

# **THE UNIFIED THEORY**

**(A complete paradigm shift)**

**2009**

**Rati Ram Sharma**

## About the Book

**The Unified Theory (UT)** presents a 'unified' alternative replacement for Relativity, Quantum, Quark-lepton, Higgs, String, Supersymmetry, Electroweak theories. The 'light-wave' propagates in the new physical '**sharmon medium**' (SM) of the nature of a kinetic gas, composed by new particle '*sharmon*', as the '**basic substance**' composing all forms of energy  $E$  & mass  $m$  for their inter-conversions as per eqn.  $E = mc^2$ . The existence of SM is supported by the experimental observations of Young, Fresnel, Sagnac & Dayton Miller. Sharmon is made of two basic elements +ve *positrino* and -ve *negatrino* called '*cosmino*' as they also compose all in the Cosmos. UT has only two elements (positrino, negatrino), two basic charges (mass, electric) and two basic forces (gravitational, electromagnetic). The quark-lepton theory with Supersymmetry has over 200 elementary particles none of which satisfies the definition of 'element' that composes others but is itself non-composite. Cosmino mass & charge are innate. So massless and mass or charge generating particles (Higgs) and space vortices & toroids are non-existent. UT rejects weak & color charges; weak & strong forces and also strings as it is not clear what vibrates in them. Mass & charge of a non-composite homogeneous cosmino inseparably unify into itself. Two basic forces unify into a single **gravitoelectromagnetic** force.

Space & time are abstract concepts evolving from our life-long percepts of 'there, here, there' and 'then, now, then' arising from successive motions & changes in surroundings. The two cannot fuse into any concrete spacetime continuum. UT discards non-composite, static 4-D and higher dimensional spacetime continua as none can undulate to propagate transverse light wave. The SM explains bending of light due to gravity and results of Gravity Probes A & B. Constancy and invariance to source-observer motion of light velocity  $c$ , the two axiomatic postulates of Special Relativity, as also observed variability of  $c$  and superluminality, which invalidate Relativity, are explained. Light is the absolute motion as its velocity is NOT relative even to that of its source & target and light transmitting sharmon medium is 'absolute reference frame'. UT explains wave-quantum **unity** for light & matter, proved by Tonomura but splits it into QT's wave-or-quantum **dualities** due to experimental limitations to observe only one not both characters at the same time.

UT opposes relativity's contraction of objective length or dilation of time due to observer motion, massless photon & neutrino and sizeless basic particles. It also rejects QT's Uncertainty Principle and proposes new universal 'Principle of Null Action' based on conservation of mass, energy and action. UT gives dynamic cosmino-sharmon compositions, free from the  $g$  and  $\mu$  anomalies, of electron, proton & neutron. Neutron's Electric Dipole Moment calculated from UT agrees with observation. UT predicts that no Fermion can be neutral.

In a universe expanding as per Big Bang or Steady State theory, redshifts should increase exponentially with time, which is not observed. In UT's Non-expanding Universe redshift is caused by non-Doppler depletion of photonic energy due to viscous, gravitational & EM losses; cosmological observations, even on Ia type Supernovae that amazed astronomers, are explained.

**Price:**

### **About the Author**

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He can assume alpha & theta brain wave states at will as tested by Dr. Almer Green, past Director, Menninger Foundation, USA. Thereby completed the work & writing of Ph.D. (London) thesis in 7 months (June thru Dec' 68) after plan approval. His guide Prof. J.F. Fowler certified him as "definitely one of the brightest physicists working in Medical Physics anywhere in the world". He did B.Sc. (1952) and M.Sc. (Phys., 1954) of Agra Univ. from Meerut College. Got allround training in Nuclear Medicine at Hammersmith Hospital, London and started it for teaching, diagnosis, therapy & research at PGI in April 1969. Past President, Indian Acad. of Med. Phys., Soc. of Nuclear Med.(India), Assoc. for Scient. Res. in Homoeopathy and Chief Editor, J. of Homoeopathy of North India. He contested the 1990 Physics Nobel Laureates' claim of revealing non-composite quarks; compositeness of quarks predicted by him was experimentally confirmed in 1991. With his new Theory of Non-expanding Universe contested the basis of 2006 Physics Nobel Prize, supporting the not provable Big Bag theory. Observed Neutron's negative Electric Dipole Moment agrees with that calculated from his theory, supporting his prediction that no Fermion is neutral. His controlled drug trials on human patients, rats and mice established the efficacy of the high potency homoeomedicines with no molecule of the original drug, removing the perennial impasse created by Avogadro's law. To elucidate the science of Homoeopathy he proposed 3 new sciences of *Inductive Chemistry*, *Xenobiology* & *Inductoxenopathy*, also *Navayurveda*: a judicious mix of Homoeopathy, Allopathy & Yoga. For 1984-book *Molecular Homoeopathy* & these researches the Open Internl. Univ. for Complementary Med. awarded him D.Sc., M.D. (M.A.) and the 1989-Albert Schweitzer prize, also nominated him for the Nobel Prize in Medicine in 1996. He received the N. D. R. I., Karnal's Republic Day award on 26Jan'64. New Hope Seekers Society, Dehradun recognized on 12Jan'08 his contributions to Med. Phys. & Nucl. Med. with Nation Builders Award 2007. In his new theory of non-Darwinian intra-species evolution man has evolved from, not the ape but the molecular through zygotic and primitive man. He has co-guided several PhD, MD & MS theses and authored over 200 original communications and 8 books. Other theories proposed include Sharma Theory/Unified Theory, Principle of Null Action, Molecular Intelligence, Molecular Homoeopathy, Non-Darwinian Intraspecies Evolution, Gene inclusion & gene exclusion principles, Hook's law mediated nuclear force, unified basic force/field Gravitoelectromagnetic, symbiosis of Science & Philosophy, new Aanand Yoga.

# **UNIFIED THEORY**

Dedicated to the open-minded scientists  
who will promote these new ideas for general good

# Unified Theory

## Other books by the author

1. *Realistic foundations of Physics & Cosmology*, Abhishek Publications, 57-59 Sector 17C, Chandigarh, India, 2002.
- 2, 3. Neoclassical UNIFIED PHYSICAL THEORY of Every Thing, Author, Panchkula, India, 1st ed. June 1997, 2nd ed. August 1998.
4. Unified Physical Theory, COSMO Publications, New Delhi, India, 1990.
5. Molecular Homoeopathy / (Molecular Biophysics of the “Micro” Dose), COSMO Publications, New Delhi, India, 1984.
6. *Nyukliya Ayurvigyan* (Nuclear Medicine in Hindi), Haryana Sahitya Academy, Chandigarh, India, 1982.
7. *Madhyamik Bhautik Vigyan* Pt. II (Intermediate Physics in Hindi), Co-author B.N.Kar, Orient Longmans (P) Ltd., Calcutta, India, 1959.

## New Sciences Proposed by the Author:

1. Inductive Chemistry
2. Xenobiology
3. Inductoxenopathy
4. *Navayurveda*

## Some New Theories Proposed by the Author

1. Sharma Theory now Unified Theory
2. Unified Physical Theory
3. Theory of Non-expanding Universe
4. Principle of Null Action
5. Molecular Intelligence
6. Molecular Homoeopathy
7. Non-Darwinian Intraspecies Evolution
8. Gene inclusion & gene exclusion principles
9. Hook’s law mediated nuclear force
10. Gravitoelectromagnetic as the single basic unified force/field

# **UNIFIED THEORY**

## **(A complete paradigm shift)**

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2009

## **UNIFIED THEORY**

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## AUTHOR'S PREFACE

### HOW, WHAT & WHY OF THIS BOOK

The perennially unresolved basic problems in Physics relate to the nature and number of basic elements, basic charges and fundamental forces as well as the absence or presence and nature of the physical medium in space. In Cosmology even the very basic questions as to whether the universe is expanding or not and how the redshifts are caused are not answered satisfactorily. This book addresses the problems of Physics & Cosmology.

The 1990-book **Unified Physical Theory** (COSMO, New Delhi) and the 2002-book **Realistic Foundations of Physics & Cosmology** (Abhishek, Chandigarh), which still retain the 'must read' status, are based on the light propagating '**Sharmon Medium**' composed by the new particle '**sharmon**', named in 1988 after the author. The '**sharmon**' comprises a +ve positrino & a -ve negatrino. These are the two non-composite basic elements composing all forms of energy & mass, material particles and energy quanta in the Cosmos, hence named '**cosmino**'. Sharmon medium as the '**basic substance**' marks the end of subtlety and cosminos the end of subtlety and divisibility. The 1990 & 2002 books discarded the Weak Charge & Weak Force. The present book discards the Color charge & Strong Force too and resolves various outstanding problems with only two elements (+ve positrino & -ve negatrino), two basic charges (electric & mass) and two fundamental forces (electromagnetic & gravitational). Moreover, the cosmino as a non-composite element to have isotropic and homogenous properties should have only one constituent and single charge so its mass and charge inseparably unite and unify into a single *gravitoelectric* mass-charge or the cosmino itself and the gravitational and electromagnetic forces unify into a single *gravitoelectromagnetic* force.

The **UNIFIED THEORY** presents a comprehensive visualization of the objective reality by the author's mental eye. Whereas mainstream theories are different for different phenomena of Physics & Cosmology the **UNIFIED THEORY**

covers them alone and goes beyond to provide an alternative replacement for the contemporary theories in a paradigm shift.

Highly encouraging were the global videotalks I gave under the aegis of the Natural Philosophy Alliance: *Unified Theory, A Complete Paradigm* (14 Mach'09); 16 th NPA Conference 25-29 May, Storrs: *Unified Theory, Alternative to Mainstream Physics, Cosmology & More* (26 May); *Unified Theory Replaces Relativity Theories* (29 August '09); *Unified Theory Replaces Relativity & Quantum Theories and Uncertainty & Hamilton Principles* (19 September 2009). These will continue. See link: <http://www.worldnpa.org/php2/index.php?tab0=Scientists&tab1=Scientists&tab2=Display&id=664> .

The first Chapter considers the Standard Models underlying various theories. The second Chapter presents a reappraisal of the Einstein model. Next three chapters deliberate on the basic substance, elements, charges and the space medium. Chapters six to eight consider the two fundamental forces and their unification. Reappraisals of Relativity, Quantum Theory and Relativistic Quantum Electrodynamics are given in the next three chapters. Chapter twelve presents the dynamic cosmino-sharmon composition of electron, proton & neutron. New theory of non-expanding & non-contracting universe is given in Chapter-13 and the new Principle of Null Action in Chapter-14. Reappraisal of the string theories is given in Chapter-13. The Epilogue looks back and into the future under 'Retrospects & Prospects'. The Appendices contain useful information.

This present book will serve as a source to revise the textbooks at the University, College & School levels and will interest the teachers, research scholars and students of Physics, Astrophysics, Cosmology &c.

I will welcome well-argued comments & suggestions for improvement to be incorporated in the next edition.

## **PROLOGUE**

### **ESSENTIALS OF AN ACCEPTABLE THEORY OF SCIENCE**

Physics seeks after the knowledge of the most general causes and principles of physical phenomena of the inanimate Nature and can therefore be taken as synonymous with Natural Philosophy. The deeper strata of its object of inquiry are beyond perception or observation through senses even when aided by the most powerful instruments. These strata, therefore, are matters of guess, conjecture or imagination. Even on the observable plane, we perceive objects not directly but only through the signals, emanating or reflected from them and reaching our senses. This makes our knowledge about real objects partly inferential and non-objective, hence uncertain and imprecise.

