

# Unified Theory and Relativity Imbrogio

Rati Ram Sharma

Professor & Head (Retired), Department of Biophysics & Nuclear Medicine, Postgraduate Institute of Medical Education & Research, Chandigarh, INDIA; Mailing Address: H. No. 615, Sector 10, Panchkula-134113, INDIA  
e-mail: [rrjss615@gmail.com](mailto:rrjss615@gmail.com) website: <http://www.physicsrevolution.com>

A wave exists in and is composed by its propagating medium. Einstein erred by replacing the physical medium for light-wave with 4-D spacetime continuum. Abstract concepts of space and time evolve from our perceptions of successive 'there, here, there' and 'then, now, then' arising from the successive motions and changes in the surroundings. These two abstract concepts cannot fuse into any tangible concrete 'spacetime' continuum. All multi-dimensional spacetime continua are mathematical constructs bereft of physical existence. In our Unified Theory, light-medium is the all-composing and all-pervading 'sharmon medium' composed by the new particle 'sharmon'. 'Origin' of light wave is the first 0-spin sharmon in the sharmon-medium, which receives energy quantum from the source and rises to its 1-spin state. Similarly, 'terminus' of light wave is the last 1-spin sharmon which transfers energy quantum to the target and itself returns to 0-spin state. From origin to terminus the 0-spin sharmon composed energy quantum moves as a wave-quantum unity via 1-spin sharmons which do not physically move. Creative beginning at the origin and vanishing end at the terminus makes velocity of light-wave invariant to the motions of source and target. Actually observed light velocity is not only constant  $c = (\epsilon_0 \mu_0)^{1/2}$  and invariant to the velocities of the source and/or the target relative to the sharmon medium but also locally variable, may superluminal or subluminal, which invalidate Relativity but are explained by Unified Theory. The light velocity  $c$  becomes  $c \pm v$  for the observer moving at a velocity  $\pm v$  relative to the sharmon medium, ruling out constancy of light velocity  $c$  over the inertial frames. Since the velocity of a body cannot vary (like  $v$ ) with and be invariant (like  $c$ ) to, the source-target velocity at the same time, the Lorentz transforms do not describe any real motion in nature. Thence deduced 'contraction of space' and 'dilatation of time' are unrealistic demands on nature to change to fit their mathematics. Bending of light in a gravitational field follows in Unified Theory with photon having mass without curving the 4-D spacetime.

## 1. Introduction

Science is the creation of scientists but not their exclusive all-time property. After publication every piece of research becomes a common property. It affects all and therefore is the concern of everybody. But sometimes the core basics of the theory are wrapped in technical jargon, not easily comprehensible to the general reader, nay even to the expert scientists [1].

It is, for example, said that initially only three persons could understand the theories of relativity: the author Albert Einstein, mathematician Arthur Stanley Eddington and philosopher Bernard Russell. The difficulties were with the tensor mathematics of general relativity and also for the new abstract concepts about the nature of space and time. Most difficult to visualize was the unrealistic and nonexistent 4-dimensional spacetime continuum, which propagates light and curves in a gravitational field.

The non-existent 4-D spacetime of relativity theories [2] was soon followed by a host of theories [3-7] based on spacetime continua of higher and higher dimensions wrapped in more and more abstruse mathematics and shrouded in increasing fantasy of unnatural philosophies to make twentieth century as the century of unrealistic physics. Quantum theory regards objective reality as a metaphysical speculation outside of physics, hence does not recognize things as they really are. It deals in what can be known about, and not in what there actually is in, the micro cosmos. Relativity, likewise deals in observed parameters. A host of such unrealistic concepts have turned the modern physics so unrealistic that even the most celebrated physicists cannot

describe the objective reality the way one would like to through easily understood language and visualizable concepts. Incalculable amounts of funds and intellectual wealth of so many brilliant physicists have been wasted. Four-five generations were taught unrealistic physics in classrooms. Innumerable textbooks were written and articles published in scientific journals and lay press to spread the message wide. The \$10b Large Hadron Collider was erected at Geneva to find the non-existent mass-generating Higgs boson and wrapped up extra dimensions of space.

