Principles of 《Universal and Unified Physics》

Wei Xu (徐崇偉), wxu@virtumanity.us

November of 2018

Abstract: The *Principles* are human wisdoms of our ultimate philosophy, scientific theories and empirical knowledge that give birth to 《*Universal and Unified Physics*》[1]. Since inauguration, it is now strikingly breaking forth systematically from the philosophy of natural laws to the unification of the entire traditional, classic and contemporary physics, and gracefully representing the triple essences of:

- ✓ Laws of universe as *Philosophy of Nature*,
- ✓ Framework of nature as *Infrastructure of Universe*,
- ✓ Hierarchy of horizon structures as *Topology of Physics*.

By exploring the profound principles behind the workings of the theory, we abstract each context of the laws philosophically, define their terminologies revelationally, derive the scientific theories mathematically, and testify the "artifacts" empirically, shown by the following approaches.

1. Chapter I: Abstracts principles of *Philosophy of Nature* and reveals secrets of *Topology of Universe* and *Horizon Hierarchy of Worlds*, predominantly *Laws of YinYang* processes and of *Event Evolutions*.
   (Designed for philosophers using methodology of "*divine inspirations by heart"*)
2. Chapter II: Illustrates how the *Infrastructure of Universe* is developed as the mathematical framework to carry out *Universal Field Equations* and give rise to the foundations of physical *Horizons*.
   (Designed for scientists using methodology of "*research thoughts by brain"*)
3. Chapter III: Testifies why the theory can unify our modern physics, conclude numerous groundbreakings, and declare as *Universal and Unified Physics*.
   (Designed for empiricism using methodology of "*controlled experiments by technology"*)

Therefore, readers will gain their confidences in development of our future sciences concisely and effectively with the methodology of

Philosophy ⇒ *Scientific Theory* ⇐⇒ *Observation and Experiment*

[1] Xu, Wei; "Universal and Unified Physics", http://vixra.org/abs/1810.0016 (2018)

Keywords: Philosophy of science; Quantum mechanics, field theories, and special relativity; General relativity and gravitation; Statistical physics, thermodynamics, and nonlinear dynamical systems; General theory of fields and particles; Unified field theories and models

PACS: 01.70.+w, 03.00.00, 04.00.00, 05.00.00, 11.00.00, 12.10.−g

To Those in Search of The Truth

To Generations of Civilization

Table of Contents

Introduction

《Universal and Unified Physics》 [1] is a theory of philosophy, natural operations, and universal laws that produces nature science on the development of, but not limited to, empirical, physical, cosmological, and ontological practice. In other words, *it* is the knowledge of nature that unifies the three branches of the epistemology: theorizing philosophical axioms from the principles of nature, composing scientific framework to infrastructure of topology, and integrating sensory experience as empirical verification.

Since its inauguration in 2016, the *Principles* harvest a variety of the scientific knowledge and theories systematically, concisely revealing secrets of cosmology, ontology, quantum physics, metaphysics and beyond. However, because the fundamental concepts are emerged beyond a level of the contemporary physics, it becomes urgent and yet critical to understand clearly the whole picture of workings of our natural laws, basic terminologies and mathematical structures.

Today, from a scientific perspective, it is pushed to its limits, unable to account for the essences that lay beyond the reach of experimentation, cut off from the intrinsic nature of matter and life in the universe, and struggling with the excessive hype of hypothetical sciences. At a philosophical perspective, scientists are seeking the divine inspiration for the original revelation of supernatural essence. Because we were born with discrepancy of the traditional philosophy and physics, it might have confused and disguised us to search for the truth. In fact, this is the first challenge one has to promote oneself before perceiving or prevailing further for discoveries of our nature.

From Bohr's declaration "Everything we call real is made of things that cannot be regarded as real" [2], to Feynman's claim for the "existence of the rest of the universe" [3], to *Hawking*'s statement "'philosophy is dead" "philosophers have not kept up with modern developments in science, particularly physics" [4], the search for a new philosophical science to overcome physical uncertainty is today's key mission to the unresolved problems of contemporary physics.

In this manuscript, we present how the *Principles* assemble our wisdom over five thousand years and are breaking forth systematically at the essentials of i) *Philosophy of Nature Laws, ii) Infrastructure of* mathematical framework with *Universal Field Equations*, and finally iii) empirical unification of our modern physics, to conclude numerous groundbreakings, and declare as *Universal and Unified Physics*.

As a result, our theoretical sciences, scoped within or limited in physical space as one of the manifolds in the universe topology, are now approaching to its twin for a duality of integrations with the virtual space. This signals us that a new era of our scientific matureness is dawning: duality of virtual-physical reality.

---

1 Xu, Wei; "Universal and Unified Physics", http://vixra.org/abs/1810.0016 (2018)
2 Barad, K.; Meeting the Universe Halfway. Duke University Press Books p254 (2007)
2 Barad, K.; Meeting the Universe Halfway. Duke University Press Books p254 (2007)
3 Feynman, R. P.; Statistical Mechanics. Benjamin/Cummings: Reading, Massachusetts (1972)
4 Sebastian, Haro; Science and Philosophy: A Love-Hate Relationship, arxiv:1307.1244 (2013)

1. Philosophy of Nature

The enlightenments and wisdoms from *divine inspirations* in this chapter are rooted in the philosophy of five millennia past, when our ancestors built a profound metaphysics and our scientists develop the sophisticated physics. Our traditional and extraordinary intelligences, inherited and advanced from generation to generations, are being naturally integrated, philosophically abstracted, intellectually refined and mathematically applied to our current and future sciences.

As a consequence, hardly with hypothesis, the philosophical principles of nature reveal secrets of *Topology of Universe* and *Horizon Hierarchy of Worlds*. Especially, *Laws of Natural processes* and of *Event Evolutions* constitute the foundations of *Universal Infrastructure* and serve as architecture to *Topology of Physics*.

1.1 Universe

Universe is the whole of everything in existence that operates under a topological system of natural laws for, but not limited to, physical and virtual events, states, matters, and actions. Equipped with fundamental properties of universe, the topology constitutes and orchestrates various domains, called ***World***, each of which is composed of hierarchical manifests, characterizable and known as a duality of ***YinYang*** ($Y^-\,Y^+$) entanglement for the ***Event Operations*** to transform and transport among the neighborhood zones or its subsets of areas, giving rise to physical ***Horizons***.

1.2 Matter and State

Matter is defined normally as the set of states, which consists or is composed of any element, object, substance, subject, or situation. Its existence is operated by the event actions that can appear as virtual, or physical, or both. States are mutational and transformable variables of the appearances or characteristics in either virtual or physical, or both. In other words, matter is an existence in the form of states or events in general, virtually and/or physically. The universe is a supernatural environment structured for the totality of existence in the form of states as the formational variables of matter. By grouping the states into virtual or physical, or both, we define the virtual and physical *worlds* as simultaneous or coexistent. Normally, states of a matter are overlaid with transformations across and transportations transverse multiple worlds.

Yin (Y^-) and *Yang* (Y^+), or simply - and +, are the states of, processes to or operations on an element or an object, which form a coherent fabric of our nature, as exhibited in all physical existence. *YinYang*（阴阳）duality is a part of the supernatural principles in an environment of virtual space that *Chinese* tradition has developed the profound metaphysics and established scientifically the natural laws of *Xing* (性) or *YinYang*: the reciprocal interaction of the opposites is to cause all universal phenomena. This display of duality forms the sense of natural harmony where the opposite is complimented to give dynamism and sense to life. The ever-changing relationship dynamically between *Matter and States* is responsible to operate and conserve the flux of the universe and life in general.