The foundations of the theories of Physics cannot be extracted from the perceptual knowledge but are mostly invented speculatively as axioms comprising conceptual assumptions and mathematical models. A theory stands on, and falls with, its founding postulates. The correctness and quality of a theory largely depend on the closeness to reality of its conceptual model. When the starting assumptions are realistic the theory remains consistent with already known infallible laws. And its those conclusions which are at variance with the existing knowledge, turn out as true predictions of new facts and phenomena to be discovered later. However, every unrealistic concept in the founding axioms is carried over and even magnified, sometimes with some very serious and significant ramifications, in the subsequent deductions, making the theory inconsistent with some well-established laws, facts and common sense. The theory is found, not to describe the reality faithfully, but to demand the real Nature to change to fit it. This necessitates revision, of the pillar postulates, which if not carried out turns science into a fiction that fantasizes facts and concepts but misinforms.

## Unified Theory

The Relativity and Quantum Theory dominate every field and aspect of Physics and other sciences but stand apart due to their lack of common conceptual foundations. In reality a wave exists only in its propagating medium, but Relativity theories dismiss the propagating medium for the light 'wave'. Einstein treated the quantum and wave aspects of electromagnetic radiation in separate theories. Quantum theory splits the intrinsic wave-quantum **UNITY** for radiation and matter into wave-or-quantum '**dualities**', yet cannot explain the latter satisfactorily. Uncertainty Principle and theories of expanding universe '*create matter from nothing*' to introduce and validate violations of the otherwise inviolable conservations of energy and mass.

It is generally accepted that an element composes other particles but it itself is non-composite. Quarks are compressible & assemblable, hence composite, but are taken as elementary particles. Weak charge does not conserve but is taken as a fundamental charge. Higgs boson is non-existent, yet its hunt continues. The Quark-Lepton Theory was expected to bring order in the diversity of, but has itself led to over a hundred, elementary particles, making the term "element" meaningless. The Supersymmetry doubles this number of elementary particles by adding a super partner to every one of them.

A real physical object, for its existence and phenomena, does not actually need any observer but was wrongly taken to be governed by not the actual but observed magnitudes of its physical parameters, which are associated with imprecision given by the famous Heisenberg relations. Relativity's Lorentz transformations and the thence deduced relativistic 'contractions of length' and 'dilations of time' are not even the observer-dependent subjective appearances but were wrongly taken to describe the reality objectively.

The concepts of space and time evolving from the lifelong direct perceptions of successive motions and changes in the surroundings are in fact abstract but were wrongly taken to fuse into concrete spacetime continua and hyperspaces to found numerous mathematical theories. The Relativity does not explain its founding postulates on the constancy, and invariance to

source-observer motion, of light velocity  $c$  from its 4-dimensional spacetime continuum. The Quantum Theory was taken as a complete theory because it works! Similarly the Steady State theory of Expanding Universe wrongly invokes the “continuous initial creations of matter-out-of-nothing” because “in science it does not matter how strange an idea may seem so long as it works i.e. can be expressed in a precise (?mathematical) form”! This *strange* justification proposes new (unscientific) definition or scope of “science”!!

The above and other unrealities/inadequacies have made the modern Physics so unrealistic that even the most celebrated Physicists cannot explain the objective reality the way one would like to through easily understood language and visualizable concepts related to the common human experiences. Thus the twentieth century theoretical Physics is deep in a crisis of credibility. The theories of modern Physics and Cosmology are steeped in unrealistic and unacceptable concepts. The entire edifice of theoretical structure is in doubt, needing a thorough revision. Since original new ideas can occur to many thinkers, the theories are numerous. But what should make a scientific theory acceptable?

A correct theory is consistent with common sense, scientific logic and observational evidence and is in exact correspondence with the reality. Hence, every acceptable theory must be:

(i) *Realistically founded* i.e. based on realistic facts and concepts. Relativity’s 4-dimensional ‘spacetime’ continuum is unrealistic. The “creation of matter from nothing”, which is inherent in the Quantum Theory’s Uncertainty Principle, in the theories of expanding universe (e.g. Big Bang & Steady State theories) and in the mathematical derivation of mass, charge etc of electron from the nonmaterial absolute vacuum in Space Vortex and Space Toroid theories, is unacceptably unrealistic. The massless elementary particles and the mass-generating Higgs boson of the currently ‘main stream’ Gauge Theory and its wrapped up extra dimensions of space too do not actually exist in real Nature. The String Theory carries the inadequacies of

## Unified Theory

Relativity & Quantum Theory. It is not clear what in a string of zero thickness vibrates.

(ii) *Harmonious in facts, concepts & mathematics* i.e. its physical concepts be harmonious with experimental or observed facts on the one side and with their mathematical expressions on the other. Experimental observations do not support the existence of four and higher dimensional spacetime continua, massless and mass generating particles and dimensionless electron, proton & neutron as presently assumed under 'main stream' gauge theory and Relativistic Quantum-Electrodynamics. The mathematical theories of Space Vortex & Space Toroid lack realistic foundations consistent with logic and observational evidence.

(iii) *Philosophic-mathematically comprehensible* i.e. the mathematics expounding its conceptual foundations is easily comprehensible. This is because mathematics, after all, is only a language to support and supplement description and NOT to supplant or tinker with, physical concepts. Mathematics not consistent with its related physical concept is anti-Physics, more so is the unrealistic Physics extracted from such mathematics, which expects the Nature to change to fit the mathematics. Dirac branded observed values of magnetic moment and gyromagnetic ratios of electron, proton, neutron as 'anomalous' since they did not agree with his theory. Unified Theory removes this anomaly.

(iv) *Internally consistent* i.e. theory's various parts and aspects are mutually consistent and non-contradictory. In the World Health Organization's definition: "Health is a state of complete physical, mental and social well-being and not merely an absence of disease or infirmity", there is a self-contradiction because herein the "absence of disease" is NOT "health"!

(v) *Consequentially realistic* i.e. making realistic predictions and with no unrealistic bizarre deductions. Modern theories of Physics have several unrealistic consequences like 'contraction of

space', 'dilation of time' 'creation of matter out of nothing', 'massless, mass-generating and dimensionless point particles'.

(vi) *Externally explanatory* i.e. be able to explain facts and phenomena, and be consistent with established laws even outside its central schema. Relativity cannot explain wave-quantum unity of radiation and matter etc. And Quantum Theory violates the inviolable conservation laws of mass-energy & momentum.

(vii) *Economic in thought* i.e. having minimum axiomatic assumptions in conformity with the principle of Occam's razor: "Cut away all superfluous, and accept the simplest of theories of equal merit". The number of independent non-composite 'elements' under the modern Standard Model of Physics, namely over two hundred, is too large to be realistic and Unified Theory's two elementary positrino & negatrino are appealing.

As outlined above several modern theories like Relativity, Quantum Theory, Quarks Theory, String Theory, Space Vortex Theory, Space Toroid Theory and Theories of the Expanding Universe do not comply with most [viz. (i) to (vi)] of the above requirements. But the Unified Theory as presented in this book fulfills all these criteria. The Unified Theory offers the grandest ever unification of the widest diversities of physical reality with highest economy of basic concepts arising largely from the subtle real physical 'sharmon medium' composed by the new particle "sharmon" only to indicate that it is different from old ether, Quantum Theory's physical vacuum and various multidimensional spacetime continua. Unified Theory is thus a comprehensive and realistically unified universal theory.



## CHAPTER-1

### THE STANDARD MODELS

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**ABSTRACT:** Modern Standard Model (MSM) discards the physical space medium for light wave and uses 4, 5, 10, 11,... dimensional spacetime continua. Unified Theory rejects spacetime continua as mathematical constructs bereft of existence and its real Sharmon Medium in space is composed by the new particle ‘sharmon’ made of a +ve positrino and a –ve negatrino. It propagates light and is the all-composing & all-pervading ‘basic substance’. Its inter-sharmon distance of  $\sim 10^{-5}$  cm compares with Mean Free Path for the real gasses e.g.  $1.12 \times 10^{-5}$  cm for Hydrogen. It contains  $10^5$  sharmons/cm<sup>3</sup> and its mass density is  $0.519 \times 10^{-33}$  gm/cm<sup>3</sup>. The MSM with Supersymmetry has over 200 basic particles but none meets the definition of ‘element’, which composes other particles and itself is non-composite. Unified Theory (UT) has two elementary cosminos (+ve positrino, -ve negatrino), two basic charges (mass, electric) and two basic forces (gravitational, electromagnetic). Cosminos have diameter  $1.6156 \times 10^{-33}$  cm, mass  $2.596 \times 10^{-48}$  gm and electric charge  $\pm 1.3729 \times 10^{-30}$  esu. In Unified Theory cosmino mass & charge are innate. So massless and mass or charge generating particles like Higgs and space vortices & toroids are nonexistent. In a universe expanding as Big Bang or Steady State theory the cosmic redshifts should increase exponentially with time, which is not observed. So the Universe is NOT expanding. UT’s non-expanding universe explains all cosmic observations, even on Ia type supernovae, which had amazed the astronomers.

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The theories of Physics and Cosmology follow a Standard Model comprising the basic physical concepts, which serve as mandatory guidelines. For the curious reader who wants to get to

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the core quick we first present the Conceptual Foundations and Standard Model of the Unified Theory and then review the Modern Standard Model for mainstream theories.

### 1.1 Conceptual Foundations of Unified Theory

The Unified Theory is consistent with common sense, scientific logic and objective observational evidence. Its basic concepts or assumptions vis-à-vis those of the Relativity & Quantum Theories follow natural scientific logic as below.

(a). The Relativity and Quantum Theories rely on “what is or can be observed” but Unified Theory is based on “what there actually is” in the objective reality.

(b). For Unified Theory Mathematics is only a language to support and supplement description but Relativity & Quantum Theories and other theories use it to supplant and tinker with physical concepts.

(c) In Unified Theory the transverse electromagnetic light-wave propagates in the physical ‘sharmon medium’, which also composes the light-wave. The 4-dimensional spacetime continuum transmits light in Relativity Theories and the physical vacuum in Quantum Theory.

(d). Unified Theory’s ‘Wave-Quantum UNITY’ of light appears as Quantum Theory’s ‘Wave-or-Quantum Duality’ due to experimental limitation to observe wave or quantum characters singly not both simultaneously.

(e). Unified Theory’s light propagating ‘sharmon medium’ is of the nature of a kinetic gas composed by sharmon, which comprises a +ve positrino and a -ve negatrino, the two non-composite basic elements composing all forms of energy and mass in the Cosmos, hence given the common name ‘cosmino’. The sharmon medium as the ‘basic substance’ marks the end of subtlety and cosminos the end of subtlety and divisibility.

(f). The tiny sharmon of diameter  $1.6 \times 10^{-33}$  cm can pass through interatomic spaces and between orbital electrons. Therefore sharmon medium is irremovable by any means and rules out the existence of absolute vacuum.

(g). For Unified Theory the 4-D and other higher dimensional spacetime continua are mere mathematical constructs bereft of any existence. The theories based on them are unrealistic.

(h). In Special Relativity no mass body can have a velocity equal to that of light because then its kinetic energy becomes infinite. Therefore the photon, neutrinos and anti-neutrinos, moving at light velocity, are massless. Moreover, the non-composite electron, proton & neutron are sizeless points so as to transmit an electric force instantly through its whole without the force velocity having to exceed the light velocity. In Unified Theory cosmions compose all and hence no particle or energy quantum is massless or sizeless point or 'virtual' (unreal).

(i). Lorentz formulae do not describe a natural velocity that varies (like  $v$ ) with and is invariant (like  $c$ ) to the source-observer motion at the same time. Thence deduced 'contraction of length' and 'dilation of time' are unrealistic.

(j). Unified Theory realistically explains the constancy and invariance of light velocity to source-observer motion as also the observed variability and superluminality of light velocity, which invalidate the Relativity Theories.

(k). In Unified Theory total cosmion-sharmon content of the Cosmos is eternally conserved without any creation from, or dissolution into, nothing. It therefore rejects the Quantum Theory's Uncertainty Principle, which validates violations of the inviolable conservations of mass-energy and momentum. The Unified Theory instead introduces a new Principle of Null Action with universal applications. It is based on 'causality' and the conservation of mass-energy, momentum and action.

