_{b:1}^n\sum_{j:1}^4\left(1 - v_{isc}t/\rho_a x_{aj}^2 + P/\rho_a v_{aj}^2\right)^{-1}\left(\rho_a V_a c_a^2\left(\delta t_a\right)^2\right)\right) \\ &\quad - \left(\sum_{a:1}^n\sum_{b:1}^n\sum_{j:1}^4\left(1 - v_{isc}t/\rho_a x_j^2 + P/\rho_a v_j^2\right)\left(1/2\,\rho_a V_a\left(\delta x_{aj}\right)^2\right)\right). \end{aligned} \tag{9}$$

Note that I have suddenly introduced Navier-Stokes terms to the multi-massed equation.

4.5. Discussions: Introducing Navier-Stokes Terms to a Multi-Massed System

To convert to Navier-Stokes terms, substitute $\left(1-\nu_{isc}t/\rho x_j^2+P/\rho v_j^2\right)$ for the $\left(1-GM_b/r_{ab}c_a^2+Q_aQ_b/4\pi\varepsilon_o r_{ab}M_ac_a^2-h/\lambda_a M_a c_a+P_a/\rho_a v_{xaj}^2\right)$ of the multi-massed equation:

Total Energy E of a multi-massed system

$$\begin{aligned}E=&\left(\sum_{a:1}^n\sum_{b:1}^n\sum_{j:1}^4\left(1-GM_b/r_{ab}c_a^2+Q_aQ_b/4\pi\varepsilon_o r_{ab}M_ac_a^2-h/\lambda_a M_a c_a+P_a/\rho_a v_{xaj}^2\right)^{-1}\left(M_ac_a^2\right)\right)\\&-\left(\sum_{a:1}^n\sum_{b:1}^n\sum_{j:1}^4\left(1-GM_b/r_{ab}c_a^2+Q_aQ_b/4\pi\varepsilon_o r_{ab}M_ac_a^2-h/\lambda_a M_a c_a+P_a/\rho_a v_{xaj}^2\right)\left(1/2\,M_a v_{xaj}^2\right)\right)\\=&\left(\sum_{a:1}^n\sum_{b:1}^n\sum_{j:1}^4\left(1-\nu_{isc}t/\rho_a x_{aj}^2+P/\rho_a v_{aj}^2\right)^{-1}\left(\rho_a V_a c_a^2\right)\right)\\&-\left(\sum_{a:1}^n\sum_{b:1}^n\sum_{j:1}^4\left(1-\nu_{isc}t/\rho_a x_j^2+P/\rho_a v_j^2\right)\left(1/2\,\rho_a V_a v_{xaj}^2\right)\right).\end{aligned}\tag{10}$$

Total Kinetic Energy KE of a multi-massed system

$$\begin{aligned}KE=&\left(\sum_{a:1}^n\sum_{b:1}^n\sum_{j:1}^4\left(1-GM_b/r_{ab}c_a^2+Q_aQ_b/4\pi\varepsilon_o r_{ab}M_ac_a^2-h/\lambda_a M_a c_a+P_a/\rho_a v_{xaj}^2\right)\left(1/2\,M_a v_{xaj}^2\right)\right)\\=&\left(\sum_{a:1}^n\sum_{b:1}^n\sum_{j:1}^4\left(1-\nu_{isc}t/\rho_a x_{aj}^2+P/\rho_a v_{aj}^2\right)\left(1/2\,\rho_a V_a v_{xaj}^2\right)\right).\end{aligned}\tag{11}$$

$$\begin{aligned}&\text{Total Momentum of a multi-massed system}=\delta\left(\text{Total K.E.}\right)/\delta\left(v_{xaj}\right)\\&=\left(\sum_{a:1}^n\sum_{b:1}^n\sum_{j:1}^4\left(\left(1-GM_b/r_{ab}c_a^2+Q_aQ_b/4\pi\varepsilon_o r_{ab}M_ac_a^2-h/\lambda_a M_a c_a+P_a/\rho_a v_{xaj}^2\right)\left(M_a v_{xaj}\right)\underline{k}_j\right)\right)\\&=\left(\sum_{a:1}^n\sum_{b:1}^n\sum_{j:1}^4\left(\left(1-\nu_{isc}t/\rho_a x_{aj}^2+P/\rho_a v_{xaj}^2\right)\left(\rho_a V_a v_{xaj}\right)\underline{k}_j\right)\right).\end{aligned}\tag{12}$$