1.3 Topology of Universe

For the conceptual simplicity, our *Topology of Universe* refers the states, events, and operations of "physical" functions to the yin supremacy, confined as physical or Y^- manifold, and of "virtual" functions to the yang supremacy, confined as virtual or Y^+ manifold. Because of this *YinYang* nature, our world always manifests a mirrored pair in the imaginary part, a conjugate pair of a complex manifold. In mathematics, *Topology of Universe* in our natural philosophy is simply a complex conjugate function as a $Y^-\,Y^+$ duality of *Physical* (W^-) and *Virtual* (W^+) worlds:

$$W^- = P + i\,V = Ae^{+i\vartheta} \qquad (1.3a)$$

$$W^+ = P - i\,V = Ae^{-i\vartheta} \qquad (1.3b)$$

The amplitude A is physical supremacy and the phase ϑ is virtual supremacy, a virtual event λ

operation is implicit to $A(r(\lambda))$ and explicit to $\vartheta(\lambda)$ (Reference [1] Chapter I).

1.4 World Plane

A World Plane has a permanent form of global topology, localizes a region of the universe, and interacts with other worlds rising from one or the other with common ground in universal conservations. Our universe, manifests as an associative framework of worlds, illustrated as a global function $G(r,\vartheta)$ of a world plane, the *Two-Dimensions* (r,ϑ) as the mutually independent and reciprocal units: an *r*-coordinate of physical manifold and a ϑ-coordinate of virtual manifold. This ϑ coordinate is named as a superphase, representing an event at the virtual states implicit to the physical dimensions. The global functions in $G(\lambda)$ axis are a collection of common objects and states of events λ, with unique functions applicable to both virtual and physical spaces of a holistic world *W*.

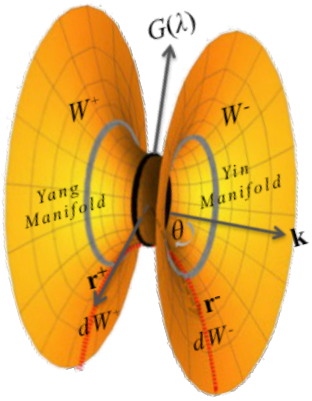

Figure 1.4: Two-Dimensional World Planes of Universal Topology

The two-dimensions of a world plane characterize the motion dynamics of world lines such that, to its physical world, a *Straight Line*, named as ***Boost***, is a residual and relativistic generator, and a *Circle Curve*, named as ***Spiral***, is a rotational and torque generator. In fact, the boost interweavement generates photons and the spiral entanglement produces gravitons. Remarkably in accordance with our philosophical anticipation, conservation of communication between the virtual and physical worlds is operated at the superphased world planes, and maintained for its torsion invariance without r-singularity (Reference [1] Artifact 7.4).

1.5 Potential Fields

Governed by a global event λ under the universal topology, an operational environment is initiated by the virtual ϕ^+ or physical ϕ^- *Potential Fields* of a quantum tensor, a differentiable function of a complex variable in its *Superphase* nature, where the scalar function is also accompanied with and characterized by a single magnitude in *Superposition* nature with variable components of the respective coordinate sets of their own manifold. Corresponding to its maximal set of commutative and enclave states, a wave function defines the states of a quantum system virtually and represses the degrees of freedom physically. Uniquely on both of the two-dimensional world planes, a wave potential functions as a type of virtual generators, potential modulators, or dark

energies that lies at the heart of all events, instances, or objects. For an object, each point of the fields $\phi^{\pm}(x,\lambda)$ is entangled with and appears as a conjugate function of the scalar field $\varphi^{\mp}$ in its opponent manifold.

$$\psi^{+} = \psi^{+}(\hat{x})\ exp[i\hat{\vartheta}(\lambda)] \qquad : x^{\mu} = x^{\mu}(\lambda),\ \lambda = \lambda(x^{\mu}) \qquad (1.5a)$$

$$\psi^{-} = \psi^{-}(\check{x})\ exp[i\check{\vartheta}(\lambda)] \qquad : x_{\nu} = x_{\nu}(\lambda),\ \lambda = \lambda(x_{\nu}) \qquad (1.5b)$$

In the world planes, a density $\rho_n^{+} = \phi_n^{+}\varphi_n^{-}$ or $\rho_n^{-} = \phi_n^{-}\varphi_n^{+}$ is incepted or operated under both virtual and physical primacies of an Y^{+} or Y^{-} manifold respectively and simultaneously, where ρ_n^{+} represents the spatial supremacy with the implicit event as an indirect dependence; and likewise, ρ_n^{+} represents the virtual supremacy with the redundant degrees of freedom in the implicit coordinates as an indirect dependence. (Reference [1] Chapter II)

1.6 Event Evolution

Both time and space are the functional spectra of the events λ, operated by and associated with their virtual and physical structures of ontology, and generated by supernatural $Y^{-}Y^{+}$ events of operation associated with their virtual and physical framework of universal topology. The event states of spatial and time on world planes are open sets and can either rise as subspaces transformed from the other worlds or confined as locally independent existence within their own domain. As in the settings of spatial and time geometry for physical or virtual world, a global parameter $G(\lambda)$ of event λ on a world plane is complex differentiable not only at $W^{\pm}(\lambda)$, but also everywhere within neighborhood of W in the complex plane or there exists a complex derivative in a neighborhood, such that an operational function can be represented as an infinite sum of the λ_i events:

$$f(\lambda) = f(\lambda_0) + f'(\lambda_0)(\lambda - \lambda_0)\cdots + f^{n}(\lambda_0)(\lambda - \lambda_0)^{n}/n! \qquad (1.6)$$

known as the *Taylor* and *Maclaurin* series, introduced in 1715 [5]. Normally, a global event generates a series of sequential actions, each of which is associated with its opponent reactions, respectively and reciprocally. (Reference [1] Chapter V)

1.7 YinYang Processes

Following *Universal Topology*, world events, illustrated in the $Y^{-}Y^{+}$ event diagram below, operate the potential entanglements that consist of the Y^{+} manifold (white background) at a top-half of the cycle and the Y^{-} manifold (black background) at a bottom-half of the cycle.

5 Taylor, Brook (1715). Methodus Incrementorum Directa et Inversa (in Latin). London. p. 21–23

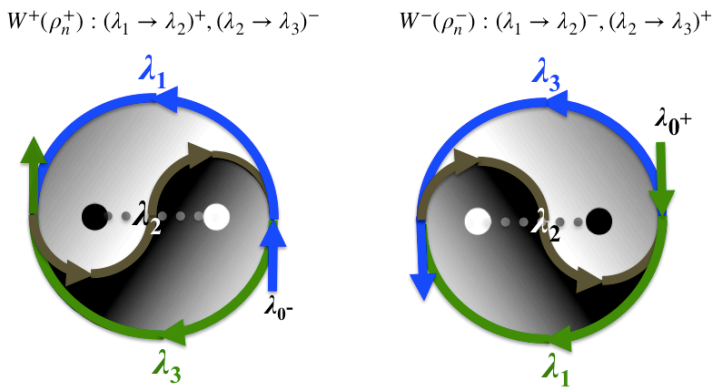

Figure 1.7: Events of *YinYang Processes (Quadrant-States)*

Each part is dissolving into the other to form an alternating stream of dynamic flows. Their transformations in between are bi-directional anti-symmetric transportation crossing the dark tunnel through a pair of the end-to-end circlets on the centerline. Both of the top-half and bottom-half share the common global environment of the state density that mathematically represents the $\rho_n^+ = \phi_n^+\varphi_n^-$ for the Y^+ supremacy and its equivalent $\rho_n^- = \phi_n^-\varphi_n^+$ for the Y^- supremacy, respectively.