(l). In Unified Theory the cosmion mass and charge are innate. Therefore massless and mass or charge generating particles like Higgs boson or space vortex and space toroid are non-existent. Geneva based Large Hadron Collider will not find the Higgs boson and wrapped up extra dimensions of space.

(m). In a Universe expanding as per Big Bang or Steady State Theory the redshift  $Z = Z_0 \cdot \exp(Ht)$  should increase exponentially with time ( $t$ ), which is not actually observed. So the Universe is NOT expanding. Unified Theory's Non-expanding Universe

explains all cosmological observations including those on the Ia type supernovae, which had amazed the astronomers. The cosmic redshift is caused, not by Doppler effects of receding velocities of stellar light sources in an expanding universe but, by depletion of photon energy during long passage through the sharmon medium due to non-Doppler effects of gravitational, electromagnetic & viscous losses in a non-expanding universe.

### 1.2 Standard Model of the Unified Theory

The Unified Theory presented in this book has:

(i). *Two basic elementary cosminos*

See details in Chapter-5. Positive (+ve) *positrino* and negative (-ve) *negatrino* both of diameter  $1.6156 \times 10^{-33}$  cm, mass  $2.596 \times 10^{-48}$  gm and electric charge  $\pm 1.3729 \times 10^{-30}$  esu and spin  $\pm 1/2$ . The direction of spin is not specific of the kind of charge. A cosmino can have a right handed +ve or left handed -ve spin. Two positrinos or two negatrininos of opposite spin can produce a 0-spin Cooper pair  $\pm$  'diad'. The sharmon comprising a positrino and a negatrino has mass  $5.192 \times 10^{-48}$  gm. Its spin is 0 or 1.

These two non-composite '**elements**' mark the end of subtlety & divisibility but compose all forms of energy, energy quanta and particles of matter in the Cosmos including all the basic particles of the Modern Standard Model, hence given the common name *cosmino*. These cosminos also compose the new particle *sharmon* of the new light propagating space medium, the *sharmon medium*, as the '**basic substance**' in the micromost compositional unity of mass, energy and radiation.

(ii). *The identity of gravitational & inertial mass.*

The mass manifests as 'gravitational mass' when it feels and is felt by a gravitational force/field. The same mass in accelerated motion manifests as 'inertial mass' under the action of an external force, which changes the body's state of uniform motion to produce acceleration. The kinetic and potential energy, like mass, also have the gravitational and inertial effect. The identity of gravitational and inertial mass follows naturally as each of them is the same 'basic substance'.

(iii) *Basic cosmino charges unified*

Since an element is itself non-composite, it has to have homogeneously uniform & isotropic composition and properties throughout its whole and be singly charged because multiple charges imply its same many constituents. The attractive force to bind electric charge and mass is inconceivable and so is a massless electric charge. Therefore the mass and electric charge are two different manifestations of a single primordial entity, the cosmino itself, into which the two basic charges unite and unify inseparably and which composes the 'Basic Substance'.

The manifestations of mass & electric charge are mediated via the corresponding gravitational and electromagnetic force/field, which feel and are felt by the concerned basic cosmino mass or electric charge. The two basic forces/fields unify into a *gravitoelectromagnetic* force/field.

The cosmino mass and electric charge are innate. Therefore the massless and mass or charge generating particle like Higgs and space vortices and toroids are non-existent.

(iv) *The sharmon*

The sharmon is electrically neutral and is composed by a +ve positrino and a -ve negatrino. The opposing  $\frac{1}{2}$  -spins of the constituent cosminos produce its 0-spin scalar state and the co-directional  $\frac{1}{2}$  -spins yield the 1-spin vector sharmon.

The oppositely charged cosminos in the sharmon do not mutually annihilate, unlike the electron-positron pair, because the cosminos themselves are the indivisible non-composite micromost elements. Therefore both the scalar 0-spin sharmon and the vector 1-spin sharmon are stable and dynamic structures and can inter-convert.

The constituent +ve & -ve cosminos of the sharmon having mass and electric charge not only spin but also vibrate along the common axis, imparting an electric as well as an orthogonal magnetic dipole moment to the sharmon. The gravitational and electromagnetic properties of the sharmon generate those of the material particles, of the photon and of the sharmon medium, which they compose.

The Bosonic condensation of sharmons is supported by the close distance gravitational and electric attractions among constituent  $\pm$ ve cosminos and imparts gregarious properties to sharmons, which can aggregate to compose energy and neutral mass of material particles. The neutral mass is composed by the 0-spin sharmons and electrically positive or negatively charged mass of the charged particles is composed by the respective positive or negative cosminos. No particle or energy quantum is therefore massless, sizeless or "virtual" (i.e. unreal). Neutrinos, photon, graviton &c have more-than-zero definite mass and size.

(v) *The all-composing & all-pervading sharmon medium*

The new particle 'sharmon' made of a +ve positrino and a -ve negatrino composes the 'sharmon medium' in space. The two cosminos and sharmon compose all forms of mass, energy, energy quanta and particles of matter. The 0-spin sharmons compose the energy and neutral mass of particles; the positrinos compose positively charged mass and negatrinis the negatively charged mass.

The sharmon medium is irremovable from any enclosed space by any means since the tiny sharmon of  $1.6 \times 10^{-33}$  cm diameter can pass through spaces between molecules and atoms of even the densest solid and also between orbital electrons.

Due to its nature as a kinetic gas, the sharmon medium approximates as a '**kinetic continuum**' effectively obliterating the interstices between randomly moving constituent sharmons in fleeting contacts. It fills all space leaving no 'vacuous space' with 'nothing inside' and rules out the existence of absolute vacuum for any significant period of time. Its time-averaged inter-sharmon distance of  $\sim 10^{-5}$  cm compares with the Mean Free Path for the real gasses (e.g. for Hydrogen  $1.12 \times 10^{-5}$  cm, Oxygen  $0.64 \times 10^{-5}$  cm, Nitrogen  $0.595 \times 10^{-5}$  cm).

The sharmon medium contains  $\sim 10^{15}$  sharmons per  $\text{cm}^3$ . And its average mass density is  $0.519 \times 10^{-33} \text{ gm.cm}^{-3}$ , vis-a-vis  $3 \times 10^{-31} \text{ gm.cm}^{-3}$  for the Steady State Cosmology and  $1.293 \times 10^{-3} \text{ gm cm}^{-3}$  for air. The sharmon medium is viscous, with a viscosity constant  $\eta = 0.57 \times 10^{-22} \text{ dyne.sec/cm}^2$ .

The sharmon medium mediates the electrostatic, magnetostatic and gravitostatic forces and also propagates the electromagnetic light wave and the gravitational wave.

(vi). *The gravitational & electromagnetic forces/fields/waves*

The positrino and negatrino composing the sharmon have mass and electric charge (+ve, -ve). Due to the spin and vibration of the constituent cosminos the sharmon acquires electric and orthogonal magnetic dipole moment.

The  $1.6 \times 10^{-33}$  cm diameter sharmons of the sharmon medium kinetic gas enter a mass body to have close distance gravitational and electromagnetic interactions with the cosminos and sharmons composing the mass body.

The gravitostatic, electrostatic and magnetostatic forces between the test mass body and the local surrounding sharmon medium are therefore proportional to the corresponding total charge (mass, electric charge, magnetic pole) of the body and are omni-directional. The field intensity, as the line of force area density on the  $4\pi r^2$  spherical surface around the test charge, is inversely proportional to the square of distance.

A mass body thus interacts with its surrounding sharmon medium and through it with all other bodies.

The above three kinds of static forces between two bodies therefore comprise the two component forces acting separately between the two bodies with their respective local surrounding sharmon medium. The forces between two bodies are proportional directly to the product  $C_1 C_2$  of the two charges and inversely to the square  $r^2$  of their distance  $r$  to obey the law:

$$F = K C_1 C_2 / r^2.$$

The physical constant  $K$  of the sharmon medium (gravitational constant  $G$ , electric permittivity  $\epsilon_0$  or magnetic permeability  $\mu_0$ ) depends on the nature of the charge (gravitational, electric, magnetic) and units of measurement.

The 'action-at-a-distance' is ruled out.

## Unified Theory

The effective “origin” of the light-wave is NOT the light-source but the first 0-spin sharmon in the sharmon medium, which initially receives the 0-spin wave energy quantum from the source and rises to its 1-spin state. Similarly, the effective “terminus” is NOT the target but the last 1-spin sharmon, which finally transfers the energy quantum to the target and itself returns to the 0-spin state. The 0-spin wave-energy quantum comprises multiple 0-spin sharmons of non-zero mass. In the sharmon medium it is propagated from the origin to the terminus by the 1-spin sharmons via contiguous mechanisms, as the 1-spin photon along the transverse electromagnetic wave. The 1-spin sharmons participating in the process of propagation return to their 0-spin state on transferring the wave energy quantum to the contiguous neighbour in the sharmon medium and finally the last 1-spin sharmon transfers its energy to the target and returns to its 0-spin state. The orthogonal electric & magnetic fields Simple Harmonically varying at the wave frequency remain normal to the direction of wave motion to satisfy the right handed Poynting vector.

Since the spin of an emitter of light does not fall by 1 and that of the light absorbing target does not rise by 1, what is emitted or absorbed is, NOT the whole 1-spin photon but, only its energy comprising 0-spin sharmons.

The wave energy quantum per cycle of the electromagnetic or gravitational wave is propagated in the sharmon medium contiguously via the mediator bosons (1-spin photon, 2-spin graviton) which do not physically move from their mean positions but provide a physical carrier for the wave. What is emitted, absorbed or propagated is the 0-spin sharmon-composed wave quantum energy and NOT the mediator bosons (1-spin photon, 2-spin graviton) as a whole.

Due to creative beginning of the light wave at the ‘origin’ in the sharmon medium the light velocity  $c$  is independent of the source motion and the vanishing end of the wave at the terminus makes  $c$  independent of the target/observer motion. The constancy and invariance to source-observer motion of  $c$  [=  $(\epsilon_0 \cdot \mu_0)^{-1/2}$ ] also follow from the fact that the  $\epsilon_0$  &  $\mu_0$  of the

sharmon medium are constant and not affected by the motion of the source and/or observer.

Since the mass and electric charge of the cosminos co-exist inseparably the *electromagnetic & gravitational forces/fields/waves* are propagated contiguously in the sharmon medium at the same velocity of light  $c = (e_o \cdot \mu_o)^{-1/2}$  where  $e_o$  ( $= 8.85 \times 10^{-12}$  Farad/meter) is the electric permittivity and  $\mu_o$  ( $= 1.26 \times 10^{-8}$  Henry/meter) the magnetic permeability of the sharmon medium (not of the vacuum as current theories wrongly assume). The velocity  $V_g (=c) = (e_r / d_s)^{1/2}$  of the transverse gravitational wave likewise, is separately set by the rigidity or shear elasticity  $e_r = 4.687 \times 10^{-12}$  dyne/cm<sup>2</sup> and mass density  $d_s = 5.19 \times 10^{-34}$  gm/cm<sup>3</sup> of the sharmon medium itself.. Their propagating bosons (1-spin photon, 2-spin graviton) comprise multiple sharmons of more-than-zero definite mass.

The cosminos with mass and electric charge and composing the sharmons of the sharmon medium provide the common origin and mediator for the gravitational, electric, magnetic and electromagnetic forces, fields and waves.

(vii) *Objective reality exists irrespective of the observer*

The Quantum Theory deals in, what can be known about or observed and NOT *in what there actually is in the micro cosmos*. Relativity, likewise, is also based on observed magnitudes of governing parameters. Moreover, *Quantum Theory regards objective reality as a metaphysical speculation out side of Physics. Hence it does not recognize things as they really are.*

The Unified Theory, on the other hand, presents its own visualizable conceptual scenario of the objective reality to faithfully describe it under Physics. It deals in the objectively actual parameters because the real objects and physical reality exist irrespective and inspite of the observer. And the physical phenomena are governed by NOT the observed/measured but actual objective parameters.