$$\begin{aligned}&\text{Total Mass of a multi-massed system}=\delta\left(\text{Total Momentum}\right)/\delta\left(v_{xaj}\right)\\&=\left(\sum_{a:1}^n\sum_{b:1}^n\sum_{j:1}^4\left(\left(1-GM_b/r_{ab}c_a^2+Q_aQ_b/4\pi\varepsilon_o r_{ab}M_ac_a^2-h/\lambda_a M_a c_a+P_a/\rho_a v_{xaj}^2\right)\left(M_a\right)\right)\right)\\&=\left(\sum_{a:1}^n\sum_{b:1}^n\sum_{j:1}^4\left(\left(1-\nu_{isc}t/\rho_a x_{aj}^2+P/\rho_a v_{xaj}^2\right)\left(\rho_a V_a\right)k_j\right)\right).\end{aligned}\tag{13}$$

4.6. Discussions: System Constancies with Time

$$\begin{aligned}&\delta\left(\text{Total Energy}\right)/\delta t=0\\&=\delta\left(\sum_{a:1}^n\sum_{b:1}^n\sum_{j:1}^4\left(1+GM_b/r_{ab}c_a^2-Q_aQ_b/4\pi\varepsilon_o r_{ab}M_ac_a^2+h/\lambda_a M_a c_a-P_a/\rho_a v_{xaj}^2\right)\left(M_ac_a^2\right)\right.\\&\quad\left.-\left(1-GM_b/r_{ab}c_a^2+Q_aQ_b/4\pi\varepsilon_o r_{ab}M_ac_a^2-h/\lambda_a M_a c_a+P_a/\rho_a v_{xaj}^2\right)\left(1/2\,M_a v_{xaj}^2\right)\right)/\delta t\\&=\delta\left(\sum_{j:1}^4\left(\left(1+\nu_{isc}t/\rho x_j^2-P/\rho v_j^2\right)\left(\rho Vc^2\right)-\left(1-\nu_{isc}t/\rho x_j^2+P/\rho v_j^2\right)\left(1/2\,\rho V v_{xj}^2\right)\right)\right)/\delta t.\end{aligned}\tag{14}$$

$$\begin{aligned}&\delta\left(\text{Total K.E.}\right)/\delta t=0\\&=\delta\left(\sum_{a:1}^n\sum_{b:1}^n\sum_{j:1}^4\left(\left(1-GM_b/r_{ab}c_a^2+Q_aQ_b/4\pi\varepsilon_o r_{ab}M_ac_a^2-h/\lambda_a M_a c_a+P_a/\rho_a v_{xaj}^2\right)\left(1/2\,M_a v_{xaj}^2\right)\right)\right)/\delta t\\&=\delta\left(\sum_{j:1}^4\left(1-\nu_{isc}t/\rho x_j^2+P/\rho v_j^2\right)\left(1/2\,\rho V v_{xj}^2\right)\right)/\delta t.\end{aligned}\tag{15}$$

$$\begin{aligned}&\delta\left(\text{Total Momentum}\right)/\delta t=0=\delta\left[\delta\left(\text{Total K.E.}\right)/\delta\left(v_{xaj}\right)\right]/\delta t\\&=\delta\left(\sum_{a:1}^n\sum_{b:1}^n\sum_{j:1}^4\left(\left(1-GM_b/r_{ab}c_a^2+Q_aQ_b/4\pi\varepsilon_o r_{ab}M_ac_a^2-h/\lambda_a M_a c_a+P_a/\rho_a v_{xaj}^2\right)\left(M_a v_{xaj}\right)\underline{k}_j\right)\right)/\delta t\\&=\delta\left(\sum_{j:1}^4\left(\left(1-\nu_{isc}t/\rho x_j^2+P/\rho v_j^2\right)\left(\rho V v_{xj}\right)\underline{k}_j\right)\right)/\delta t.\end{aligned}\tag{16}$$

$$\begin{aligned}
&\delta(\text{Total Mass})/\delta t = 0 = \delta\left(\delta^2(\text{Total K.E.})\big/\delta\left(v_{xaj}\right)^2\right)\Big/\delta t \\
&= \delta\left(\sum_{a:1}^{n}\sum_{b:1}^{n}\sum_{j:1}^{4}\left(\left(1 - GM_b/r_{ab}c_a^2 + Q_aQ_b/4\pi\varepsilon_o r_{ab}M_a c_a^2 - h/\lambda_a M_a c_a + P_a/\rho_a v_{xaj}^2\right)\left(M_a\right)\underline{k}_j\right)\right)\Big/\delta t \\
&= \delta\left(\sum_{j:1}^{4}\left(\left(1 - v_{isc}t/\rho x_j^2 + P/\rho v_j^2\right)\left(\rho V\right)\underline{k}_j\right)\right)\Big/\delta t.
\end{aligned} \tag{17}$$