Besides, the left-side diagram presents the event flow acted from the inception of λ_{0-} through $\lambda_1\ \lambda_2\ \lambda_3$ to intact a cycle process for the Y^+ supremacy. In parallel, the right-side diagram depicts the event flow initiated from the event λ_{0+} through $\lambda_1\ \lambda_2\ \lambda_3$ to complete a cycle process for the Y^- supremacy. With respect to one another, the two sets of the *Event Processes*, cycling at the opposite direction simultaneously, formulate the flow charts in the following mathematical expressions:

$$W^+(\rho_n^+):\ (\lambda_1\to\lambda_2)^+,(\lambda_2\to\lambda_3)^- \qquad (1.7a)$$

$$W^-(\rho_n^-):\ (\lambda_1\to\lambda_2)^-,(\lambda_2\to\lambda_3)^+ \qquad (1.7b)$$

This pair of the interweaving system pictures an outline of the internal commutation and continuum density of the $Y^-\,Y^+$ entanglements. (Reference [1] Chapter IV)

Philosophically, it demonstrates that the two-sidedness of any event flows, each dissolving into the other in alternating streams, operate a life of situations, movements, or actions through least continuous helix-circulations aligned with the topology of universe, which lay behind the context of the main philosophical interpretation of *World Equations*. In physics, it represents a cycle process of the *Quadrant-State* entanglements on the two-dimensional world planes to give rise to the infrastructure generators that produce a *quadrant* set of the 2x2 *Pauli Matrices* and *Gamma-matrices* at the second horizon and evolve into the generators of the *Lorentz* group.

1.8 World Equations

Because the events are operated through the potential fields, it essentially incepts on the world planes a set of the λ_i derivatives, giving rise to the horizon infrastructures:

$$\hat{W}_n = \phi_n^+(\lambda,\hat{x})\phi_n^-(\lambda,\check{x}) \qquad \phi_n^{\mp}(\lambda,x) = f(\lambda)\ \phi_n^{\mp}(\lambda,x)|_{\lambda=\lambda_0} \qquad (1.8a)$$

$$f(\lambda) = f_0 + \kappa_1 \dot{\partial}_{\lambda_1} + \kappa_2 \dot{\partial}_{\lambda_2} \dot{\partial}_{\lambda_1} \cdots + \kappa_n \dot{\partial}_{\lambda_n} \dot{\partial}_{\lambda_{n-1}} \ldots \dot{\partial}_{\lambda_1} \qquad (1.8b)$$

where $f(\lambda)$ is a series of sequential actions, given by Eq. (1.6). This *World Equation* $\hat{W}_n$ features the virtual supremacy for the processes of creations and annihilations. Amazingly, the higher horizon reveals the principles of *Force Fields,* which include, but are not limited to, and are traditionally known as the *Spontaneous Breaking* and fundamental forces. For the physical observation, the amplitude $|\hat{W}_n|$ features the Y^- behaviors of the forces explicitly while the phase attributes the Y^+ comportment of the superphase actions implicitly. (Reference [1] Chapter V)

1.9 Domains of Worlds

Between virtual and physical worlds, there are three domains with each of their own type of spaces or times, respectively defined by:

1. Xingspace: Xingscope in virtual worlds.
2. Timestate: Statescope between virtual and physical worlds.
3. Spacetime: Spacescope in physical worlds.

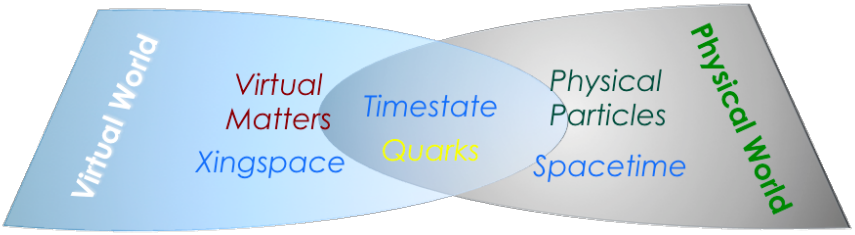

Figure 1.9: Hierarchy of Worlds

In virtual worlds, yinyang interactions under xingspace produce a set of fields through the circular movements of the yinyang elements. This results in the virtual objects birthing reproductions or annealing cyclical processes, bi-directionally transforming into or from the *Timestate* fields. The movements between xingspace modulated virtual worlds and dimensionally confined physical worlds or spacetime dynamics give rise to the physical *Horizons*.

1.10 Ontological Evolutions

When an event gives rise to the states crossing each of the horizon points, an *evolution* process takes place. One of such actions is the field loop that incepts a superphase process into the physical world from the virtual Y^+ regime where a virtual instance is imperative and known as a process of creations or annihilations. Because it is a world event incepted on the two-dimensional planes residually, the potential fields of massless instances can transform, transport and emerge the mass objects symmetrically into the physical world that extends the extra two-dimensional freedom. Within the second horizon, this virtual evolution is *implicit* until it embodies as an energy enclave of the acquired mass, and associates with strong nuclear and gravitational energy in the next horizon. As a duality of nature, its counterpart is another process named the Y^- *Explicit Reproduction*. It requires a physical process of the Y^- reaction or annihilation for the *Animation*.

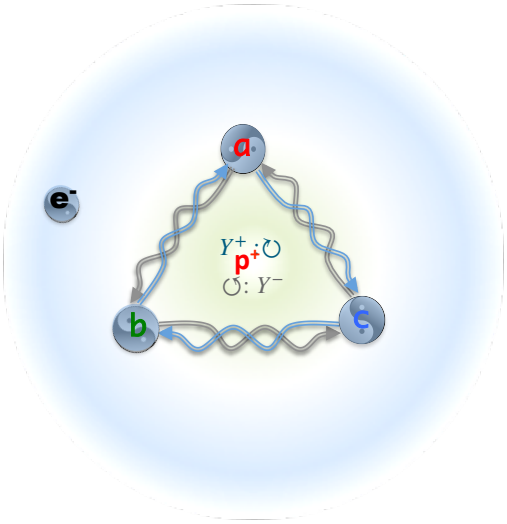

Figure 1.10: Two Implicit Loops of Triple Explicit Entanglements

At the second horizon of the event evolution processes, the gauge fields yield the holomorphic superphase operation, continue to give rise to the next horizons, and develop a complex event operation in term of an infinite sum of operations. The principle of the chain of least reactions in nature is for three particles to form a loop. Confined within a triplet group, the particles jointly institute a double streaming interweavement with the three action states. (Reference [1] Chapter XIX)

1.11 Horizon Hierarchy

The apparent boundary of a realm of perception or the like, where unique structures are evolved, topological functions are performed, various neighborhoods form complementary interactions, and zones of the worlds are composed through multi-functional transformations. Each horizon rises and contains specific fields as a construction of the symmetric and asymmetric dynamics within or beyond its own range. In other words, fields infer and vary from one horizon to the others, each of which are a part of and aligned with *Universal Topology* of the worlds.

As a part of *Universal Topology*, the *YinYang* duality architecturally defines further hierarchy of the event evolutions, its operational interactions and their commutative infrastructures. In the $Y^-\ Y^+$ manifolds, a potential field can be characterized by a scalar function of $\psi \in \{\phi^+, \phi^-, \varphi^+, \varphi^-\}$ as *Ground Fields*, to serve as a state environment of universal topology. Among the fields, their localized entanglements form up, but are not limited to, the density fields, as *First Horizon Fields*. The derivatives to the density fields are event operations of their motion commutations, which generate an interruptible tangent space, named as *Second Horizon Fields*, and further give rise to *Third Horizon* and beyond. In physics, the *Horizon Hierarchy* is shown by the following structure:

- Ground Horizon: Elementary Particles: quarks $\psi \in \{\phi^+, \phi^-, \varphi^+, \varphi^-\}$
- First Horizon (Thermodynamics): State density of *World Planes* ($\rho_n^{\pm} = \phi_n^{\pm}\varphi_n^{\mp}$)
- Second Horizon (Ontology): Continuity and commutation of *YinYang* loops ($\mathbb{f}_x^{\pm} = \kappa_x \partial \rho_n^{\pm}$)
- Third Horizon (Electromagnetism): Continuity of Symmetric fields ($\mathbf{g}_x^{\pm} = \kappa_g \dot{\partial}_\lambda \mathbf{f}_x^{\pm}$)
- Fourth Horizon (Cosmology): Vector Commutation of asymmetry ($\mathbf{g}_v^{\pm} = \kappa_g \dot{\partial}_\lambda \mathbf{f}_v^{\pm}$)

1.12 Spacetime Manifold

Amazingly, under the two-dimensions of the world planes, the horizon generators develop a freedom of the extra dimensions into the physical or virtual worlds, respectively giving rise to the *Third Horizon*, where it generates gamma-matrices and chi-matrices emerges the 4x4 *Lorentz* generators, completes a full mass acquisition, and finally develops into the four-dimensional *Spacetime* manifold for physical objects, simultaneously. From a world plane to its spacetime manifold, the evolution can be visualized in mathematics as the following:

$$d\Sigma^2 = dr^2 + S_k(r)^2 d\Omega^2 \quad \rightarrow \quad d\Omega^2 = d\vartheta^2 + sin^2\vartheta \, d\varphi^2 \qquad (1.12)$$

This whole process of inauguration of physical formations is classically known as spontaneous breaking. Thereupon, one spatial dimension on the world planes evolves its physical world with freedom of the extra two-coordinates, which results in a rotational *Central-Singularity*.