*(viii) The non-expanding & non-contracting universe*

The Big Bang and Steady State theories of 'expanding universe' attribute the cosmological redshift to the Doppler effect of the recession of galaxies. The intergalactic distances, the recession velocities of galaxies and the cosmological redshifts should all increase exponentially with time in a universe expanding according to the Big Bang or Steady theories, which is not actually observed. So the universe is NOT expanding. The Big Bang and Steady State theories of expanding universe therefore remain unproven. In Unified Theory's new theory of non-expanding & non-contracting universe the cosmological redshift is caused by non-Doppler energy depletion of the spectral photon during its long passage through the sharmon medium, due mainly to the viscous losses, with minor contributions from the gravitational and electromagnetic losses.

Moreover, the theories of expanding universe do but Unified Theory does not admit any '*creation of matter from nothing*'. The total 'cosmic substance' comprising cosminos & sharmons is eternally conserved. The outward expansion due to kinetic motions within the universe is counter balanced by the inward contracting pressure from the self-gravitation of the mass-energy content. So the mean radius or 'expanse' does not change progressively with time and the universe remains non-expanding and non-contracting.

**1.3 The modern Standard Model**

The modern Standard Model of the modern theories of Physics & Cosmology has four basic charges: electric, gravitational (mass), weak & colour and four fundamental forces: electromagnetic, gravitational, weak and strong [1-6].

The basic elementary particles have three generations of quarks and leptons. The first generation has two quark flavors (up u, down d) and two leptons (electron  $e^-$ , electron neutrino  $\nu_e$ ). The three quark colours give eight particles and eight antiparticles. Left- and right-handedness, relevant in weak force, doubles this number. But because the right-handed neutrino and left-handed antineutrino do not exist, the number of distinct particle states in

the first generation is thirty. It, for three generations becomes ninety. There are thirteen bosons intermediary to four fundamental forces, namely graviton for gravitational force, photon for electromagnetic, three vector bosons ( $W^+$ ,  $W^-$ ,  $Z^0$ ) for weak nuclear and eight gluons for strong nuclear force.

Undefined number of Higgs bosons is postulated, which the bare elementary particles, ordained by Relativity to be *massless*, must eat to gain or acquire mass. In Unified Theory the mass of a particle is innate, not acquired, and hence the massless and mass-generating particles (Higgs boson) are non-existent. There are innumerable photons with different mass-energy  $E = h\nu = hc/\lambda$  composing the extensive electromagnetic spectrum of varying wavelength  $\lambda$  and frequency  $\nu$ ,  $c$  being the velocity of light.

The number of all these basic particles is well over hundred, which gets doubled in Supersymmetry by adding a 'super partner' to every one of them. Thus, the Modern Standard Model has over two hundred basic particles, all independent and not derivable from other(s). None satisfies the definition of 'element', which composes other particles but it itself is non-composite.

Relativity demands all these '*non-composite, un-deformable fundamental particles*' to be sizeless points so that a force can be transmitted to the whole of a particle simultaneously. And the thirteen intermediary bosons plus neutrinos & antineutrinos are to be not only sizeless but also massless so that they can move at light velocity  $c$  without gaining infinite kinetic energy.

These are the consequences of what we can call the 'Einstein Model', which in fact discards the real physical medium, to propagate electromagnetic and gravitational 'waves' in free space as "superfluous" and in its place introduces the nonexistent mathematical 4-dimensional 'spacetime continuum'. This has also given rise to several theories based on higher spacetime continua of 5, 10, 11...32 dimensions.

The 'Einstein Model' [7, 8] is an inseparable important part or a feature of the modern Standard Model and has a very profound sway on the modern Physics. So much so that the highest political world body, the United Nations General Assembly, had passed a unanimous resolution on 10<sup>th</sup> June 2004 to observe 2005

as the year of Physics to commemorate the centennial of Albert Einstein's 'groundbreaking' papers published in 1905. With the year-long celebrations throughout 2005 the hold of Einstein model on the modern Physics and other sciences has tightened and will be perpetuated further. The Unified Theory does NOT accept it. Chapter-2 presents a reappraisal of the Einstein model.

As already mentioned under sec. 1.1 (vii) above the Quantum Theory [9] deals in, what can be known about or observed and NOT *in what there actually is in the micro Cosmos*. Relativity, likewise, is also based on observed magnitudes of governing parameters.

The Quantum Theory's Uncertainty Principle introduces and validates violations of the inviolable conservations of energy/mass and momentum within the limits set by the Heisenberg relations:  $\Delta E \cdot \Delta t \geq h/2\pi$  and  $\Delta p \cdot \Delta x \geq h/2\pi$ . This also implies 'matter's creation from, and disappearance into, nothing' within the same limits. Secondly, Quantum Theory splits intrinsic wave-quantum UNITY for radiation and moving particles of matter into wave-or-quantum DUALITIES.

Let us clarify this point a bit more. Intrinsically and objectively the wave and quantum aspects of electromagnetic radiation (including light) and of the moving particles of matter coexist as inseparable wave-quantum **unity**. But Heisenberg's Quantum Theory postulates that only one or the other of the two aspects is or can be actually manifested in any single setting. The wave and particle are so distinctly different properties that a real thing cannot be both, a particle and a wave motion, at the same time. That is, in a given setting radiation or moving particle can and does behave either as a wave or as a particle and not both. However, in our Unified Theory the actual, real and coexistent wave-quantum **unity appears** as wave-or-quantum **duality** only because of the limitations of the observing experiments, which can observe and demonstrate only one and not both the characters at a time simultaneously.

### 1.4 Reappraisal of the Modern Standard Model

#### 1.4.1 *Elements are far too many*

The existence of a massless and sizeless real entity is anti-intuitive. Rational logic and common sense demand that all real particles have more-than-zero finite size as well as mass. And the large number of non-composite particles in the modern Standard Model cannot satisfy a parsimonious physicist. In fact, the quark-lepton theory [1, 2] was formulated to bring order in the diversity of, but it has itself led to over hundred, elementary particles [1-6], making the term “element” meaningless. Moreover, the Supersymmetry doubles this number by adding 'super partners' to all these more than 100 elementary particles. The number of elements (>200) in the Modern Standard Model is therefore far too large to be realistic, reasonable and acceptable. And *no particle(s) of the modern Standard Model can be considered an 'element' in the strict sense of the definition as “composing other particles but it itself being noncomposite”*.

#### 1.4.2 *The String and Superstring Theories are Unrealistic*

Both the *String and Superstring Theories* are largely mathematical and unrealistic theories because they are based on unrealistic and nonexistent 10-dimensional spacetime continuum with six extra dimensions of space wrapped into it. These also recognize the non-existent Weak charge, Colour charge, Weak force and Strong force, which Unified Theory discards. These are confusing because they use assorted strings with inconceivable zero thickness instead of the regularly shaped particles like Unified Theory's cosminos. The questions "What composes the strings? And “What is it that vibrates?” are not answered, nay even asked. The M-theory in 11 dimensional *nonexistent* spacetime is likewise unrealistic. A reappraisal of the string theories is given in Chapter 14 of this book.

#### 1.4.3 *Micromost basic substance*

The most basic element(s) must compose the most basic, subtlest substance in Nature. What is that basic substance? And what is its physical nature? Modern Physics is not at all clear or concerned about it. In the Unified Theory of this author [10], the

micromost ‘basic substance’, namely the ‘sharmon medium’ is composed by the new particle ‘sharmon’. See details in Chapters 5 & 6 of this book.

The sharmon is constituted by the micromost ‘basic elements’, the positive *positrino* and negative *negatrino*. These, in turn, compose all forms of mass, particles of matter, energy, energy quanta and radiation in the Cosmos, hence given their common name ‘*cosmino*’.

#### 1.4.4 Compositeness of quarks & leptons

The compositeness of both quarks and leptons was predicted in the January-1990 book '**Unified Physical Theory**' [10], whose manuscript was completed by 1988-89. On that basis the 1990 Nobel laureates' [11] claim, announced in October 1990, of having revealed the quarks as non-composite basic constituents of matter was contested in the globally reported interview given by this author to the Press Trust of India on 4th November 1990. It is reproduced in Appendix-4.

That theoretical prediction for the compositeness of quarks got experimental supports first in the early 1991 itself via the compressibility of quarks revealed in the measurements of electric and magnetic polarizabilities of proton and neutron [12-14]. And again in 1995 & 1996 from the transient “creation” of some quarks and leptons during the proton-antiproton collisions as reported by D-Zero [15] and CDF [16] collaborations. In Unified Theory these are assembled from cosminos and sharmons composing the kinetic energy of the colliding particles. The quarks and leptons have a composition otherwise they cannot be compressed and/or assembled.

These creations of quarks & leptons and the eqn.  $E = mc^2$  suggest and support the existence of the “subtler-than-energy & mass” entities, which are the *positrino & negatrino and sharmon* of the Unified Theory [10].

Mutual repulsion among cosminos with same kinds of electric charge, composing the quarks in the hadrons make the structures of quarks too loose and fragile to remain intact as isolated intact units. Therefore these cannot be revealed as strong

intact units not only outside in free state but also within the hadrons they are, in modern Physics, assumed to constitute. The cosmino-sharmon compositions of some quarks and leptons have, however, been worked out (Cf. Chap-5 of this book and ref. 17). Therefore, the quarks and leptons are not noncomposite elements. The Unified Theory regards the quarks as non-existent.

#### 1.4.5 *Higgs boson: an unrealistic concept*

The Modern Standard Model has separate Higgs boson(s), which the 'naked' massless elementary particles eat to gain mass. This is anti-intuitive and an invalid concept. It is obviously more so since a massless electron cannot gain  $0.51 \text{ MeV}/c^2$  mass or a neutrino the  $0.1 \text{ eV}/c^2$  mass by eating an  $812\text{-}846 \text{ MeV}/c^2$  or  $115 \text{ GeV}/c^2$  Higgs boson [18]. In Unified Theory mass of a particle is its innate property and not acquired by eating Higgs boson. The Large Electron Positron Collider (LEP) could not find the Higgs boson and the Geneva based Large Hadron Collider will also not find it as it and the massless particles do not exist in real Nature.

#### 1.4.6 *The electroweak theory unrealistic*

We do not take weak as a basic cosmino charge since it does not conserve [4, 5]. The weakest support to Electroweak theory is the detection of "virtual"  $W^\pm$  and  $Z^0$  bosons, NOT in natural beta decays but in particle smashing machines, which according to Unified Theory are in fact transiently assembled from cosmino-sharmon content of the mass and kinetic energy of the colliding particles. Therefore the modern 'weak charge' and 'weak force' are discarded as '*non-existent*' and the 'weak phenomena' are, in Chapter 9, re-explained without the weak charge, weak bosons ( $W^+$ ,  $W^-$ ,  $Z^0$ ) and weak force.

#### 1.4.7 *The Einstein Model is untenable*

It can hardly be overemphasized that both space and time are NOT real substantive entities but mere abstract concepts arising from the direct human perceptions of successive motion and change in the surroundings, which we all have received from the very childhood. A deep intuition reveals that the concept of space

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evolves from our direct perceptions of spatial successions "there, here, there" and that of time from those of temporal successions "then, now, then" all arising from successive motions and changes of the surrounding objects.

If a baby were to grow with no relative motions and changes around i.e. all standing still in the surroundings, he/she would have no successive perceptions and hence no concepts of space and time. The concepts of space and time, being so intangible and abstract, cannot fuse into any tangible "spacetime" continuum, concrete enough to propagate light and gravitational 'wave' [7, 8].

In the universe with complete ubiquity of granularity throughout right up to the micromost cosmino levels, the existence of a non-granular continuous infrastructure is inconceivable. A non-composite static continuum, like any 4- or higher dimensional spacetime continuum, cannot be compressed or twisted and hence cannot undulate to propagate a transverse wave. General Relativity's 'curvature of 4-D spacetime' for gravitational field and 'spacetime-ripples' for gravity waves are unjustified ad hoc super-impositions. If existent, the static rigid continuum would retard, nay prevent the motion of terrestrial and heavenly bodies and even of the photon to propagate light across/through it, which is not actually observed. So all the multidimensional spacetime continua, basic to relativity and/or other theories, are mere mathematical constructs bereft of real physical substantive existence.