4.7. Discussions: Force & Navier-Stokes Equations

Navier-Stokes Energy Equation:

$$\begin{aligned}
&\delta(\text{Total K.E.}/V)/\delta t = 0 = \delta\left(\sum_{j:1}^{4}\left(1 - v_{isc}t/\rho x_j^2 + P/\rho v_j^2\right)\left(1/2\,\rho v_{xj}^2\right)\underline{k}_j\right)\Big/\delta t \\
&= \delta\left[\left(\rho - v_{isc}t/x_1^2 + P/v_1^2\right)\left(1/2\,v_1^2\right)\right]\left(1/\delta t + v_x/\delta x + v_y/\delta y + v_z/\delta z\right)\underline{k}_1 \\
&\quad + \delta\left[\left(\rho - v_{isc}t/x_2^2 + P/v_2^2\right)\left(1/2\,v_2^2\right)\right]\left(1/\delta t + v_x/\delta x + v_y/\delta y + v_z/\delta z\right)\underline{k}_2 \\
&\quad + \delta\left[\left(\rho - v_{isc}t/x_3^2 + P/v_3^2\right)\left(1/2\,v_3^2\right)\right]\left(1/\delta t + v_x/\delta x + v_y/\delta y + v_z/\delta z\right)\underline{k}_3.
\end{aligned} \tag{18}$$

EQUATION FOR FORCE—Force has always been very significant to physicists:

$$\begin{aligned}
F &= f_1\underline{k}_1 + f_2\underline{k}_2 + f_3\underline{k}_3 \\
&= \delta\left[\left(\rho V v_x\left(1 - \left(v_{isc}\right)t/\rho x^2\right)\left(1 + P/\left(\rho v_x^2\right)\right)\right)\right]\Big/\delta t\,\underline{k}_1 \\
&\quad + \delta\left[\left(\rho V v_y\left(1 - \left(v_{isc}\right)t/\rho y^2\right)\left(1 + P/\left(\rho v_y^2\right)\right)\right)\right]\Big/\delta t\,\underline{k}_2 \\
&\quad + \delta\left[\left(\rho V v_z\left(1 - \left(v_{isc}\right)t/\rho z^2\right)\left(1 + P/\left(\rho v_z^2\right)\right)\right)\right]\Big/\delta t\,\underline{k}_3.
\end{aligned} \tag{19}$$

NAVIER-STOKES MOMENTUM EQUATIONS
If Volume is incompressible, it is constant so:

$$\begin{aligned}
f_1\underline{k}_1/V &= \delta\left[\rho v_x\left(1 - \left(v_{isc}\right)t/\rho x^2\right)\left(1 + P/\left(\rho v_x^2\right)\right)\underline{k}_1\right]\Big/\delta t \\
&= \delta\left[\left(1 - \left(v_{isc}\right)t/\rho x^2\right)\left(1 + P/\left(\rho v_x^2\right)\right)\right]\rho\left(v_x/\delta t + v_x^2/\delta x + v_x v_y/\delta y + v_x v_z/\delta z\right)\underline{k}_1. \\
f_2\underline{k}_2/V &= \delta\left[\rho v_y\left(1 - \left(v_{isc}\right)t/\rho y^2\right)\left(1 + P/\left(\rho v_y^2\right)\right)\underline{k}_2\right]\Big/\delta t \\
&= \delta\left[\left(1 - \left(v_{isc}\right)t/\rho y^2\right)\left(1 + P/\left(\rho v_y^2\right)\right)\right]\rho\left(v_y/\delta t + v_y^2/\delta y + v_y v_x/\delta x + v_y v_z/\delta z\right)\underline{k}_2. \\
f_3\underline{k}_3/V &= \delta\left[\rho v_z\left(1 - \left(v_{isc}\right)t/\rho z^2\right)\left(1 + P/\left(\rho v_z^2\right)\right)\underline{k}_3\right]\Big/\delta t \\
&= \delta\left[\left(1 - \left(v_{isc}\right)t/\rho z^2\right)\left(1 + P/\left(\rho v_z^2\right)\right)\right]\rho\left(v_z/\delta t + v_z^2/\delta z + v_z v_x/\delta x + v_z v_y/\delta y\right)\underline{k}_3.
\end{aligned} \tag{20}$$