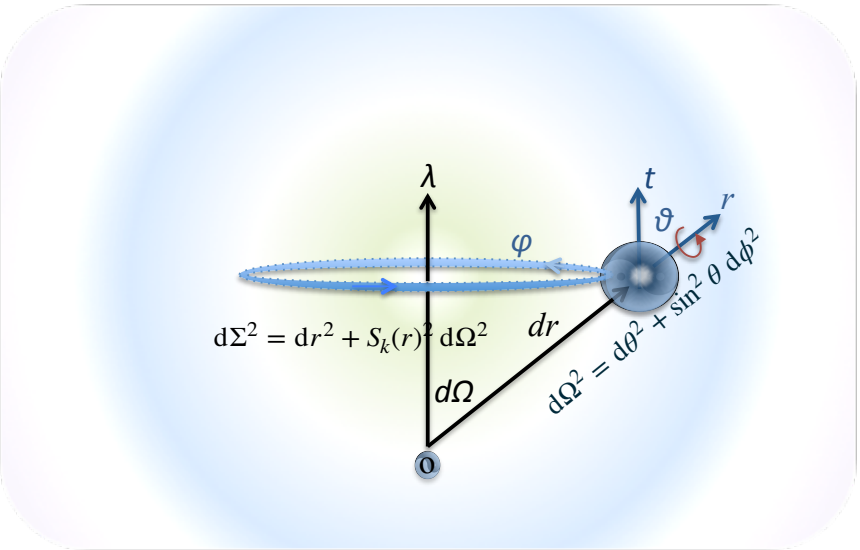

Figure 1.12: Evolution from *World Planes* into *Spacetime Manifold*

In fact, the evolution is a course of events for inception of space associated with its reciprocal duality: sequential procedure, named as time in physical world. By acquiring mass with freedom of spacetime, the nature of physical-supremacy characterizes the essential forces between physical objects and limits their interactive distances. As an associative affinity, the principle operates the gravitational attractions between the mass bodies, or gives weight to physical objects in residence. (Reference [1] Chapter VIII)

1.13 Energy and Mass

Energy is a property of the states associated with the variables in virtual worlds, which are mutable in the transformation between virtual and physical worlds, or between massless and massive substances of a matter. For example, the states of the energy-mass conversion must be a pair of the virtual complexes:

$$E^- = +i\, mc^2 \qquad E^+ = -i\, mc^2 \qquad (1.13)$$

It redefines and extends *Einstein* mass-energy equivalence, introduced in 1905, into the virtual energy states as one of the essential formulae of the natural philosophy.

Mass is an enclave of energies or virtual objects embodied in a physical world. It is well known that an interruption is superposing among objects or energies in the virtual world, such as light-wave interference where exists no forces at all. In other words, mass is a source of "forces" for physical interactions only in physical worlds. Based on the evolutional topology of universe, forces cannot be the fundamental formations to give birth to a physical world. The laws of natural philosophy imply no singularity exist during mass inauguration at its initial phase of the acquisition [6].

1.14 Conclusion

Equipped with our laws and terminologies philosophically in this chapter, all fundamental elements and dynamics in the physical worlds can be derived and briefed by the rest of sections or fully detailed by *《Universal and Unified Physics》* [1]. In the next Chapter, the mathematic framework of the infrastructure is further developed as the *Infrastructure of Universe* towards the scientific interpretations of our physical topology.

6: Xu, Wei; Artifact 9.9 of "Universal and Unified Physics", http://vixra.org/abs/1810.0016 (2018)

2. Infrastructure of Universe

In this chapter, we describe how *Philosophy of Nature* as a profound architecture constitutes the *Mathematical Framework*, upon which the event operations develop the intrinsic *Infrastructure of Universe* under the principles of *YinYang* processes (Figure 2.0a) and event evolutions (Figure 2.0b). Together as the *Universal Architecture*, it carries out all of *Universal Field Equations*, and gives rise to the foundations of evolutional *Horizons* for *Quantum Physics*, *Quantum Ontology*, *Spacetime Cosmology*, and beyond.

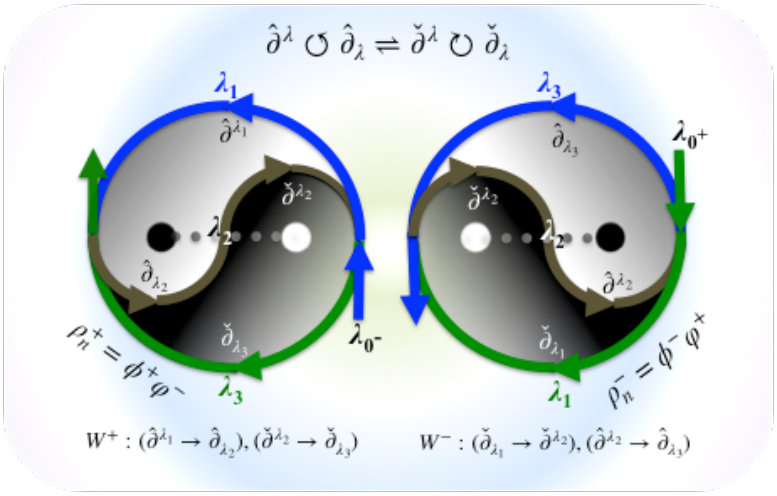

Figure 2.0a: *YinYang* Event Processes $\hat{\partial}^{\lambda} \circlearrowleft \hat{\partial}_{\lambda} \rightleftharpoons \check{\partial}^{\lambda} \circlearrowright \check{\partial}_{\lambda}$

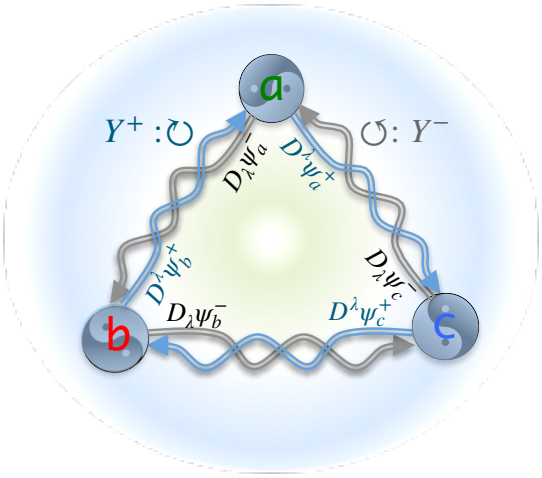

Figure 2.0b: Ontological Evolutions $\hat{\partial}_{\lambda}\check{\partial}^{\lambda} \mapsto (\dot{x}^{\mu}\zeta^{\mu}D^{\lambda}\hat{\psi}) \wedge (\dot{x}^{\nu}\zeta^{\nu}D_{\lambda}\check{\psi})$

Universal Architecture

2.1 Mathematical Framework

As a part of the natural architecture, the mathematical regulation of terminology not only includes symbol notation, operators, and indices of vectors and tensors, but also philosophically classifies the mathematical tools and scopes out their interpretations under the topology of universe.