I am constrained to make these remarks under the impulse of the concern for the development of realistic science. Einstein, with a great open mind, admitted in his famous 12 December 1951-letter to Besso that he never was clear and sure about the physical nature of the light photon. Yet he carried the mathematical logic of his belief in the 'constant  $c$  in 4-D spacetime invariant to source-observer motion' with courage of conviction, to the two (Special & General) theories of relativity with so many astounding conclusions, which though unrealistic in nature are still holding the sway even after a century.

On 10th June 2004 the United Nations general assembly passed a unanimous resolution declaring 2005 as the "year of physics" and asked UNESCO to organize events to commemorate Einstein's groundbreaking papers published in 1905. The UN, by and large, is a political world body. It pronounced a well-meaning judgment, on behalf of all its member countries, on a controversial scientific subject. The discussions in this paper will, however, unravel the truth and help the readers to see for

themselves that the UN members innocently and wrongly believed that Einstein was completely and flawlessly right. In fact Unified Theory provides a realistic alternative replacement [1, 8] for the theories of special and general relativity.

## 2. Space, Time and Spacetime Continua

Space and time are basic to the theories of physics and cosmology. However, a deep intuition reveals that these are not substantive physical entities but abstract concepts. The concept of space evolves from our life-long perceptions of successive "there, here, there" and that of time from successive perceptions of "then, now, then", all arising from the successive motions and changes in the surrounding objects. A person born and brought up in all-standing-still surroundings will not have the concepts of space and time. The "time arrow" moves only forward and never backwards due to irreversibility of the natural processes of change and motion generating the time concept.

The concepts of space and time being essentially abstract cannot fuse into any tangible concrete spacetime continuum. The existence of any spacetime continuum would retard the motion of terrestrial and heavenly bodies and of even photons to propagate light through or across it, which is not actually observed. Moreover, a non-composite static spacetime continuum cannot undulate to transmit transverse light waves. Therefore the spacetime continua of four and higher dimensions are mere mathematical constructs bereft of real physical existence. The "wrapped up extra dimensions of space", which the Geneva based Large Hadron Collider is planned to investigate, thus do not exist.

## 3. Light Propagating Sharmon-Medium

Newton did not comment or commit on the light propagating aether because the corpuscles of his theory of light could jolly well move in empty vacuum. However, Christian Huygens' light waves needed the space filling aether extremely more rigid than air to propagate high speed light, misconstrued as elastic wave like sound. Moreover, light, unlike sound, was not known to bend round corners.

The work of Thomas Young and Augustin Fresnel on interference and diffraction of light up to 1827 and of Sagnac in 1913 had established the wave nature of light needing a light medium for its propagation in space. The postgraduate students of physics under spectroscopy routinely experiment on the interference and diffraction of light. James DeMeo's review [9] stresses that Dayton Miller's "positive" results yielded more-than-zero aether drift as evidence for the existence of light-propagating medium.

Light-wave is a form of energy. Inter-conversions of energies  $E$  among themselves and/or with mass  $m$  follow  $E = mc^2$  suggesting the existence of a basic substance composing all forms of energy and mass otherwise  $E$  and  $m$  could not inter-convert. Compositional unity of energy and mass into a subtler substance needs to encompass the space-medium, since the electromagnetic radiation including light-wave, is compositionally one with its propagating medium. This is analogous to the compositional oneness of water wave and the pond water on which it moves.

In Unified Theory, therefore, light medium is the subtlest **basic substance** composed by the new particle, sharmon, comprising electrically positive positrino and negative negatrino, the two

non-composite indivisible 'elements' composing all forms of energy  $E$  and mass  $m$  for the inter-conversions among  $E$  and  $m$ .