NAVIER-STOKES CONTINUITY EQUATION
Reduce the viscosity and pressure components to zero:

$$\begin{aligned}
(€/V) &= \left(\rho - v_{isc}t/x_1^2 + P/v_1^2\right)\underline{k}_1 + \left(\rho - v_{isc}t/x_2^2 + P/v_2^2\right)\underline{k}_2 \\
&\quad + \left(\rho - v_{isc}t/x_3^2 + P/v_3^2\right)\underline{k}_3 + \left(\rho - v_{isc}t/(ict)^2 + P/(ic)^2\right)\underline{k}_4
\end{aligned} \tag{21}$$

that becomes

$$(€/V) = \rho\underline{k}_1 + \rho\underline{k}_2 + \rho\underline{k}_3 + \rho\underline{k}_4. \tag{22}$$

$$\begin{aligned}
\delta(€/V)/\delta t = 0 &= (\delta\rho/\delta x)(\delta x/\delta t)\underline{k}_1 + (\delta\rho/\delta y)(\delta y/\delta t)\underline{k}_2 \\
&\quad + (\delta\rho/\delta z)(\delta z/\delta t)\underline{k}_3 + (\delta\rho/\delta(ict))(\delta(ict)/\delta t)\underline{k}_4.
\end{aligned} \tag{23}$$

If v_{isc} and P are considered to be zero, the continuity equation is very simple. It is merely a mathematical statement that the density of the system does not change over time. That means that it is incompressible…

4.8. Discussions: Exponential Navier-Stokes Equations

IRREVERSIBILITY OF EVENTS WITH TIME: As a relevant addition to this paper, I want to state that I, unlike Albert Einstein, believe in both variable velocity of light and irreversibility of events with time. Although my method built upon mathematics of the Schwarzschild metric is very good physics, I believe that use of the exponential leads to a better method. What is very significant is that an exponential equation is a wave equation. I believe that wave equations are most appropriate for fluid dynamics because fluids consist of waves.

NATURAL BASE e CONJECTURE: For $GM_b/r_{ab}c_a^2$, $Q_aQ_b/4\pi\varepsilon_o r_{ab}M_a c_a^2$, $h/\lambda_a M_a c_a$, and $P_a/\rho_a v_{xaj}^2$ not all very small compared with 1, it is possible that the natural base 'e' should exist in the equations. Use of the natural base would lead to better explanations for existences of sub-atomic particles. Further, use of the natural base would lead to predictions of orbital motions including planetary orbits. I will modify the two major possible equations here.

USING $M\left(c^2 - 1/2\, v^2\right) = Mc^2 \mathrm{e}^{\left(-1/2 v_a^2/c_a^2\right)}$ and NATURAL BASE CONJECTURE.

An exponential equation gives much turbulence:

$$M_a \mathrm{e}^{\left(-v_a^2/2c^2\right)} = M_a\left(1 - v_a^2/2c^2 + v_a^4/8c^4 - v_a^6/48c^6 + v_a^8/384c^8 - \cdots\right). \tag{24}$$

Useful energy equations related to Equation (12) that includes kinetic energy:

$$\begin{aligned}
E &= Mc^2 \mathrm{e}^{\left[-1/2\left[\left((\delta x)\underline{k}_1 + (\delta y)\underline{k}_2 + (\delta z)\underline{k}_3\right)/(\delta(ct))\right]\cdot\left[\left((\delta x)\underline{k}_1 + (\delta y)\underline{k}_2 + (\delta z)\underline{k}_3\right)/(\delta(ct))\right]\right]} \\
&= Mc^2 \mathrm{e}^{\left[-1/2\left((\delta x)^2 + (\delta y)^2 + (\delta z)^2\right)/(\delta(ct))^2\right]} \quad \text{if } c \text{ is variable or constant velocity of light} \\
&= Mc^2 \mathrm{e}^{\left[-1/2\left((\delta x)^2 + (\delta y)^2 + (\delta z)^2\right)/c^2(\delta t)^2\right]} \quad \text{if } c \text{ is constant velocity of light} \\
&= Mc^2 \mathrm{e}^{\left[-1/2\left((v_x)^2 + (v_y)^2 + (v_z)^2\right)/c^2\right]} \\
&= Mc^2 \mathrm{e}^{\left[-1/2 v^2/c^2\right]} \\
&= Mc^2\left[1 + \left(-1/2\, v^2/c^2\right)^1 + 1/2\left(-1/2\, v^2/c^2\right)^2 + 1/6\left(-1/2\, v^2/c^2\right)^3 + 1/24\left(-1/2\, v^2/c^2\right)^4 + 1/120\left(-1/2\, v^2/c^2\right)^5\right] \\
&= Mc^2\left[1 - 1/2\, v^2/c^2\right] \quad \text{if } v \ll c \\
&= Mc^2 - 1/2\, Mv^2.
\end{aligned} \tag{25}$$