2.1.1 Variance of Manifolds

In order to describe the nature precisely, we define a duality of the covariant $Y^- = Y\{\mathbf{r} + i\mathbf{k}\}$ and contravariant $Y^+ = Y\{\mathbf{r} - i\mathbf{k}\}$ manifolds operated under the λ event, respectively by the following regulations.

1. Covariance ($\check{\partial}_\lambda$) – One set of the symbols with the lower indices (x_m, u_n, M_{ab}), as covariance forms, are the numbers for the $Y\{\check{x}\}$ basis of the Y^- manifold labelled by its identity symbols of $\{\check{},^-\}$. "Covariance" is a formalism in which the nature laws of dynamics performs the event actions $\check{\partial}_\lambda$, maintains its physical supremacy of the Y^- dynamics, and dominates the physical characteristics under the manifold $\check{x}$ basis. For example, the Y^- spacetime manifold consists of the tetrad-coordinates:

$$x_m \in \check{x}\{x_0, x_1, x_2, x_3\} \subset Y^-\{\mathbf{r} + i\mathbf{k}\} \qquad : x_0 = ict,\ \check{x} \in Y^- \qquad (2.1a)$$

2. Contravariance ($\hat{\partial}^\lambda$) - Another set of the symbols with the upper indices $\{x^\mu, u^\nu, M^{\nu\sigma}\}$, as contravariant forms, are the numbers for the $Y\{\hat{x}\}$ basis of the Y^+ manifold labelled by its identity symbols $\{\hat{},^+\}$. "Contravariance" is a formalism in which the nature laws of dynamics operates the event actions $\hat{\partial}^\lambda$, maintains its virtual supremacy of the Y^+ dynamics, and dominates the virtual characteristics under the manifold $\hat{x}$ basis. For example, the Y^+ timespace manifold consists of the reciprocal coordinates:

$$x^\mu \in \hat{x}\{x^0, x^1, x^2, x^3\} \subset Y^+\{\mathbf{r} - i\mathbf{k}\} \qquad : x^0 = -x_0,\ \hat{x} \in Y^+ \qquad (2.1b)$$

Either contravariance or covariance has the same form under a specified set of transformations to the lateral observers within the same or boost basis as a common or parallel set of the references for the operational event.

The communications between the manifolds are related through the tangent space of the world planes, regulated as the following operations:

3. Communications ($\hat{\partial}_\lambda$ and $\check{\partial}^\lambda$) - Lowering the operational indices $\hat{\partial}_\lambda$ is a formalism in which the quantitative effects of an event λ under the contravariant Y^+ manifold are projected into, transformed to, or acted on its conjugate Y^- manifold. Rising the operational indexes $\check{\partial}^\lambda$, in parallel fashion, is a formalism in which the quantitative effects of an event λ under the covariant Y^- manifold are projected into, transformed to, or reacted at its reciprocal Y^+ manifold.

The dual variances are isomorphic to each other regardless if they are isomorphic to the underlying

manifold itself, and form the norm (inner product) of the manifolds or world lines. Because of the reciprocal and contingent nature, the dual manifolds conserve their invariant quantities under a change of transform commutations and transport continuities with the expressional freedom of its underlying basis. (Reference [1] Chapter III)

2.1.2 Classical Operators

In quantum physics, a mathematical operator is driven by the event λ, which, for example at $\lambda = t$, can further derive the classical momentum $\hat{p}$ and energy $\hat{E}$ operators at the second horizon:

$$\hat{\partial}^t : \dot{x}^\mu \partial^\mu = \left(-ic\partial^\kappa, \mathbf{u}^+ \partial^r\right) = \frac{i}{\hbar}\left(\hat{E}, \mathbf{u}^+ \hat{p}\right) \qquad : \partial^\kappa = \frac{\partial}{\partial x^0}, \mathbf{u}^+ = \frac{\partial x^r}{\partial t} \qquad (2.1c)$$

$$\check{\partial}_t : \dot{x}_m \partial_m = \left(+ic\partial_\kappa, \mathbf{u}^- \partial_r\right) = \frac{i}{\hbar}\left(\hat{E}, \mathbf{u}^- \hat{p}\right) \qquad : \partial_\kappa = \frac{\partial}{\partial x_0}, \mathbf{u}^- = \frac{\partial x_r}{\partial t} \qquad (2.1d)$$

$$\hat{E} = -i\hbar\frac{\partial}{\partial t}, \qquad \hat{p} = -i\hbar\nabla \qquad : \partial^r = \partial_r = \nabla \qquad (2.1e)$$

It is worthwhile to emphasize that *a*) the manifold operators of $\{\partial^\mu, \partial_m\}$, including traditional "operators" of $\{\partial/\partial t, \partial/\partial x, \nabla, \hat{E}, \hat{p}, \cdots\}$ are exclusively useable as mathematical tools only, and *b*) the tools do not operate or perform by themselves unless they are driven or operated by an event λ, implicitly or explicitly.

2.1.3 Interpretation of Lagrangians

To seamlessly integrate with the classical dynamic equations, it is critical to interpret or promote the natural meanings of *Lagrangian* mechanics $\mathscr{L}$ in forms of the dual manifolds. As a function of generalized information and formulation, *Lagrangians* $\mathscr{L}$ can be redefined as a set of densities, continuities, or commutations, entanglements of the $Y^-\ Y^+$ manifolds respectively. For a scalar or vector entanglement, the commutator *Lagrangians*, as examples, can be expressed by their local- or inter-communications:

$$\tilde{\mathscr{L}}_\rho = \check{\mathscr{L}}_\rho + i\hat{\mathscr{L}}_\rho = \psi^-(\check{x})\ \psi^+(\hat{x})\ exp\left(i\vartheta(\lambda)\right) \qquad (2.1f)$$

$$\tilde{\mathscr{L}}_L^\pm = -\frac{1}{c^2}\left[\hat{\partial}^\lambda\hat{\partial}^\lambda, \check{\partial}_\lambda\check{\partial}_\lambda\right]_{s/v}^\pm \qquad \tilde{\mathscr{L}}_I^\pm = -\frac{1}{c^2}\left[\check{\partial}^\lambda\hat{\partial}_\lambda, \hat{\partial}_\lambda\check{\partial}^\lambda\right]_{s/v}^\pm \qquad (2.1g)$$

Those formulae generalize the *Lagrangian* such that the central quantity of *Lagrangian,* introduced in 1788*,* represents the bi-directional fluxions that sustain, stream, harmonize and balance the dual continuities of entanglements of the $Y^-\ Y^+$ dynamic fields. Apparently, there are a variety of ways to comprehend or empathize on a *Lagrangian* function under a scope of isolations.

2.1.4 First Type of World Equations

Because the events are operated through the potential fields, it essentially incepts on the world planes a set of the λ_i derivatives, giving rise to the horizon infrastructures:

$$\hat{W}_n = \phi_n^+(\lambda, \hat{x})\phi_n^-(\lambda, \check{x}) \qquad \phi_n^\mp(\lambda, x) = \left(1 \pm \tilde{\kappa}_1\dot{\partial}_{\lambda_1} \pm \tilde{\kappa}_2\dot{\partial}_{\lambda_2}\dot{\partial}_{\lambda_1}\ \cdots\right)\phi_n^\mp(\lambda, x)\,|_{\lambda=\lambda_0} \qquad (2.1h)$$

where $\phi_n^+(\lambda, \hat{x})$ or $\phi_n^-(\lambda, \check{x})$ is the virtual or physical potential of a particle n, and $\hat{\kappa}_n$ is defined as the world constants. Integration of the two functions is, therefore, named as *First Type* of ***World Equations***, because the function $\hat{W}_n$ represents that

4. The first two terms $(1 \pm \kappa_1 \dot{\partial}_{\lambda_1})$ - The event drives both virtual and physical system and incepts from the world planes systematically breakup and extend into each of the manifolds.
5. The higher terms $\pm(\kappa_2 \dot{\partial}_{\lambda_2} \dot{\partial}_{\lambda_1} + \cdots \kappa_i \dot{\partial}_{\lambda_i} \dot{\partial}_{\lambda_{i-1}} \ldots \dot{\partial}_{\lambda_1})$ - The event operations transcend further down to each of its sub-coordinate system with extra degrees of freedoms for either physical dimensions $\mathbf{r}(\lambda)$ or virtual dimensions $\mathbf{k}(\lambda)$, reciprocally.