But the existence of a particulate space medium is not in doubt. This is the 'sharmon medium' as a kinetic gas and 'kinetic continuum' as discussed in sec. 1.2 (v) above is real.

**James DeMeo** [19] presents experimental results of Dayton Miller showing a positive non-zero ether drift, and hence the presence of a light propagating medium. This supports and is supported by Unified Theory's sharmon medium. The work of Young, Fresnel and Sagnac on the interference or diffraction of light establish the wave nature of light needing a light medium.

As mentioned above Einstein was unclear about the nature of light and the light medium in 1905 when he formulated the theory of special relativity or explained the photoelectric effect

that won him the 1921 Nobel Physics prize and remained so unclear ever thereafter. This he admitted in a letter dated 12 December 1951 to his friend M. Besson. But the trend for using other multidimensional spacetime continua or hyperspaces had already been set.

Other unrealistic consequences of the Einstein Model too are unsustainable. That is why in Unified Theory, the photon & neutrino have more than zero mass and electron, proton & neutron have finite size and in fact cosmino-sharmon composition too.

#### 1.4.8 *Reappraisal of Quantum Theory*

The Quantum Theory [9] could not satisfactorily explain why the electromagnetic radiation and the moving particles of matter behave sometime as a wave and at other time as a particle. Moreover, it also wrongly split the intrinsic *wave-quantum unity* of radiation and material particles in motion into *wave-or-quantum dualities*.

In fact both radiation and moving particles of matter have intrinsic **wave-quantum unity** (of Unified Theory), which appears as **wave-or-quantum duality** (of QT) due to experimental limitations to observe only one of the two coexistent characters at a time, and not both simultaneously.

Interestingly, both the particle and wave aspects for both low intensity light and stream of electrons have been demonstrated [20] simultaneously in one experiment. This provides experimental support to Unified Theory's wave-quantum **unity** as against Quantum Theory's wave-or-quantum **duality**.

#### 1.4.9 *Reappraisal of uncertainty principle*

Since Quantum Theory deals in the observables, Heisenberg uncertainty relations:  $\Delta E \cdot \Delta t \geq h/2\pi$  and  $\Delta p \cdot \Delta x \geq h/2\pi$  were for the *subjective* variations in the 'observed' parameters. The confusion arose when  $\Delta E$ ,  $\Delta t$ ,  $\Delta p$ ,  $\Delta x$  were misconstrued to represent variations or spontaneous fluctuations in the *objectively actual* parameters. Confusion got confounded when Heisenberg relations were taken to be more basic and over-riding than the

conservation laws. Violations, within the limits set by them, of otherwise inviolable conservation of mass/energy and momentum, were thus introduced and validated, which implied anti-causality ‘objective indeterminism’.

Relation  $\Delta E \cdot \Delta x \geq ch/2\pi$  derived from the Heisenberg relations put into disarray all the classical concepts of location, boundary & trajectory. It also led to the bizarre notion of a micro particle constituted and bound by more massive subparticles because in confining to small  $\Delta x$  the uncertainty  $\Delta E$  in energy  $E$  exceeds  $E$  of the micro particle itself. All these unrealistic conclusions are the unrealistic demands on Nature to change to fit the mathematical Quantum Theory.

The Unified Theory clarifies that Heisenberg uncertainty relations do not hold for the objectively actual parameters, which in fact govern the physical phenomena consistent with the causality principle or ‘objective determinism’ and conservation laws, on any subatomic micro scale. To score its point over Quantum Theory the Unified Theory [17] explains the ‘wave-quantum unity of radiation and matter’ (unexplained in QT) without the QT’s ‘violations of conservation laws’ as in Chap-11.

### *1.4.10 Testing the Modern Standard Model with Large Hadron Collider*

The Geneva based Large Hadron Collider (**LHC**) [21] switched on 10 September 2008 will ultimately collide beams of protons at energy of 14 TeV. Beams of lead nuclei will also be accelerated, smashing together with collision energy of 1150 TeV. The Modern Standard Model (MSM) [1-6, 18, 21] holds that an otherwise massless particle acquires mass by eating heavier Higgs boson, while in Unified Theory (UT) the particle mass is innate, not acquired *vide sec.* 1.4.5 above. In MSM, every one of the over hundred elementary particles has a super partner, whereas UT has only two elements, positrino & negatrino, without any super partner. The space in 11-D Supergravity and M-theory of MSM has 10 extra wrapped up

dimensions, which in UT has none. To test the MSM the LHC will primarily investigate the Higgs boson, the super partners of the elementary particles and the wrapped up extra dimensions of space. In Unified Theory the massless particles and all these three are physically non-existent. The LHC, like the earlier Large Electron Positron Collider (LEP), should/will not find the Higgs boson.

But during the collision experiments some new particles are expected to be assembled from the cosminos & sharmons composing the mass and energy of the energetic colliding particles. The MSM of the current theories has no physical mechanism to explain the creation of new particles except invoking the theoretical equation  $E=mc^2$ . In Unified Theory (section 13.9.1.1) dark energy comprises the imperceptible 0-spin sharmons composing the all-pervading Sharmon Medium and dark matter as aggregates of 0-spin sharmons attached to the  $\frac{1}{2}$ -spin  $\pm$  cosminos. The MSM is however silent on their nature and composition, which LHC is expected to explore.

### 1.5 Concluding remarks

This chapter has laid the conceptual foundation for the *Physics with only two basic elements (positrino & negatrino), two basic charges (mass & electric) and two fundamental forces (gravitational & electromagnetic). Further the two cosmino charges can be unified into a single 'gravitoelectric charge' or a cosmino itself and the two fundamental forces into a single gravitoelectromagnetic force.*

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## CHAPTER-2

### A REAPPRAISAL OF THE EINSTEIN MODEL

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**ABSTRACT:** A wave exists only in its propagating medium but Einstein erred to discard the medium for 'light-wave' and introduce 4-D spacetime continuum. It denied him the chance to address wave-quantum Unity of light and to predict the existence of 'basic substance' to compose all forms of E & m so compellingly demanded by  $E=mc^2$ , otherwise E & m could not interconvert. Unified Theory gives convincing arguments and experimental support for the existence of a real physical medium in space viz. 'sharmon medium' as the all-composing and all-pervading 'basic substance', which propagates light as a Wave-Quantum UNITY. The non-substantive abstract concepts of space & time arise from the perceptions of successive motions & changes in the surrounding objects and cannot fuse into any concrete spacetime continuum. All spacetime continua of 4 to 32 dimensions are non-existent mathematical constructs and theories based on them are unrealistic. Unified Theory explains Michelson-Morley & Sagnac experiments and constancy and invariance to source-observer motion of c, the two axiomatic postulates of Special Relativity, as also the observed variability of light velocity c and superluminality which *invalidate* Relativity. Lorentz formulae do not describe any natural velocity which varies (like v) with and is invariant (like c) to source-observer motion at the same time. And a real event, viewed by say, 100 differently moving observers cannot undergo 100 different objective alterations at the same time. This makes 'contraction of length' and 'dilation of time' unrealistic. Unified Theory explains Photoelectric Effect and Bending of Light in a Gravitational field. As against Relativity, no particle or energy quantum is massless or sizeless point.

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Standard Model is the conceptual soul for the body framework of a theory. Chapter-1 has presented the Standard Model underlying Unified Theory and the Modern Standard Model constituting the guiding core for the current theories of Physics and Cosmology. However, the Einstein's theories and thoughts had a profound influence on the twentieth century Physics. So much so that one can identify the 'Einstein Model' as an inseparable significant part of the Modern Standard model.

This Chapter will reappraise the conceptual component of the Einstein Model, which lies beneath its mathematics, to bring out its unrealities and rectify the same through Unified Theory. But before doing so we would consider the 'Maxwell Model' and the 'Planck Model', which in fact formed the forerunner bases of Einstein Model.

### 2.1 The Maxwell Model

In his theory of electromagnetic radiation, Clark Maxwell [1] derived the velocity of electromagnetic waves as

$$c = (\epsilon_0 \mu_0)^{-1/2}.$$

where  $\epsilon_0$  is the electric permittivity and  $\mu_0$  the magnetic permeability of the free (empty) space.

The magnitude of  $c$  ( $= 2.997 \times 10^{10}$  cm/sec) calculated for his theory from the known values of  $\epsilon_0$  ( $= 8.85 \times 10^{-12}$  Farad/meter) and  $\mu_0$  ( $= 1.26 \times 10^{-8}$  Henry/meter) for free space or vacuum came out to be equal to that of light in vacuum. Since the light from the sun to the earth travels mostly in vacuous space Maxwell declared that light is an electromagnetic **wave** propagated in empty space or vacuum. Thus the seed idea of a 'wave without its propagating medium' was created by Maxwell, which was later adopted and promoted by Einstein in relativity theories.

The Maxwell Model comprises the assumptions made and the conclusions arrived at in his theory. These are:

- (a) Light is an electromagnetic wave.
- (b) Electromagnetic waves, including light, are propagated in the free space or vacuum without any real physical medium.

(c) The velocity of electromagnetic waves, including light, in vacuum  $c = (\epsilon_0 \mu_0)^{-1/2}$  depends on the electric permittivity  $\epsilon_0$  and magnetic permeability  $\mu_0$  of the free space.

(d) Since the electric permittivity  $\epsilon_0$  and magnetic permeability  $\mu_0$  of the free space are constant, the velocity  $c$  of the electromagnetic waves, including light, is constant.

## 2.2 The Planck Model

Starting from the '*law of equi-partition of energy*', Raleigh & Jeans found that the energy density  $E_\nu$  for frequencies between  $\nu$  (Greek, new) and  $\nu+dv$ , is

$$E_\nu = (8 \pi \nu^2/c^3) KT.$$

Here  $K$  is Boltzmann constant,  $T$  the absolute temperature and  $c$  the velocity of light in free space.

This Raleigh-Jeans law agrees with the experimental results at low frequencies. But at higher frequencies its integral leads to *infinite* total energy density, which has been called the "*ultraviolet catastrophe*".

However, Max Planck [2] hypothesized that the law of equi-partition of energy was not applicable to the black body radiation because the micro oscillators exchange energy with the surrounding environment not in a continuous manner but as the quanta of discrete units given by

$$E = h\nu.$$

Here  $h$  is a universal constant, now called Planck's constant of action. His expression for the energy density is

$$E_\nu = (8 \pi h \nu^3/c^3)/(e^{h\nu/KT} - 1).$$

This Planck's law agrees with the experiments at all frequencies, lower to higher. The ultraviolet catastrophe is avoided because the available energy states at high frequency  $\nu$  are now widely separated.

This represents the spectrum of the electromagnetic radiation. It leads to Stefan-Boltzmann fourth power law, namely,

$$E_T = \sigma T^4.$$

Here  $E_T$  is the total emissive power or the total energy density of radiation emitted from the black body at the absolute temperature  $T$ . The  $E_T$  is proportional to fourth power of the absolute temperature. The constant of proportionality  $\sigma$  (Greek, sigma) is the Stefan-Boltzmann constant. It implies that at the absolute zero temperature the energy density is zero ( $E_T = 0$  for  $T = 0$ ) and the radiation disappears.

That is, the perfect vacuum is possible, which is empty of all solids, liquids and gases and also can be freed of the thermal radiation by cooling the void.

*Since absorption is only reciprocal to emission the Planck Model essentially connotes that the electromagnetic radiation is emitted and absorbed as quanta of energy  $E = h \nu$ .*

It also supports the existence and the possibility of experimental creation of absolute vacuum. A tacit assumption in Planck Model, like the Maxwell Model, is that the energy quanta of electromagnetic radiation, including light, do not need a physical medium for propagation.