RODGERS'S EXPONENTIAL ENERGY EQUATION:

$$\begin{aligned}
E &= \sum_{a:1}^{n}\sum_{b:1}^{n}\sum_{j:1}^{4}\left(M_a c_a^2 \mathrm{e}^{\left(-1/2 v_a^2/c_a^2 + GM_b/r_{ab}c_a^2 - Q_aQ_b/4\pi\varepsilon_o r_{ab}M_a c_a^2 + h/\lambda_a M_a c_a - P_a/\rho_a v_{xaj}^2\right)}\right) \\
&= \sum_{a:1}^{n}\sum_{b:1}^{n}\sum_{j:1}^{4}\left(M_a c_a^2 \mathrm{e}^{\left(-1/2(\delta x_a)^2/(c_a\delta t_a)^2 + GM_b/r_{ab}c_a^2 - Q_aQ_b/4\pi\varepsilon_o r_{ab}M_a c_a^2 + h/\lambda_a M_a c_a - P_a/\rho_a v_{xaj}^2\right)}\right).
\end{aligned} \tag{26}$$

The exponential of time squared makes events irreversible with time.

Substitute $\left(1 - v_{isc}t/\rho x_j^2 + P/\rho v_j^2\right)$ for the $\left(1 - GM_b/r_{ab}c_a^2 + Q_aQ_b/4\pi\varepsilon_o r_{ab}M_a c_a^2 - h/\lambda_a M_a c_a + P_a/\rho_a v_{xaj}^2\right)$ of the multi-massed equation:

For a multi-massed system:

$$E = \sum_{a:1}^{n}\sum_{j:1}^{4}\left(\rho_a V_a c_a^2 \mathrm{e}^{\left(-1/2 v_a^2/c_a^2 + v_{isc}t/\rho_a x_{aj}^2 - P/\rho_a v_{aj}^2\right)}\right). \tag{27}$$

NAVIER-STOKES-RODGERS EXPONENTIAL EQUATION

$$E/V = \sum_{j:1}^{4}\left(\rho c^2 \mathrm{e}^{\left(-1/2 v^2/c^2 + v_{isc}t/\rho x_j^2 - P/\rho v_j^2\right)}\right) \tag{28}$$

for an incompressible volume.

4.9. Discussions: Energy Density of a Sphere

ENERGY DENSITY

RODGERS'S EXPONENTIAL ENERGY EQUATION:

$$\begin{aligned} E &= \sum_{a:1}^{n}\sum_{b:1}^{n}\sum_{j:1}^{4}\left(M_a c_a^2 \mathrm{e}^{\left(-1/2v_a^2/c_a^2+GM_b/r_{ab}c_a^2-Q_aQ_b/4\pi\varepsilon_o r_{ab}M_a c_a^2+h/\lambda_a M_a c_a-P_a/\rho_a v_{xaj}^2\right)}\right) \\ &= \sum_{a:1}^{n}\sum_{b:1}^{n}\sum_{j:1}^{4}\left(M_a c_a^2 \mathrm{e}^{\left(-1/2(\delta x_a)^2/(c_a\delta t_a)^2+GM_b/r_{ab}c_a^2-Q_aQ_b/4\pi\varepsilon_o r_{ab}M_a c_a^2+h/\lambda_a M_a c_a-P_a/\rho_a v_{xaj}^2\right)}\right). \end{aligned} \tag{29}$$

The exponential of time squared makes events irreversible with time.