This *World Equation* $\hat{W}_n$ features the virtual supremacy for the processes of creations and annihilations. Amazingly, the higher horizon reveals the principles of *Force Fields,* which include, but are not limited to, and are traditionally known as the *Spontaneous Breaking* and fundamental forces. For the physical observation, the amplitude $|\hat{W}_n|$ features the Y^- behaviors of the forces explicitly while the phase imaginary $ln(\hat{W}_n)$ attributes the Y^+ comportment of the superphase actions implicitly. (Reference [1] Chapter V)

2.1.5 Event Processes

Following *Universal Topology*, world events, illustrated in the $Y^- Y^+$ event diagram below, operate the potential entanglements that consist of the Y^+ manifold (white background) at a top-half of the cycle and the Y^- manifold (black background) at a bottom-half of the cycle.

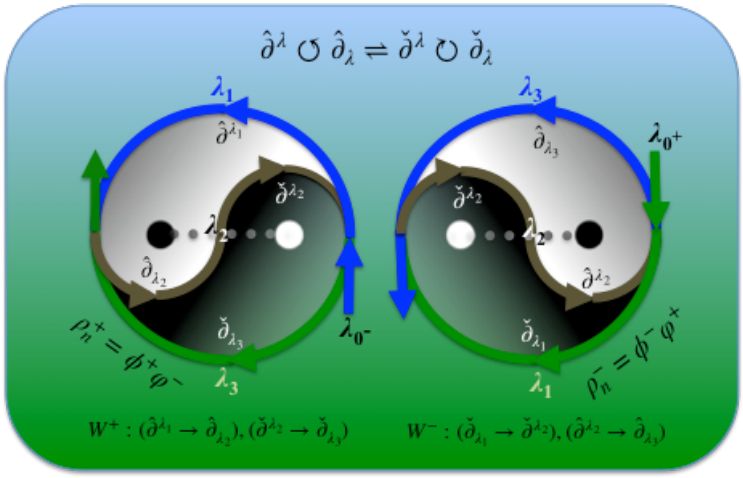

Figure 2.1: Events of *YinYang Processes*: $\hat{\partial}^{\lambda} \circlearrowleft \hat{\partial}_{\lambda} \rightleftharpoons \check{\partial}^{\lambda} \circlearrowright \check{\partial}_{\lambda}$

Each part is dissolving into the other to form an alternating stream of dynamic flows. Their transformations in between are bi-directional antisymmetric transportation crossing the dark tunnel through a pair of the end-to-end circlets on the centerline. Both of the top-half and bottom-half share the common global environment of the state density that mathematically represents the $\rho_n^+ = \phi^+ \varphi^-$ for the Y^+ supremacy and its equivalent $\rho_n^- = \phi^- \varphi^+$ for the Y^- supremacy, respectively.

Besides, the left-side diagram presents the event flow acted from the inception of λ_{0-} through $\lambda_1\ \lambda_2\ \lambda_3$ to intact a cycle process for the Y^+ supremacy. In parallel, the right-side diagram depicts the event flow initiated from the event λ_{0+} through $\lambda_1\ \lambda_2\ \lambda_3$ to complete a cycle process for the Y^- supremacy. With respect to one another, the two sets of the *Event Processes*, cycling at the opposite direction simultaneously, formulate the flow charts in the quadrant-state expressions:

$$W^+ : (\hat{\partial}^{\lambda 1} \to \hat{\partial}_{\lambda_2}), (\check{\partial}^{\lambda 2} \to \check{\partial}_{\lambda_3}) \qquad (2.1i)$$

$$W^- : (\check{\partial}_{\lambda_1} \to \check{\partial}^{\lambda 2}), (\hat{\partial}^{\lambda 2} \to \hat{\partial}_{\lambda_3}) \qquad (2.1j)$$

This pair of the interweaving system pictures an outline of the internal commutation of dark energy and continuum density of the $Y^- Y^+$ entanglements. (Reference [1] Chapter IV)

2.1.6 Least Operations

As a natural principle of motion dynamics, one of the flow processes dominates the intrinsic order, or development, of virtual into physical regime, while, at the same time, its opponent dominates the intrinsic annihilation or physical resources into virtual domain. Applicable to world expressions of (2.1h), the principle of least-actions derives a set of the *Motion Operations*:

$$\check{\partial}^-\left(\frac{\partial W}{\partial(\hat{\partial}^+\phi^+)}\right) - \frac{\partial W}{\partial \phi^+} = 0 \qquad : \check{\partial}^- \in \{\check{\partial}_\lambda, \check{\partial}^\lambda\},\ \phi^+ \in \{\phi_n^+, \varphi_n^+\} \qquad (2.1k)$$

$$\hat{\partial}^+\left(\frac{\partial W}{\partial(\check{\partial}^-\phi^-)}\right) - \frac{\partial W}{\partial \phi^-} = 0 \qquad : \hat{\partial}^+ \in \{\hat{\partial}^\lambda, \hat{\partial}_\lambda\},\ \phi^- \in \{\phi_n^-, \varphi_n^-\} \qquad (2.1l)$$

This set of dual formulae extends the philosophical meaning to the *Euler-Lagrange* [7-8] *Motion Equation* for the actions of any dynamic system. The new sets of the variables of $\phi_n^{\mp}$ and the event operators of $\check{\partial}^-$ and $\hat{\partial}^+$ signify that both manifolds maintain equilibria and formulations from each of the motion extrema, simultaneously and reciprocally driving a duality of physical and virtual dynamics. (Reference [1] artifact 4.1)

2.1.7 Complex Conjugation

Gauge Invariance - Mathematically, a partial derivative of a function of several variables is its derivative with respect to one of those variables, while the others held as constant. In physics, this expression evokes the *Gauge Invariance* [9], seamlessly or effortlessly:

$$D^\lambda W^{\mp} = \dot{r}\left(\frac{\partial}{\partial r} \pm i\frac{e}{\hbar}\dot{A}\right) W^{\mp} \qquad : \frac{e}{\hbar}A = \frac{\partial \vartheta}{\partial r}, \dot{r} = \frac{\partial r}{\partial \lambda} \qquad (2.1m)$$

7 Courant, R; Hilbert, D (1953). Methods of Mathematical Physics. Vol. I. New York: Interscience Publishers, Inc. ISBN 978-0471504474

8 Landau, L. D. & Lifshitz, E. M. (1975). Classical Theory of Fields (Fourth Revised English Edition). Oxford: Pergamon. ISBN 0-08-018176-7

9 Yang C. N., Mills R. L. (1954). "Conservation of Isotopic Spin and Isotopic Gauge Invariance". Phys. Rev. 96: 191–195.

The term $\dot{r}\frac{\partial\vartheta}{\partial r} \neq 0$ is for the superphase ϑ modulator to operate the λ events in the physical space as a part of *Universal Topology*.

Signatures of Manifolds - The *Universal Topology*, for another example, represents the world line interval ds^2 between the two events are describable concisely by:

$$\Delta s^2 = (\Delta r - i\,\Delta k)(\Delta r + i\,\Delta k) = (\Delta r)^2 - (c\Delta t)^2 \qquad :k = ict \qquad (2.1n)$$

In the relativity literature, the sign conventions are associated with a minor or *YinYang* variation of the metric signatures $(+---)$ and $(-+++)$. Either of conventions is widely used within spacetime field in modern physics, but unfortunately not both.