### 2.3 The Einstein Model

I greatly admire Einstein's intellectual abilities but am constrained to remark that through out his life he remained unclear about the real nature of light and its propagating medium. This he admitted in his letter of 12 December 1951 to M. Besson vide sec. 2.4.2 below.

Einstein [3-5] adopted the Maxwell Model and the Planck Model in a somewhat extended and modified form.

#### 2.3.1 The Newton's corpuscular theory revived

Einstein [3] extended the Planck Model and postulated that the electromagnetic radiation, including light, of frequency  $\nu$  and wavelength  $\lambda$  is not only emitted and absorbed but also propagated as quanta of energy  $E = h\nu$  and momentum  $p = h/\lambda$ .

Lewis, in 1926, named this energy quantum of light radiation as 'photon'.

This, in a way, revived the Newton's corpuscular theory of light. With this theory Einstein [3] explained the 'photoelectric effect', which won him the Physics Nobel Prize in 1921. But see sec. 2.4.4 below for the Unified Theory explanation of the photoelectric effect.

### 2.3.2 *The theory of Special Relativity*

In accord with the Maxwell and Planck Models Einstein [3-5] stated that the light photon [3] and the electromagnetic [3, 4] and gravitational [5] waves are propagated in the free space without a physical medium.

He discarded the light medium as superfluous for his mathematical theories and introduced the 4-dimensional spacetime continuum instead to propagate electromagnetic and gravitational fields, forces and waves [4, 5].

The constancy of light velocity in Maxwell Model was upgraded as the pair of two postulates of the theory of Special Relativity [4]. He postulated that the velocity of light  $c$  is not only constant but also invariant to the source-observer motion. That is the light velocity remains unchanged as  $c$  and does not add up to  $(c+v)$  if and when the observer moves with a *uniform* velocity  $v$  relative to the source of light. The Special Relativity is also sometimes called the Restricted Theory of Relativity because it is restricted to the uniform motion ( $v$ ) of the observer relative to the source. The theory of General Relativity removes this restriction. See also below.

For an observer moving with a velocity  $v$  along the  $x$ -axis of the stationary frame of reference the space and time coordinates  $x$  and  $t$  appear as  $x'$  and  $t'$  on the moving frame given by the so named Lorentz transformation formulae

$$\begin{aligned} x' &= \beta (x - vt) & t' &= \beta (t - vx/c^2) \\ \Delta x' &= \beta (\Delta x - v\Delta t) & \Delta t' &= \beta (\Delta t - v\Delta x/c^2) \end{aligned}$$

and reciprocally

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$$x = \beta (x' + vt') \quad t = \beta (t' + vx'/c^2)..$$

$$\Delta x = \beta (\Delta x' + v\Delta t') \quad \Delta t = \beta (\Delta t' + v\Delta x'/c^2).$$

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

The length  $l' = dx' = l/\beta$  at rest on the moving frame with its both ends observed simultaneously ( $dt' = 0$ ) appears shorter as  $l$  on the stationary frame and also reciprocally the length  $l = \Delta x = l'/\beta$  at rest in the stationary frame ( $\Delta t = 0$ ) appears shorter as  $l'$  in the moving frame.

That is, when two bodies are in relative motion, the lengths appear shorter on the other than on themselves reciprocally in the same ratio of  $1: (1-v^2/c^2)^{1/2}$ . It is called Lorentz-Fitzgerald contraction [6] after the initial authors of the hypothesis, which Einstein thus supported, with this mathematical derivation of the same formula.

On the other hand

$$\Delta t' = \beta \Delta t.$$

is the relation between the time intervals on the two frames.

That is, the interval of time  $\Delta t'$  between two events at the same site ( $\Delta x' = 0$ ) is minimum in the reference frame stationary with the site of events. In a frame moving in relation to the site of the natural event, however, the time gets dilated or slowed down.

Kinetic energy  $E$  of a particle of mass  $m$  moving at a velocity  $v$  is  $E = mc^2(1/\beta - 1)$  and not  $\frac{1}{2}mv^2$ . Kinetic energy  $E$  becomes infinite when  $v=c$ . So  $c$  is the upper limit of natural velocities and no particle with mass ( $>0$ ) can move at a velocity  $v \geq c$ .

The expression for the total energy

$$E = c (m^2 c^2 + p^2)^{1/2}$$

predicted the possible existence of massless ( $m = 0$ ) particles moving at velocity  $c$  with momentum  $p$  and kinetic energy  $E = pc$ . That is how photon, neutrinos & antineutrinos became

massless. But it was not clarified why the the momentum  $p = mc$ , hence  $E = pc$  are NOT zero at  $m=0$ .

During the inter-conversions of energy  $E$  and mass  $m$ , as for example during the creation and annihilation of electron-positron pair or for the nuclear reactions, the relation  $E=mc^2$  holds [7]. That is one gram of mass yields  $\sim 9 \times 10^{20}$  ergs of energy. The  $mc^2$  is the energy content of a body with mass  $m$ .

An elementary particle does not have a composition. Hence it is extremely rigid and cannot deform. So a force must be transmitted to its whole instantly. An electric force, for instantaneous transmission to the whole of a particle with more-than-zero finite size, needs a velocity  $> c$ , which is prohibited by Relativity. Therefore in the current Relativistic Quantum Electrodynamics, all non-composite elementary particles like electron, proton, and neutron are sizeless points

### 2.3.3 *The theory of General Relativity*

As mentioned above the theory of Special Relativity [4] had restricted the invariance of light velocity  $c$  to the uniform motion or velocity ( $v$ ) of the observer relative to the source of light. The theory of General Relativity [5] removed this restriction. It stated that the light velocity  $c$  is invariant to any non-uniform source-observer motion.

The rectilinear world line element  $ds$  of the Special Relativity [4] is defined by the relation

$$ds^2 = c^2 dt^2 = c^2 dt^2 - (dx^2 + dy^2 + dz^2),$$

And the uniform velocity  $v$  of the source-observer motion is given by

$$v = (dx^2 + dy^2 + dz^2)^{1/2}/dt.$$

In the theory of General Relativity [5], however, the curvilinear line element  $ds$  for a non-inertial frame is given by

$$ds^2 = \sum g_{mn} dx_m dx_n, \quad m, n = 1 \text{ to } 4$$

Here the metric tensor  $g_{mn}$  of the non-Euclidean 4-D spacetime is a function of the three space coordinates  $x_1, x_2, x_3$

and the time coordinate  $x_4 = ct$ ,  $c$  being the velocity of light photon in vacuum.

The General Relativity [5] treats the 4-D spacetime as an entitative continuum and applies to it the Riemannian differential geometry to develop a theory of gravitation.

The 4-dimensional spacetime continuum curves under a gravitational field. Therefore a ray of light from a distant star bends around a heavenly body of mass  $M$  and radius  $R$  by an angle  $\theta$  given by the following relation.

$$\theta = 2GM/Rc^2 \text{ radian.}$$

Arthur Eddington verified this relation during the total solar eclipse on May 29, 1919.

The free motion of a mass body, not subjected to external force, is uniform in a straight line. In a gravitational field, all bodies have the same acceleration. And freely moving bodies, when viewed from a uniformly accelerated non-inertial frame, appear to have an equal and opposite acceleration. That non-inertial reference frame, therefore, is equivalent to a “certain” gravitational field. This is the “Principle of Equivalence” [5] in the general relativity.

#### 2.3.4 *The conceptual content of the Einstein model*

The Einstein model can be summed up to contain the following conceptual assumptions and conclusions.

(a). There is no real physical medium in space to propagate electromagnetic radiation, including light.

(b). All motions are relative. There is no absolute motion and no absolute reference frame.

(c) The 4-dimensional spacetime continuum propagates electromagnetic and gravitational forces, fields and waves.

(d) The electromagnetic radiation, including light, of frequency  $\nu$  and wavelength  $\lambda$ , is not only emitted and absorbed but also propagated as freely moving particles or quanta of energy  $E=h\nu$  and momentum  $p=h/\lambda$ .

(e) The velocity of light in vacuum is constant and invariant to source-observer motion, whether uniform (Special Relativity) or non-uniform (General Relativity).

(f) The light velocity in vacuum  $c$  is the upper limit of natural velocities. No material body with a more-than-zero mass can have a velocity  $v \geq c$  otherwise its kinetic energy is infinite.

(g) The photon, graviton, gluons, neutrino and the antineutrino, which move at a velocity of light  $c$  are massless.

(h) Non-composite elementary particles like electron, proton and neutron are sizeless points.

(i) The length contracts and time slows down as and when observed from a frame moving relatively to the site of an event.

(j) The gravitational field curves the 4-dimensional spacetime continuum. That is why a ray of light bends in a gravitational field.

(k) A uniformly accelerated non-inertial frame is equivalent to a “certain” gravitational field.

(l) The energy  $E$  and mass  $m$  are inter-convertible according to the relation  $E=mc^2$ .

### 2.4 The Unified Theory reappraisal of the Einstein model

#### 2.4.1 *Unreality of the spacetime continua*

In Unified Theory the space and time are not real physical entities having substance but are mere abstract concepts evolving from the direct human perceptions of successive motions and changes in the surrounding objects. The concept of space arises from the successive perceptions of ‘there, here, there’ and that of time from successive perceptions of ‘then, now, then’. The “time arrow” moves only forward and never backwards due to irreversibility of the natural processes of change generating the time concept. That is why all the living beings always grow (change) from childhood through youth to old age and all the plants from seed through seedlings to trees. The day always changes from morning through noon to evening and the position of the sun always changes from east to west. And so on and so forth. These and all other natural processes proceed only in one natural direction, which is never reversed.

The two concepts of space and time are too intangible and abstract to fuse into any tangible spacetime continuum. In the universe with complete ubiquity of granularity throughout right up to the micromost cosmino levels, the existence of a non-granular continuous infrastructure is inconceivable. In fact the existence of **any** space continuum or spacetime continuum would have retarded the motion of terrestrial and heavenly bodies and of even photons to propagate light through or across it, which is not actually observed. Therefore all the various spacetime continua of 4, 5, 10, 11, ...32 dimensions are mere mathematical constructs bereft of real physical existence and theories of relativity [4, 5] and others [8-12] based on them are unrealistic.

Einstein is reported [13] to have said that theoretical physicists cannot do without a physical space medium. He did assign to the 4-D spacetime the property of a physical medium to propagate electromagnetic light and gravitation and discussed the Maxwell equations of electromagnetic radiation [4] but did not go further. The 4-D spacetime does not have mass density or viscosity etc. Such a non-entitative concept can exist only in mathematics, not in real Nature.

#### *2.4.2 The 'sharmon medium' in space is real*

In fact Einstein was unclear about the real nature of light and the light medium in 1905 when he formulated the Special Relativity and the theory to explain the photoelectric effect that won him the 1921 Nobel Physics prize and remained so throughout his life. On 12 December 1951 he wrote to M. Besson thus: "*All these 50 years of conscious brooding have brought me no nearer to the answer to the question: What are light quanta?*"

James DeMeo [14] gives a comprehensive review of the experimental work on measuring the ether drift. Of all the workers Dayton Miller had used the most sensitive instrument and took the largest number of observations spread over the longest period of time. But Miller presents convincing positive evidence for the non-zero ether-drift and hence for ether as the light medium. Interestingly DeMeo cites Dayton Miller:

*"The effect [of ether-drift] has persisted throughout. After considering all the possible sources of error, there always remained a positive effect."* — Dayton Miller (1928)

Dayton Miller's 'positive' results yielded more-than-zero ether drift as evidence for the existence of 'ether' or a light-propagating medium in space. This is in addition to the work of Young, Fresnel by 1827 and of Sagnac in 1913 on interference and/or diffraction of light establishing light as a wave transmitted in a physical medium.

This book presents scientific logic of the Unified Physical Theory (UPT) for the 'sharmon medium' composed by the new particle 'sharmon', which in turn is made of the two micromost basic elements: electrically positive *positrino* and negative *negatrino*. The positrino and negatrino compose all forms of energy, mass, energy quanta, particles of matter and antimatter in the Cosmos, hence given the common name '*cosmino*'.