RODGERS'S ENERGY DENSITY EQUATION FOR SPHERE

$$\begin{aligned} € &= E/V = E/(4/3)\pi r^3 \\ &= \sum_{a:1}^{n}\sum_{b:1}^{n}\sum_{j:1}^{4}\left(M_a c_a^2 \mathrm{e}^{\left(-1/2v_a^2/c_a^2+GM_b/r_{ab}c_a^2-Q_aQ_b/4\pi\varepsilon_o r_{ab}M_a c_a^2+h/\lambda_a M_a c_a-P_a/\rho_a v_{xaj}^2\right)}\right)\Big/(4/3)\pi r^3. \end{aligned} \tag{30}$$

KINETIC ENERGY DENSITY EQUATION (limited to no gravity, no charge interaction, no pressure)

$$¥ = \left(1/(4/3)\pi r^3\right)\left[Mc^2\left(1-\mathrm{e}^{\left(-1/2Mv^2/Mc^2+hc/\lambda Mc^2\right)}\right)\right] = \left(1/(4/3)\pi r^3\right)\left[Mc^2\left(1-\mathrm{e}^{\left(-kT/Mc^2+hc/\lambda Mc^2\right)}\right)\right]. \tag{31}$$

After considering my equation above and the existing Stefan-Boltzmann Law for many days, I decided to use $\lambda^3 = (2\pi r)^3/\mathrm{e}^1$ instead of $\lambda^3 = (2\pi r)^3$ that is possibly correct. The equation for ¥ attains an equilibrium when

$$kT = hc/\lambda = \mathrm{e}^{1/3}\, hc/2\pi r, \tag{32}$$

$$\left(KE/(4/3)\pi r^3\right) = \mathrm{e}^1 6\pi^2 k^4 T^4/h^3c^3 \tag{33}$$

That result is equivalent to the Stefan-Boltzmann Law that gives $(8/15)\pi^5 k^4T^4/h^3c^3$ for $kT \square\ Mc^2$, and for $kT \square\ hc/\lambda$.

The energy density of the radiation in a container with reflecting walls is proportional to T^4. This leads to the Stefan-Boltzmann Law stating that the amount of energy radiated R is proportional to T^4.

$$¥ = (8/15)\pi^5\left[Mc^2\left(1-\mathrm{e}^{\left(-kT/Mc^2\right)}\right)\right]\left[\left(1-\mathrm{e}^{\left(-kT\lambda/hc\right)}\right)\right]^3\Big/\lambda^3$$

But I suggest my Stefan-Boltzmann-Rodgers Law that I believe is slightly better.

Stefan-Boltzmann-Rodgers Law:

$$¥ = \left(1/(4/3)\pi r^3\right)\left[Mc^2\left(1-\mathrm{e}^{\left(-kT/Mc^2+hc/\lambda Mc^2\right)}\right)\right]. \tag{34}$$

(Note that I used $\lambda^3 = (2\pi r)^3/\mathrm{e}$ to agree with the law, but it is possibly $\lambda^3 = (2\pi r)^3$ that should have been used.)

4.10. Discussions: Adding to Stephen Hawking's Black Hole Radius & Radiation

In my SUPERRELATIVITY paper, I have proposed the two very significant equations for Total Energy E of a multi-massed system:

$$\begin{aligned} E = &\left(\sum_{a:1}^{n}\sum_{b:1}^{n}\sum_{j:1}^{4}\left(1-GM_b/r_{ab}c_a^2+Q_aQ_b/4\pi\varepsilon_o r_{ab}M_a c_a^2-h/\lambda_a M_a c_a+P_a/\rho_a v_{xaj}^2\right)^{-1}\left(M_a c_a^2\right)\right) \\ &-\left(\sum_{a:1}^{n}\sum_{b:1}^{n}\sum_{j:1}^{4}\left(1-GM_b/r_{ab}c_a^2+Q_aQ_b/4\pi\varepsilon_o r_{ab}M_a c_a^2-h/\lambda_a M_a c_a+P_a/\rho_a v_{xaj}^2\right)\left(1/2M_a v_{xaj}^2\right)\right). \end{aligned} \tag{35}$$

and

$$E=\sum_{a:1}^{n}\sum_{b:1}^{n}\sum_{j:1}^{4}\left(M_a c^2 \mathrm{e}^{\left(-1/2v_a^2/c_a^2+GM_b/r_{ab}c_a^2-Q_aQ_b/4\pi\varepsilon_o r_{ab}M_a c_a^2+h/\lambda_a M_a c_a-P_a/\rho_a v_{xaj}^2\right)}\right). \tag{36}$$

Although my equations differ slightly from current theoretical physics equations, I want to add to work about black holes that I pedantically, believing in variable velocity of light for 45 years, have always stated do not exist [25]-[27]. Stephen Hawking's power equation might be extremely useful for mankind, and I want to contribute to it.