Harmonic Oscillator - The third well-known example is the quantum harmonic oscillator. The "ladder operator" method [10], developed by *Paul Dirac*, defines a pair of the operators $\tilde{a}_n^-$ and $\tilde{a}_n^+$ for *Hamiltonian* in the *Topology* formula,

$$\tilde{H} = \hbar\omega \sum_{n=1}^{N} \left(\tilde{a}_n^{\pm}\tilde{a}_n^{\mp} \mp \frac{1}{2} \right) \qquad \tilde{a}_n^{\mp} = \sqrt{\frac{m\,\omega}{2\hbar}} \left(r_n \pm \frac{i}{m\,\omega}\hat{p}_n \right) \qquad (2.1o)$$

$$\tilde{a}_n^+ |n\rangle = \sqrt{n+1}\,|n+1\rangle \qquad \tilde{a}_n^- |n\rangle = \sqrt{n}\,|n-1\rangle \qquad (2.1p)$$

It means that $\tilde{a}_n^-$ acts on |n⟩ to produce |n–1⟩, and $\tilde{a}_n^+$ acts on |n⟩ to harvest |n+1⟩. For this reason, $\tilde{a}_n^-$ and $\tilde{a}_n^+$ are the conjugate "operators" alternatively called "annihilation", a physical yin animation, and "creation", a virtual yang action, because they destroy and create particles.

2.2 Horizon Structure

In mathematics, the *Horizon Hierarchy* is described by the following formulae:

- Ground Horizon: Particle fields *(Eq. 1.5a-b)*
- *First* and *Second Horizon: First Universal Field Equation (Eq. 2.3)*
- *Second and Third Horizon: World Equations of Evolutions (Eq. 1.8, 2.1h)*
- *Third* Horizon: *Second Universal Field Equations,* Symmetry *(Eq. 2.6)*
- *Second* or *Fourth Horizon*: *Third Universal Field Equations*, Asymmetry *(Eq. 2.8)*

The *Horizon Infrastructure* defines scopes of, commutations between and relational hierarchy to the natural objects and events. For example, the *Standard Model* is a non-abelian gauge theory with the symmetry group $U(1)\times SU(2)\times SU(3)$, where *U(1)* is the first horizon, *SU(2)* the second horizon, and *SU(3)* the third. This means that, at *U(1)*, it builds a structure as the building blocks for *SU(2)*, the *SU(2)* builds another structure for *SU(3)*, and so on.

10 Dirac, P.A.M. (1927) "The Quantum Theory of the Emission and Absorption of Radiation". Proceedings of the Royal Society of London A. 114 (767): 243–65

2.2.1 Horizon Equations

As a part of the *Universal Topology*, a communication infrastructure formalizes the ontological processes in mathematical presentation driven by axiomatic creators and evolutions of the event operations that transform and transport informational messages and conveyable actions. Empowered with the speed of light, the *two-dimensional* $\{\mathbf{r} \mp i\,\mathbf{k}\}$ communication of the *World Planes* is naturally contracted for tunneling between the Y^- and Y^+ domains at both local residual and relativistic interaction among virtual dark and physical massive energies, which is mathematically describable by local invariances and relativistic commutations of interweavement cycling reciprocally and looping consistently among the four potential fields of the dual manifolds.

Remarkably, there are the environmental settings of originators and commutators that establish entanglements between the manifolds as a duality of the Y^- Y^+ infrastructures for the life transformation, transportation, or commutation simultaneously and complementarily. When the event $\lambda = t$ operates at constant speed *c*, the Y^- Y^+ dynamics give rise to the second horizon of the world planes. Each world contracts a two-dimensional manifold, generates a pair of the boost and spiral transportations, and entangles an infinite loop between the manifolds (Figure 2.0a):

$$\hat{\partial}^{\lambda} \circlearrowleft \hat{\partial}_{\lambda} \rightleftharpoons \check{\partial}^{\lambda} \circlearrowright \check{\partial}_{\lambda} \qquad : x_m \in \{ict, \tilde{r}\},\ x^{\mu} \in \{-ict, \tilde{r}\} \tag{2.2a}$$

In order to operate the local actions, an event λ exerts its effects of the virtual supremacy within its Y^+ manifold. Because of the local relativity, the residual derivative ∂^{λ} to the vector $x^{\nu}\mathbf{b}^{\nu}$, where $\mathbf{b}^{\nu}$ is the basis, has the changes of both magnitude quantity $\dot{x}^{\mu}(\partial x^{\nu}/\partial x^{\mu})\mathbf{b}^{\nu}$ and basis direction $\dot{x}^{\mu}x^{\nu}\Gamma^{+}_{\mu\nu a}\mathbf{b}^{\mu}$, where $\dot{x}^{\mu} = \partial x^{\mu}/\partial\lambda$, transforming between the coordinates of x^{ν} and x^{μ}, giving rise to the second horizon in its *Local* or *Residual* derivatives with the boost and spiral relativities.

$$\hat{\partial}^{\lambda}\psi = \dot{x}^{\mu}X^{\nu\mu}\big(\partial^{\nu} - i\Theta^{\mu}(\lambda)\big)\psi \quad : X^{\nu\mu} \equiv S_2^{+} + R_2^{+},\ S_2^{+} \equiv \frac{\partial x^{\nu}}{\partial x^{\mu}},\ R_2^{+} \equiv x^{\mu}\Gamma^{+}_{\nu\mu a}\ \Theta^{\mu} = \frac{\partial\hat{\vartheta}(\lambda)}{\partial x^{\mu}} \tag{2.2b}$$

Because the exogenous event λ has indirect effects via the local arguments of the potential function, the non-local derivative to the local event λ is at zero. Likewise, the Y^- actions can be cloned straightforwardly, which gives rise from the Y^- tangent rotations of both magnitude quantity $\dot{x}_n(\partial x_m/\partial x_n)\mathbf{b}_m$ and basis rotation $\dot{x}_n x_m\Gamma^{-}_{nm\alpha}\mathbf{b}_n$ into a vector Y^- potentials of the second horizon:

$$\check{\partial}_{\lambda}\psi = \dot{x}_m X_{nm}\big(\partial_n + i\Theta_m(\lambda)\big)\psi \quad : X_{nm} \equiv S_2^{-} + R_2^{-},\ S_2^{-} \equiv \frac{\partial x_n}{\partial x_m},\ R_2^{-} \equiv x_m\Gamma^{-}_{nma},\ \Theta_{\nu} = \frac{\partial\check{\vartheta}(\lambda)}{\partial x_{\nu}} \tag{2.2c}$$

where the $\Gamma^{-}_{nm\alpha}$ or $\Gamma^{+}_{\nu\mu a}$ is an Y^- or Y^+ metric connection, similar but extend the meanings to the *Christoffel* symbols of the *First* kind, introduced in 1869 [11].

By lowering the index, the virtual Y^+ actions manifest the first tangent potential $\hat{\partial}_{\lambda}$ projecting into its opponent basis of the Y^- manifold. Because of the relativistic interactions, the derivative ∂_{λ} to the vector $x^{\nu}\mathbf{b}^{\nu}$ has the changes of both magnitude quantity $\dot{x}_a(\partial x^{\nu}/\partial x_a)\mathbf{b}^{\nu}$ and basis direction

11 Christoffel, E.B. (1869), "Ueber die Transformation der homogenen Differentialausdrücke zweiten Grades", Journal für die reine und angewandte Mathematik, B70: 46–70

$\dot{x}^a x_\mu \Gamma^{+\nu}_{\mu a} \mathbf{b}^\nu$, transforming from one world plane $W^+\{\mathbf{r} - i\mathbf{k}\}$ to the other $W^-\{\mathbf{r} + i\mathbf{k}\}$. This action redefines the Y^+ event quantities of relativity and creates the *Relativistic Boost* S_1^+ *Transformation* and the *Spiral Torque* R_1^+ *Transportation* around a central point, which gives rise from the Y^+ tangent rotations into the vector Y^- potentials for the second horizon.

$$\hat{\partial}_\lambda \psi = \dot{x}_a X^\nu{}_a \big(\partial^\nu - i\Theta^\nu(\lambda)\big)\psi \quad : X^\nu{}_a \equiv S_1^+ + R_1^+,\ S_1^+ \equiv \frac{\partial x^\nu}{\partial x_a},\ R_1^+ \equiv x^\mu \Gamma^{+\nu}_{\mu a},\ \dot{x}_a = \frac{\partial x_a}{\partial \lambda} \quad (2.2d)$$