It follows that in reality there is an intrinsic unity or continuity in the compositions of all forms of mass, energy, radiation and the space medium, which propagates light. The physical "sharmon medium" therefore is the subtlest physical entity in nature and hence is the '**basic substance**'.

## 4. Unreality of Lorentz Transforms

Einstein in his theory of special relativity (SR) wrongly replaced the physical medium for light-wave with 4-dimensional spacetime continuum and re-deduced the Lorentz Transformation formulae to support its postulated constancy of the light velocity  $c$  in an inertial frame moving at a velocity  $v$ .

For an observer moving with the speed  $v$  along the  $x$ -axis of the stationary frame, the space and time coordinates  $x$  and  $t$  appear on the moving frame  $X'Y'Z'$  as  $x'$  and  $t'$ , given by the so-named Lorentz formulae

$$x' = \beta(x - vt) \text{ and } t' = \beta\left(t - vx/c^2\right) \quad (1)$$

where  $\beta = 1/\left(1 - v^2/c^2\right)^{1/2}$ .

The velocity  $v$  of a material particle or of the primed frame  $X'Y'Z'$  is caused by an externally impressed force in accord with Newton's laws of motion but the light velocity  $c$  is that of the self propagated photon along an electromagnetic wave. The light velocity  $c$  is constant and invariant to source-observer motion but that of the material particle  $v$  is not so. The Lorentz transformations in effect relate to a factitious motion of a hypothetical particle with too exclusively different dual kinematics of  $v$  and  $c$ . So Lorentz transformations do NOT describe any motion in the real Nature. Their conclusions on 'contraction of length' and 'dilatation of time' are unrealistic demands on Nature to change to fit the mathematics of Special Relativity. Even otherwise, actual lengths and objective time intervals in an object or a physical phenomenon, viewed by say, 100 differently moving observers cannot undergo 100 different objective distortions at the same time. In fact, the light velocity becomes  $c \mp v$  for the observer moving at a velocity  $\pm v$  relative to the light propagating sharmon medium, ruling out constancy of light velocity  $c$  over the inertial frames.

## 5. Nature of Light

In Unified Theory [9] the light-wave energy quantum, after emission from the source is initially received by a 0-spin sharmon in the sharmon-medium, which rises to its 1-spin state and marks the effective "origin" of the light-wave. And the last 1-spin sharmon of the medium, which finally transfers the wave energy quantum as a 1-spin photon to the target and itself returns to the 0-spin state, marks the "terminus" of the wave. From origin to the terminus, the 0-spin sharmon packet-energy quantum per unit frequency cycle is propagated as a wave-quantum unity along a transverse electromagnetic wave in the sharmon medium contiguously via 1-spin sharmons, which do not physically move but only provide a physical carrier.

Due to creative beginning of the light-wave at the "origin" in the sharmon medium, the light velocity  $c$  in the sharmon me-

dium is invariant to the source velocity  $S$  (uniform or variable/accelerated) relative to the light propagating sharmon medium and vanishing end of the light wave at the "terminus" in the sharmon medium makes  $c$  independent of the target-velocity  $T$  (uniform or variable/accelerated) relative to the sharmon medium. Constancy and invariance to source-target motion of light velocity in  $c = (\epsilon_0 \mu_0)^{1/2}$  the sharmon medium also follow from the fact that the electric permittivity  $\epsilon_0$  and magnetic permeability  $\mu_0$  of the sharmon medium are constant and not affected by the motion of the source or target. Even the observed variability [10] and superluminality [11] (light velocity exceeding  $c$ ), which invalidate the theories of special and general relativity, also follow in the Unified Theory [8] by merely affecting electric permittivity  $\epsilon_0$ , magnetic permeability  $\mu_0$ , and refractive index of the propagating sharmon medium locally. Sharmon medium as a kinetic gas composed by sharmons provides for local variations in its number density sharmons/cm<sup>3</sup>, mass density gm/cm<sup>3</sup>,  $\epsilon_0$ ,  $\mu_0$ , and  $c = (\epsilon_0 \mu_0)^{1/2}$  also in the gravitational constant  $G$ .