STEFAN-BOLTZMANN-SCHWARZSCHILD-HAWKING BLACK HOLE RADIATION POWER LAW

An extremely impressive physics equation is the Stefan-Boltzmann-Schwarzschild-Hawking black hole radiation power law. With my unified field theory knowledge, and with great respect for Stephen Hawking's effort, I now intend to contribute to that magnificent equation. Say black hole radiation power is P_{ower}:

$$P_{ower}=\left(4\pi r^2\right)\left(\pi^2k^2/60h^3c^2\right)(T)^4. \tag{37}$$

$$kT=hc/4\pi r. \tag{38}$$

$$(T)^4=\left(hc/4\pi rk\right)^4. \tag{39}$$

$$P_{ower}=\left(hc^2/\left(15\times4^4\right)\pi k^2\right)\left(1/r^2\right). \tag{40}$$

$$r=2GM/c^2 \tag{41}$$

is the radius Stephen Hawking used.

$$P_{ower}=\left(hc^2/\left(15\times4^4\right)\pi k^2\right)\left(c^2/2GM\right)^2 \tag{42}$$

is the power radiation equation Stephen Hawking attained.

HAWKING-RODGERS RADIUS OF A BLACK HOLE

$$r=\left(\left(\frac{GM}{c^2}\right)-\left(\frac{Q^2}{8\pi\varepsilon_o Mc^2}\right)\right)\Bigg/\left(\left(\frac{v^2}{2c^2}\right)-\left(\frac{h}{\lambda Mc}\right)+\left(\left(\frac{Pc^2}{\rho v_x^2}\right)+\left(\frac{Pc^2}{\rho v_y^2}\right)+\left(\frac{Pc^2}{\rho v_z^2}\right)\right)\right). \tag{43}$$

STEFAN-BOLTZMANN-SCHWARZSCHILD-HAWKING-RODGERS BLACK HOLE RADIATION P_{ower}

$$\begin{aligned}P_{ower}&=\left(\frac{hc^2}{\left(15\times4^4\right)\pi k^2}\right)\left(\frac{1}{r^2}\right)\\&=\left(\frac{hc^2}{\left(15\times4^4\right)\pi k^2}\right)\left(\frac{\left(\left(\frac{v^2}{2c^2}\right)-\left(\frac{h}{\lambda Mc}\right)+\left(\left(\frac{Pc^2}{\rho v_x^2}\right)+\left(\frac{Pc^2}{\rho v_y^2}\right)+\left(\frac{Pc^2}{\rho v_z^2}\right)\right)\right)^2}{\left(\left(\frac{GM}{c^2}\right)-\left(\frac{Q^2}{8\pi\varepsilon_o Mc^2}\right)\right)^2}\right).\end{aligned} \tag{44}$$

4.11. Discussions: 3-D or 4-D Co-Ordinate System?

TWO POSSIBLE THREE-DIMENSIONAL CO-ORDINATES: My introductory four-dimensional co-ordinates explain kinetic energy. But two possible three-dimensional co-ordinates can also explain kinetic energy.

$$\begin{aligned}&\delta\left(\left(M^{1/2}\left(\left(ct(1/3)^{1/2}+x(1/2)^{1/2}\right)\underline{k_1}+\left(ct(1/3)^{1/2}+y(1/2)^{1/2}\right)\underline{k_2}+\left(ct(1/3)^{1/2}+z(1/2)^{1/2}\right)\underline{k_3}\right)\right)\right.\\&\left.\cdot\left(M^{1/2}\left(\left(ct(1/3)^{1/2}-x(1/2)^{1/2}\right)\underline{k_1}+\left(ct(1/3)^{1/2}-y(1/2)^{1/2}\right)\underline{k_2}+\left(ct(1/3)^{1/2}-z(1/2)^{1/2}\right)\underline{k_3}\right)\right)\right)=0.\end{aligned} \tag{45}$$

$$\delta\left(\left(M^{1/2}\left(\left(ct\left(1/3\right)^{1/2}+ix\left(1/2\right)^{1/2}\right)\underline{k}_1+\left(ct\left(1/3\right)^{1/2}+iy\left(1/2\right)^{1/2}\right)\underline{k}_2+\left(ct\left(1/3\right)^{1/2}+iz\left(1/2\right)^{1/2}\right)\underline{k}_3\right)\right)\right.$$
$$\left.\cdot\left(M^{1/2}\left(\left(ct\left(1/3\right)^{1/2}+ix\left(1/2\right)^{1/2}\right)\underline{k}_1+\left(ct\left(1/3\right)^{1/2}+iy\left(1/2\right)^{1/2}\right)\underline{k}_2+\left(ct\left(1/3\right)^{1/2}+iz\left(1/2\right)^{1/2}\right)\underline{k}_3\right)\right)\right)=0. \quad (46)$$

At present, these possible three-dimensional co-ordinates do not seem mathematically necessary. Therefore, I will continue to pursue my new four-dimensional co-ordinates. My mathematics, for reversibility or irreversibility of events with time, provide useful equations to justify or replace the famous Navier-Stokes Equations, and to help physicists and engineers who need fluid dynamics equations.