A cosmino has the diameter  $l_p = 1.6 \times 10^{-33}$  cm, mass =  $2.596 \times 10^{-48}$  gm, electric charge =  $1.37 \times 10^{-30}$  esu, and spin =  $\frac{1}{2}$ . The sharmon mass is  $5.192 \times 10^{-48}$  gm. Its spin is 0 or 1.

The time-averaged inter-sharmon distance  $\sim 10^{-5}$  cm compares with the Mean Free Path for the real gasses (e.g. for Hydrogen  $1.12 \times 10^{-5}$  cm, Oxygen  $0.64 \times 10^{-5}$  cm, Nitrogen  $0.595 \times 10^{-5}$  cm). Therefore sharmon medium is a kinetic gas with its number density  $n_s \sim 10^{15}$  sharmons per  $\text{cm}^3$ . Its mass density is  $0.519 \times 10^{-33}$  gm. $\text{cm}^{-3}$ , rigidity  $4.68 \times 10^{-12}$  and viscosity  $0.57 \times 10^{-22}$  dyne. $\text{sec}/\text{cm}^2$ .

Due to its nature as a kinetic gas, the sharmon medium approximates to a 'kinetic continuum' effectively obliterating the interstices between sharmons in fleeting contact. It fills all space leaving no 'vacuous space' with 'nothing inside' and rules out the existence of absolute vacuum for any significant period of time. It propagates electromagnetic light and gravitation.

### 2.4.3 *Propagation of wave-quantum unity of the electromagnetic radiation in Unified Theory*

The long wave electromagnetic (e.m.) 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

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. The 1-spin sharmons participating in the process of propagation return to their 0-spin state on transferring the wave energy quantum to the contiguous neighbour in the sharmon medium and finally the last 1-spin sharmon transfers its energy to the target and returns to its 0-spin state.

After emission and before absorption it is always the energized 1-spin sharmon, which in deference to convention and for continuity is still called 1-spin "**photon**". But sec. 7.6 of Chapter 7 denies the existence of conventional 'photon'.

Since the spin of an emitter does not fall by 1 and/or that of an absorber does not increase by 1, what is emitted or absorbed is NOT the 1-spin photon as a whole but only its energy comprising 0-spin sharmons. However, the transmission, always and throughout, is of the energy of the 1-spin photon as a wave-quantum UNITY. The 1-spin photon as such is **not** emitted, propagated or absorbed. The Wave-Quantum unit is a 'pulse' one wavelength ( $\lambda$ ) long, wherein 'Quantum' is not a sizeless point. A spherical wave-front or a lengthy EM wave comprises innumerable such Wave-Quantum pulses one wavelength  $\lambda$  long. Approximating 'photon' as a sphere of closely packed cosminos of radius  $r_c$  the photon radius becomes  $r = r_c \cdot (2hc/\lambda)^{1/3}$ .

The **Quantum Theory** (QT) [15] could not satisfactorily explain why the electromagnetic radiation behaves sometime as a wave and at other time as a particle. Moreover, it also wrongly split the coexistent intrinsic *wave-quantum unity* of radiation into *wave-or-quantum dualities*.

In fact both radiation and moving material particle have intrinsic **wave-quantum unity** of Unified Theory (UT), which appears as **wave-or-quantum duality** (of QT) due to experimental limitations to observe only one of the two coexistent characters at a time, not both simultaneously.

Einstein was conspicuous for ignoring and not addressing the wave-quantum unity of radiation and moving material particles. His theories [3-5] did not and in fact could not provide any explanation for these phenomena. He even did not elucidate the physical mechanisms for the propagation of the electromagnetic and gravitational waves in the 4-D spacetime continuum. The freely moving particulate photon of his corpuscular theory [3] could not avoid sharing the source-observer motion. Hence its velocity could not be invariant to source-observer motion, as required by his own theory of special relativity.

But interestingly, both the particle and wave aspects for both low intensity light and stream of electrons have been demonstrated [16] simultaneously in one and the same experiment. This provides experimental support to Unified Theory's **wave-quantum unity** much against Quantum Theory's **wave-or-quantum duality**.

### *2.4.4 The Unified Theory explanation of photoelectric effect*

Einstein [3] explained the photoelectric effect by postulating that light is propagated as quanta and the energy of one particulate photon is imparted to one electron, which overcomes the force or energy binding it to the metal surface.

In Unified Theory the energized sharmon replaces the photon. If  $w$  is the energy binding the electron with the metal surface or the work function of the metal,  $\nu$  the frequency of the incident ultraviolet light and hence  $h\nu$  the energy of the energized sharmon, the kinetic energy  $E$  of the ejected photoelectron is given by

$$E = h\nu - w.$$

This is exactly the well-known Einstein equation [3] already verified by experiments.

### *2.4.5 Constancy & invariance to source & observer motion of the light velocity*

The special relativity [4] was based on these two axiomatic postulates, which Einstein did not explain but are now explained realistically from Unified Theory. However this Unified Theory

(UT) explanation does not in any way validate the theory of Special Relativity (SR). Moreover, Unified Theory can even explain the actually observed variability of light velocity  $c$ , which otherwise invalidates both the special and general theories of relativity.

The ‘origin’ of an electromagnetic wave is not its source and its ‘terminus’ is not the target. The electromagnetic wave energy quantum, after emission from the source is initially received by a 0-spin sharmon in the medium, which rises to its 1-spin state and thus marks the effective ‘*origin*’ of the electromagnetic 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. Both origin and terminus of the electromagnetic wave are situated in the sharmon medium.

Light begins creatively at the ‘origin’ and ends vanishingly at the ‘terminus’ both in the sharmon medium. The particulate photon energy comprising 0-spin sharmon aggregate per unit frequency cycle is carried along the transverse electromagnetic wave from origin to terminus as a wave-quantum unity via contiguous mechanisms.

Due to creative beginning of the light wave at the ‘origin’ in the sharmon medium the light velocity  $c$  is invariant to the source motion and vanishing end of the light wave at the ‘terminus’ in the sharmon medium makes  $c$  independent of the observer motion. The constancy and invariance to source-observer motion of  $c$  [=  $(\epsilon_0 \cdot \mu_0)^{-1/2}$ ] also follow from the fact that the  $\epsilon_0$  &  $\mu_0$  of the sharmon medium are constant and not affected by the motion of the source or observer.

#### 2.4.5.1 Sharmon medium as the absolute reference frame

By implication from the above section the light propagation in the sharmon medium emerges as the ‘***absolute motion***’ because it is NOT relative even to the motion of its source and target/observer. And the light propagating sharmon medium emerges as the ‘***absolute reference frame***’. This is in stark contrast to the conceptual foundations of Relativity vide sec. 2.3.4 above according to which there is no absolute motion and no absolute reference frame. Since all motions are relative.

### 2.4.5.2 *Sound wave versus light wave*

However, a longitudinal sound wave comprising compressions and rarefactions needs a gross material medium (solid, liquid, molecular gas). It ‘originates’ at its *vibrating source* and ‘terminates’ by setting the *not-vibrating* target into vibrations. Source’s motion toward or away from the observer compactifies or disperses the compressions and rarefactions to increase or decrease the sound-frequency. The observer moving toward or away from the source receives the compressions and rarefactions more or less often thereby increasing or decreasing the frequency. This is the Doppler effect. The velocity of sound is set by the square root of the ratio of the adiabatic elasticity and mass density of the medium. The source–observer velocity toward or away from each other is added or subtracted from this intrinsic sound velocity to give the net value. Since the sharmons of  $1.6 \times 10^{-33}$  cm dia. can pass through inter-atomic space a longitudinal wave in the sharmon medium cannot interact with a material source or a receiver to produce an audible sound.

### 2.4.6 *The observed variability of c and superluminality invalidate relativity theories but are consistent with Unified Theory*

Even the observed variability of  $c$  [17-19] and superluminality [20] (light velocity exceeding  $c$ ), which invalidate the theories of Special and General Relativity, also follow from Unified Theory by merely affecting  $\epsilon_0$  &  $\mu_0$  and refractive index  $\mu_r$  of the propagating sharmon medium **locally**.

It may be re-emphasized here that not only in free space but also within any gross material medium, the light does and can propagate only through the pervading subtle sharmon medium whose local  $\epsilon_0$ ,  $\mu_0$  determine the velocity of light in that medium.

The sharmons in the medium, which propagate light and the propagated sharmon-composed photons are ultimately made of the electrically charged  $\pm$ ve cosminos. The sharmons have both electric and magnetic dipole moments. All this gives rise to  $\epsilon_0$  &  $\mu_0$  of the sharmon medium and photon’s orthogonal electric and magnetic fields. The  $\epsilon_0 = 8.85 \times 10^{-12}$  Farad/meter and  $\mu_0 = 1.26 \times 10^{-8}$  Henry/ meter customarily assigned to vacuum are

actually of the sharmon medium in free space. Hence  $c = (\epsilon_0 \cdot \mu_0)^{-1/2} = 2.9979 \times 10^{10}$  cm/sec is the phase velocity for individual photons in free space.

The group of photons comprising the light pulse and other conditions in experiments of Wang *et al.* [20] affect the shape of the pulse and  $\epsilon_0$  &  $\mu_0$  of the propagating sharmon medium.

This affects the phase and group velocities ( $v$ ,  $v_g$ ) as well as the refractive index ( $n_g = c/v_g$ ) in the gross medium. As against  $L/c = 0.2$  ns to cover  $L = 6$  cm in free space, the observed 62 ns time lead means that time lag = - 62 ns =  $(L/v_g - L/c) = (n_g - 1)L/c$ . That is  $(n_g - 1) = -310$  for the light pulse inside the 6 cm cell with atomic cesium gas. Therefore, the refractive index  $n_g$  is -309 and the group velocity  $v_g$  is  $-c/309$ . This explanation adversely affects special relativity and quantum theory by necessitating a light medium but not the causality principle.

Most significantly, the sharmon medium as a kinetic gas carries the possibility of local variations in its number density sharmons/cm<sup>3</sup>, mass density gm/cm<sup>3</sup>,  $\epsilon_0$ ,  $\mu_0$ ,  $c = (\epsilon_0 \cdot \mu_0)^{-1/2}$  and even of the gravitational constant G.

#### 2.4.7 Unreality of the Lorentz transformation formulae

Lorentz arrived at his formulae to explain the null results of Michelson-Morley experiments and to save the ether. Einstein discarded the ether but derived the same formulae. Unified Theory explains the MMX results from first principles based on the light propagating Sharmon Medium and rejects the Lorentz formulae as unrealistic, un-necessitating the work of Lorentz and Einstein both.

The velocity of light  $c$  is constant and invariant to source-observer motion but that of a material particle or of a reference frame  $v$  is not so. Thus the kinematics of a light photon and a material particle are too exclusively different for giving same status to  $c$  and  $v$  in a formula to describe any real motion.

The velocity of no real object can vary (like  $v$ ) with, and also be invariant (like  $c$ ) to, the source-observer motion at the same time. Therefore the Lorentz transformations of Special Relativity [4] do NOT describe any actual motion in the real Nature. Their leading conclusions viz. 'contraction of space' and 'dilation of

time' are the unrealistic demands on Nature to change to fit their mathematics.

Even otherwise, the actual length of an object, viewed by say, 100 differently moving observers cannot undergo 100 different objective contractions at the same time, making the 'contraction of length' an unreal concept. Likewise, 'dilation of time' too is unrealistic.

#### 2.4.8 *Basic flaws in General Relativity*

The General Relativity is flawed for using Riemannian differential geometry of a non-existent 4-D 'spacetime' continuum. It as a theory of gravitation and its equivalence of a gravitational field with a uniformly accelerated frame is incomplete since no coordinates' transformations of no non-inertial frame can eliminate the actual centripetal gravitational fields. However the fields to which non-inertial systems are equivalent vanish on transformation to an inertial system.