However, for the observer moving at velocity  $\pm u$  relative to the light propagating sharmon medium the light velocity appears as  $U = \mp u$ . This rules out the constancy of light velocity  $c$  in Relativity's inertial frames. Propagation of light in the sharmon medium is an absolute motion since it is NOT affected even by the motion of the source and/or target/observer. Thus in this context one has to differentiate and be clear about the nature of the six velocities  $c, S, T, v, u, U$ . Einstein's special relativity had confined its consideration only to  $c$  and  $v$  in the context of its inertial frames and drew wrong conclusion.

The long wave electromagnetic radiation, like the radio waves, is predominantly wavelike and the short waves like X- and gamma rays show corpuscularity. As the transition from one part of the electromagnetic spectrum to the other is continuous, its "wave-quantum unity" is inescapable. Due to experimental limitation to observe only one, not both, of the two co-existent and blended-together characters at a time, this unity appears as "wave-or-quantum" duality described by Quantum Theory. After emission and before absorption it is always the energized 1-spin sharmon, which in deference to convention and for continuity is still called the 1-spin "photon". But Sec. 7.6 of Chapter-7 in [9] denies the existence of conventional "photon".

Since the spin of an emitter does not fall by 1 after emitting the photon and that of an absorber does not increase by 1 on absorbing the photon, what is emitted or absorbed is NOT the 1-spin photon/sharmon as a whole but only its energy of one wave-cycle comprising 0-spin sharmons. The 1-spin photon as such is not emitted, propagated or absorbed. However, the transmission, always and throughout, is of the energy of the 1-spin photon, composed by 0-spin sharmon, as a wave-quantum unity. The wave-quantum unit is a one wave-cycle 'pulse' one wavelength  $\lambda$  long, wherein the "quantum" has more than zero size and mass. A spherical wave-front or a lengthy electromagnetic wave comprises innumerable such wave-quantum pulses. In the relativistic quantum theory the photon of total energy

moves at light velocity  $c$  without having an infinite energy  $E = cp$  because it is massless ( $m = 0$ ). It is not clear, however, why for  $m = 0$ , the momentum  $p = mc$  and total energy  $E = pc$  are not zero.

## 6. Bending of Light in a Gravitational Field

A photon comprising sharmons of non-zero mass, experiences the acceleration due to gravity  $g = GM/R^2$  of the heavenly body of mass  $M$  and radius  $R$ . Light from a distant star goes past the heavenly body in time  $t = R/c$ , to fall by the distance

$$s = \frac{1}{2} g t^2 = \frac{1}{2} \left( \frac{GM}{R^2} \right) \cdot \left( \frac{2R}{c} \right)^2 = \frac{2GM}{c^2} \quad (2)$$

For a distance  $D$  the light bends by the angle

$$\frac{s}{D} = \frac{2GM}{Dc^2} \quad (\text{in radians}) \quad (3)$$

This is exactly the Einstein first formula for the bending of light due to curving of the 4-D spacetime in a gravitational field. Actually the gravity of the mass body extends far beyond to act on the photon for an 'influence-period' much longer than the transit time  $t = 2R/c$  used above to produce a much larger bending of  $4GM/Dc^2$ . Arthur Eddington's observation during the total solar eclipse on May 29, 1919 confirmed the bending of light from distant star due to the sun's gravity to support Einstein's unique and revolutionary views on the nature of space, which made Einstein a world hero instantly.

Our above derivation [8], as against relativity, shows that photon is NOT massless but has gravitational mass and the real physical "sharmon medium" propagates light and also mediates gravitational field. Light bends under gravitational field without curving the 4-D spacetime continuum which in Unified Theory is non-existent. Details are given in [8].

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