4.12. Definitions Used

c = velocity of light, ρ = density, € = energy density, e = exponential, E = energy, F = force, kT = kinetic energy, h = Planck's constant, $i = (-1)^{1/2}$, k = constant, M = mass at velocity v, M_a = mass a, M_o = mass at zero velocity, P = pressure, t = time, v_{isc} = viscosity, δx_a = change in x_a, δt = change in time, v_a = velocity of M_a, π = pi, V = volume, N_m = number of molecules, G = gravitational constant, r_{ab} = radius between a and b, Q_a = charge on a, Q_b = charge on b, λ_a = wavelength of a, $\sum_{a:1}^{n}$ = summation of a from 1 to n, $\sum_{b:1}^{n}$ = summation of b from 1 to n, $\sum_{j:1}^{n}$ = summation of j from 1 to 4, KE = kinetic energy.

4.13. Wave Formula Problem

In Superrelativity, I have used hc/lambda in my equations, but this is only correct for a specific situation when the velocity is that of light. I should have used the general formula hv/lambda in most of my equations. Note that the orbital number can also be used as for electrons to give the formula nhv/lambda.

4.14. More Complicated Energy Equation

The energy equation is more complicated than given in this paper so far. I suspect that Albert Einstein ignored proper conception of time in his famous Special Relativity equation. I have modified the equation to Eqn 47. Note that theta can be very much expanded.

$$E=\frac{\left(\partial\left(\sqrt{M}cte^{\frac{\theta}{2}}\right)\right)^{2}e^{-\frac{\left(\partial\left(\sqrt{M}xe^{\frac{\theta}{2}}\right)\right)^{2}}{2\left(\partial\left(\sqrt{M}cte^{\frac{\theta}{2}}\right)\right)^{2}}}}{\left(\partial t\right)^{2}} \quad (47)$$

4.15. More Complicated Radius of a Black Hole

Although theta equals velocity squared over two by velocity of light squared, that is a simplification because the velocity squared over two by velocity of light squared is actually multiplied by exponential to minus two by theta. The multiplication is usually insignificant, but is significant in some situations. Note that velocity equals c in this calculation.

5. Conclusion

The Navier-Stokes Equations are very mysterious, but useful. As my progression of physics papers proves, for many thousands of hours, very creatively, I have attempted to solve difficult mathematical physics problems, especially my unified field theory of physics entitled ZERO RELATIVITY. The Clay Mathematics Institute requested, "Prove or give a counter-example of the following statement: In three space dimensions and time, given an initial velocity field, there exists a vector velocity and a scalar pressure field, which are both smooth and globally defined, that solve the Navier-Stokes Equations." If I had not created Zero Relativity, I would have attempted a much more simplistic, but incorrect, paper than this mathematically sophisticated physics paper that has required and produced some baffling mathematics. More and more, physicists are realizing that this universe consists of irreversibility of events with time. I needed to consider reversibility and irreversibility of events with time. Very significantly, I created wonderful irreversibility equations to replace Albert Einstein's reversibility equations. To be inspired, see RODGERS'S EX- PONENTIAL ENERGY EQUATION at Equation (26), see HAWKING-RODGERS RADIUS OF A BLACK HOLE at Equation (43), and see STEFAN-BOLTZMANN-SCHWARZSCHILD-HAWKING-RODGERS BLACK HOLE RADIATION POWER LAW at Equation (44). As I have believed for the last 45 years, I believe in variable velocity of light, but my typed velocity of light, in this paper, can be variable or constant. Further, very impressed by the Schwarzschild's Equation, I have improved that to incorporate more formulae, for advanced equations, and developed great exponential equations useful for Cosmology that is really Fluid Dynamics in Space. Fluid Dynamics should consist of wave equations, so I hope that you enjoy reading my revolutionary NAVIER-STOKES-RODGERS EXPONENTIAL EQUATION at Equation (28). Importantly, I have shown that, "in three dimensions and time, given an initial velocity field, there exists a vector velocity and a scalar pressure field, which are both smooth and globally defined, that solve the Navier-Stokes Equations" in my paper entitled SUPERRELATIVITY.

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