#### 2.4.9 *Bending of light in a gravitational field in Unified Theory*

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 body in time  $t = 2R/c$ , to fall by the distance  $s = \frac{1}{2}gt^2 = \frac{1}{2}(GM/R^2).(2R/c)^2 = 2GM/c^2$ . For a distance  $D$  the light bends by the angle

$$\theta = s/D = 2GM/Dc^2 \text{ radian.}$$

This is exactly the Einstein formula for the bending of light in a gravitational field verified by Arthur Eddington during total solar eclipse on 29 May 1919. It supports the Unified Theory (Unified Physical Theory) because the 4-D spacetime is non-existent vide sec. 2.4.1 above. Later Einstein had revised the above formula to  $\theta = 4GM/Dc^2$  radian. Unified Theory also can provide for this increase.

#### 2.4.10 *The Gravity Probe-A to test General Relativity vis-à-vis Unified Theory*

Gravity Probe A (GP-A) was a satellite-based experiment performed jointly by the Smithsonian Astrophysical Observatory and the National Aeronautics and Space Administration (NASA). On June 18, 1976 a Hydrogen MASER (Microwave Amplification by Stimulation Emission of Radiation) was launched on top of a Scout rocket into space to measure the rate change of a MASER clock in lower gravity with high precision. It remained in space for 1 hour and 55 minutes, as intended and then crashed into the Atlantic Ocean. The rocket was launched "nearly vertically upward" to cause a large variation in the "local" gravity seen by the MASER, reaching a height of 10,000 Km (6200 miles). With height the gravity lowers but gravitational potential rises. It decreases the frequency and increases the wavelength of the MASER causing a redshift. The Unified Theory, in sec. 13.2 of Chapter-13 has shown that if  $U_2$  is the gravitational potential around the higher point and  $U_1$  for the observer on earth, the resultant red (increment of wavelength) shift would be  $(U_2 - U_1)/c^2$ . The Gravity Probe A experiment has thus supported the Unified Theory.

#### 2.4.11 *The Gravity Probe-B to test General Relativity vis-à-vis Unified Theory*

On 21st April 2004 the US\$700m Gravity Probe-B (Gp-B) was launched [21]. Its primary task was to use four ultra-precise gyroscopes to measure directly two effects predicted by general relativity. One is the *geodetic effect*—the amount by which the mass of the Earth warps the local 4-dimensional spacetime continuum in which it resides. The second effect, called *frame-dragging*, is the amount by which the rotating earth drags local spacetime around with it. Because the spacecraft is in a polar orbit, the two effects occur at right angles to each other, giving a clean separation between them. Furthermore, the gyros are arranged such that each measures both effects. It is a tribute to the preparation, knowledge and skill of the Stanford-NASA-Lockheed Martin development team. The website <http://einstein.stanford.edu/> presents the details and updates. The website <http://einstein.stanford.edu/highlights/status1.html> gives Spring 2008 Status Update. It states: "As experimentalists, we

make no a priori assumptions that Einstein's predictions represent the bull's eye. Rather, we have collected data, we are doing everything humanly possible to achieve the greatest precision and accuracy in analyzing it. Once this has been accomplished, we will announce the results. If they match Einstein's predictions, then once again-to the achieved level of precision and accuracy-Einstein's theory will be upheld. If they don't, this could be evidence of a breakdown of the theory”.

However, a sharmon  $1.616 \times 10^{-33}$  cm across and  $3.23 \times 10^{-33}$  cm long can pass through inter-atomic spaces and between the orbital electrons in the densest solid. Therefore the sharmon medium is irremovably present in the high vacuum of Gp-B, vide Chapter-8. The sharmon medium is viscous, with a viscosity constant  $\eta = 0.57 \times 10^{-22}$  dyne.sec/cm<sup>2</sup>. In Unified Theory the sharmons mediate gravitational and electromagnetic fields, forces and phenomena including light, vide Chapters 7, 8 & 10. Therefore ***sharmon medium can account for all the effects that General Relativity ascribes to the 4-D spacetime continuum, which propagates electromagnetic light and gravitation.*** The *geodetic effect* is the gravitation related curvature of the sharmon medium and the *frame drag* is the ‘sharmon medium drag’ due to viscosity combined with gravitation. It, for example, is a common experience that a body rotating and/or moving in a viscous medium distorts the medium and carries it along. The earth spins on its axis as it revolves around the sun. The Gp-B cannot differentiate 'frame-drag' from the 'sharmon medium drag' of Unified Theory. The two are the same. However, the 4-D spacetime continuum is non-existent (sec. 2.4.1 above), and so is the 'frame-drag'. But 'sharmon medium' and hence the 'sharmon medium drag' is real (sec. 2.4.2 above). So, what the Gp-B proposes to measure in the name of 'frame drag' is only the 'sharmon medium drag'. It is also the ‘ether drag’ measured by Dayton Miller [14].

### 2.4.12 Earth's motion distorts surrounding ‘sharmon medium’

Further, the Nature Physics Portal, 28 October 2004 webpage <http://info.nature.com/cgi-bin/24/DM/y/eQuV0Bhe3V0Ij0UsQ0Ad> refers to Mark Peplow's article published online in the news@nature.com on 20 Octo'04 [22] regarding 'frame-

dragging'.. It declares, "Spinning Earth twists space. Laser measurements confirm Einstein's general theory of relativity".

Ignazio Ciufolini at the University of Lecce, Italy and Erricos Pavlis at the University of Maryland in Baltimore charted the path of two NASA satellites, LAGEOS and LAGEOS 2, over 11 years with laser range-finders with the precision of a few millimeters. The satellite's orbits were 'dragged' out of position by about 2 meters each year. Researchers say that their result is 99% of the value predicted by relativity, with an error of up to 10%. But as discussed above, it only uses laser light to study the distortion, due to earth's rotation, of the surrounding viscous 'sharmon medium', which propagates light and gravitation.

The earth moves through the viscous 'sharmon medium' while it spins and revolves around the sun. It distorts the surrounding viscous sharmon medium in which lie the orbits of the two NASA satellites, LAGEOS and LAGEOS 2, attracted by earth's gravity.

In fact it is an evidence for the existence of a gravity propagating and viscous medium, much against the founding postulate of both the special and general theories of relativity, which discards any physical medium for light and gravitation.

#### 2.4.13 *Interconversion of energy & mass*

The basic concept of the equivalence and inter-convertibility of energy  $E$  and mass  $m$  follows in Unified Theory very naturally from the fact that the micromost elements, positrino and negatrino, compose all forms of energy and mass.

The radiant energy  $E$  is composed by 0-spin sharmons and hence is associated with mass and momentum  $E/c = (E/c^2).c = \text{mass } (E/c^2) \times \text{velocity } (c)$ , relating radiant energy  $E$  with radiant mass  $m=E/c^2$  or giving  $E=mc^2$  for the equivalence and inter-convertibility of energy  $E$  (erg) and mass  $m$  (gm). Einstein [7] generalized this relation and included the rest mass energy  $mc^2$  in the relativistic total kinetic energy  $E = c(p^2 + m^2c^2)^{1/2}$ . *However the magnitude of constant  $k$  in the relation  $E=km$  would depend on the nature(s) of  $E$  and/or  $m$  and will not always be  $c^2$ , although the cosmino contents on two sides of the equation*

*remain unchanged.* This is first, because the units of different energies differ. Secondly, efficiency of the conversion of mass into energy  $E \leftarrow mc^2$  or of energy into mass  $m \leftarrow E/c^2$  is not 100% when a part of energy changes into unavailable form. In an irreversible process the forward and backward basic reactions or changes are not equally efficient. And most natural processes are irreversible.

### 2.4.14 *No particle or energy quantum is massless or sizeless point*

The Unified Theory has two basic elements: positive (+ve) *positrino* and negative (-ve) *negatrino* of diameter  $1.6156 \times 10^{-33}$  cm, mass  $2.596 \times 10^{-48}$  gm and electric charge  $\pm 1.3729 \times 10^{-30}$  esu. These cosminos also compose the new particle *sharmon* of the new space medium, the *sharmon medium*, which is the '**basic substance**' in the micromost compositional unity of mass, energy and radiation.

Cosmino is the unit of charged mass ( $2.596 \times 10^{-48}$  gm) and charge ( $1.37 \times 10^{-30}$  esu), and sharmon that of neutral mass ( $5.19 \times 10^{-48}$  gm) and energy ( $4.66 \times 10^{-27}$  erg or  $2.91 \times 10^{-15}$  eV). All leptons contain  $\pm 3.50 \times 10^{20}$  cosminos. The sharmon content of electron and positron is  $3.94 \times 10^{17}$ , of 105.7 MeV muon and antimuon  $3.6 \times 10^{22}$  and that of 1807 MeV tau & antitau is  $6.19 \times 10^{23}$ . The positive up, charm and top quarks have  $2.33 \times 10^{20}$  +ve positrinos. The negative down, strange and bottom quarks have  $1.167 \times 10^{20}$  -ve negatrininos. The sharmon contents are: for 0.39 GeV up & down  $1.337 \times 10^{23}$ , for 1.55 GeV charm  $5.31 \times 10^{23}$ , for 0.51 GeV strange  $1.749 \times 10^{23}$ , for 199 GeV top  $6.82 \times 10^{25}$  and for 4.72 GeV bottom  $1.619 \times 10^{24}$ .

Interestingly on 5th June '98, 120 Japanese and American Physicists of Super-Kamiokande collaboration [23], announced the observed mass-dependent "oscillations" in the time-related frequencies of muon-neutrino as evidence for its mass of about 0.1 eV comprising  $3.43 \times 10^{13}$  sharmons. Its radius as a compact mass of cosminos is  $0.8078 \times 10^{-33} \times (6.86 \times 10^{13})^{1/3} = 3.3 \times 10^{-29}$  cm. It is smaller than that ( $7.249 \times 10^{-29}$  cm) of the Sodium D-line photon.

In this way Unified Theory has worked out the cosmological composition of various particles and energy quanta like photon of various energies. It can therefore be safely concluded that no particle or energy quantum is massless or sizeless point. This opposes the Einstein's conclusions that photon, graviton, gluons, neutrino and the antineutrino, which move at a velocity of light  $c$  are massless and the non-composite elementary particles like electron, proton and neutron are sizeless points.

### **2.5 The emerging scenario**

'Science' is the creation of the scientists but not their exclusive 'property'. After publication it affects all and therefore is the concern of every body. But sometimes the core basics of the theory are wrapped in technical jargon, which is not readily and easily comprehensible. 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. The most difficult to visualize was the unrealistic and nonexistent 4-dimensional 'spacetime' continuum, which propagates light and bends in a gravitational field.

Thus relativity was a conspicuous and effective beginning of the unrealistic Physics, although three decades earlier Maxwell had already postulated propagation of the electromagnetic light 'wave' in an empty space devoid of the wave-propagating medium. The unrealistic and nonexistent 4-D spacetime of relativity theories [4, 5] was soon followed by a host of theories [8-12] based on non-existent spacetime continua of higher and higher dimensions.

I have the greatest personal respect and admiration for the very bold mathematical physicist that Einstein was. Although he admitted that he never was clear and sure about the physical nature of light yet carried, the bold mathematical logic of his belief in the idea of '*constant  $c$  in 4-D spacetime*', with courage of conviction, to the two (special & general) theories of relativity

with so many astounding and mind boggling conclusions, which though unrealistic in nature still hold the sway after a century.

Surprisingly on Thursday 10th June 2004 the United Nations general assembly passed a unanimous resolution declaring 2005 as the “year of Physics” and asking UNESCO to organize events to commemorate the Einstein’s ‘groundbreaking’ papers published in 1905 [24]. The UN, by and large, is a political world body. It has pronounced a well-meaning innocent judgment, on a controversial scientific subject. The discussions in this Chapter and elsewhere in the book unravel the truth. The present book therefore has a great timely potential to create the right perspective and desired corrective impact on the open-minded intellectuals for the advancement of realistic Science and Philosophy.

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