Similarly, one has the Y^- derivative relativistic to its Y^+ opponent:

$$\check{\partial}^\lambda \psi = \dot{x}^\alpha X_m{}^\alpha \big(\partial_m + i\Theta_m(\lambda)\big)\psi \quad : X_m{}^\alpha \equiv S_1^- + R_1^-,\ S_1^- \equiv \frac{\partial x_m}{\partial x^\alpha},\ R_1^- \equiv x_s \Gamma^{-m}_{s\alpha},\ \dot{x}^a = \frac{\partial x^a}{\partial \lambda} \quad (2.2e)$$

where the $\Gamma^{-m}_{s\alpha}$ or $\Gamma^{+\nu}_{\mu a}$ is an Y^- or Y^+ metric connection, similar but extend the meanings to the *Christoffel* symbols of the *Second* kind. (Reference [1] Chapter III)

2.2.2 Quantum Ontology

Essentially, an integration of the above formulae, the principle of *Evolutional Processes* outlined philosophically by Figure 2.0a ($\hat{\partial}^\lambda \circlearrowleft \hat{\partial}_\lambda \rightleftharpoons \check{\partial}^\lambda \circlearrowright \check{\partial}_\lambda$) is concisely translated into the equations of physics in mathematical formula (Reference [1] Chapter VII):

$$S_2^+ + R_2^+ \circlearrowleft S_1^+ + R_1^+ \rightleftharpoons S_1^- + R_1^- \circlearrowright S_2^- + R_2^- \quad (2.2f)$$

This fundamental loop structure serves as the generators of the infrastructure. As a fascinating consequence, one can anticipate the following results:

1. Appling the principle of *Least Operations* of Eq. (2.1k-l) on *World Equations*, the events of the fundamental generators of the infrastructure to produce or give rise to *Pauli Matrix, Direct Equation, Schrödinger Equation, Klein–Gordon Equation*, etc., known as *Quantum Physics*.
2. With the principle of *Double Loops of Triple Entanglements* of Figure 2.0b, the nature orchestrates the potential fields of the infrastructure to produce *Gauge Theory*, *Quantum Chromodynamics*, *Standard Model*, etc., named as *Quantum Ontology*.

At this horizon, some objects acquire a part of their mass quantity (exert strong forces for fully physical interactions) and some have zero-mass (interactive virtually without force). Essentially, they are building blocks of a fully physical domain *SU(3)*. Only at the third horizon, particles have their full mass (weak force interactions). Associated with the mass enclave, a force is natural in physical domain but not in virtual world. (Reference [1] Artifact 7.8)

2.3 First Universal Field Equations

From the least interwoven relationships, the motion operations on the *World Equations* determine a pair of partial differential equations of the $Y^- Y^+$ state fields ϕ_n^+ and φ_n^+ under the supremacy of virtual dynamics at the $Y\{x^\nu\}$ manifold:

$$\kappa_1\big(\check{\partial}^{\lambda_2} - \hat{\partial}_{\lambda_2}\big)\phi_n^+ + \kappa_2\big(\check{\partial}_{\lambda_3}\check{\partial}^{\lambda_2} + \hat{\partial}_{\lambda_3}\hat{\partial}_{\lambda_2} - \check{\partial}_{\lambda_3}\hat{\partial}_{\lambda_2}\big)\phi_n^+ = W_n^+ \phi_n^+ \quad (2.3a)$$

$$\kappa_1\left(\check{\partial}_{\lambda_1}-\hat{\partial}^{\lambda 1}\right)\varphi_n^+ + \kappa_2\left(\check{\partial}^{\lambda 2}\check{\partial}_{\lambda_1}+\hat{\partial}^{\lambda 2}\hat{\partial}^{\lambda 1}-\check{\partial}^{\lambda 2}\hat{\partial}^{\lambda 1}\right)\varphi_n^+ = W_n^-\varphi_n^+ \qquad (2.3b)$$

giving rise to the Y^+ *General Fields* from each respective opponent during their physical interactions. In the events of the physical supremacy in parallel fashion, the dynamic reactions on the *World Equations* under the Y^+ manifold continuum give rise to the *Motion Operations* of the Y^- state fields ϕ_n^- or φ_n^-, which determine a pair of linear partial differential equations of the state function ϕ_n^- or φ_n^- under the supremacy of physical dynamics at the $Y\{x_m\}$ manifold:

$$\kappa_1\left(\hat{\partial}^{\lambda 1}-\check{\partial}_{\lambda_1}\right)\phi_n^- + \kappa_2\left(\hat{\partial}^{\lambda 2}\hat{\partial}^{\lambda 1}+\check{\partial}^{\lambda 2}\check{\partial}_{\lambda_1}-\hat{\partial}^{\lambda 2}\check{\partial}_{\lambda_1}\right)\phi_n^- = W_n^-\phi_n^- \qquad (2.3c)$$

$$\kappa_1\left(\hat{\partial}_{\lambda_2}-\check{\partial}^{\lambda 2}\right)\varphi_n^- + \kappa_2\left(\hat{\partial}_{\lambda_3}\hat{\partial}_{\lambda_2}+\check{\partial}_{\lambda_3}\check{\partial}^{\lambda 2}-\hat{\partial}_{\lambda_3}\check{\partial}^{\lambda 2}\right)\varphi_n^- = W_n^+\varphi_n^- \qquad (2.3d)$$

giving rise to the Y^- *General Fields* from each of the respective opponents during their virtual interactions. Under Topology of Universe, two pairs of the above dynamic fields are operated generically under horizon of the *World Events*. Together, the four formulae are named as *First Universal Field Equations*, because they are fundamental and general to all fields of natural evolutions. (Reference [1] Chapter VI).

The above equations depict the dynamics between the first and second horizons, applicable to the classical quantum physics to harvest *Dirac Equation*, *Weyl Equation*, *Schrödinger Equation*, *Pauli Theory*, *Klein–Gordon Equation*, etc. (Reference [1] Chapter XI).

2.4 Ontological Equations

From the first type of *World Equations* (1.8, 2.1h), the virtual superphase events under both of the $Y^-\ Y^+$ reactions $\psi^{\pm}$ evolve their density of the circular process, simultaneously:

$$\hat{W}_n = \left[\psi^+(\hat{x},\lambda)+\hat{\partial}\psi^+(\hat{x},\lambda)\right]\left[\psi^-(\check{x},\lambda)+\check{\partial}\psi^-(\check{x},\lambda)\right] = \psi^+\psi^- + \tilde{J}_s + \left(\hat{\partial}\psi^+\right)\wedge\left(\check{\partial}\psi^-\right) \qquad (2.4a)$$

$$\tilde{J}_s = \frac{\hbar}{2mi}\left(\psi^+\check{\partial}\psi^- + \psi^-\hat{\partial}\psi^+\right) = \left\{ic\tilde{\rho},\tilde{\mathbf{J}}\right\} \qquad (2.4b)$$

The first term $\psi^+\psi^-$ is the ground density, and the second term is the probability current or flux J_s. Apparently, the third term constructs the horizon interactions. Since the tensor product has two symmetric types, the tensors react upon each other, symbolized by the wedge product $\wedge$ as the following:

$$\left(\hat{\partial}\psi_j^+\right)\wedge\left(\check{\partial}\psi_k^-\right) = \left(\dot{x}^\mu\zeta^\mu D^\lambda\psi_j^+\right)\wedge\left(\dot{x}_\nu\zeta_\mu D_\lambda\psi_k^-\right) =$$

$$\dot{x}^\mu\zeta^\mu\left(\partial^\mu - i\frac{e}{\hbar}A^\mu - \tilde{\kappa}_2^+F_{\mu\nu}^{+n}\right)\psi_j^+ \wedge \dot{x}_\nu\zeta_\nu\left(\partial_\nu + i\frac{e}{\hbar}A_\nu + \tilde{\kappa}_2^-F_{\nu\mu}^{-n}\right)\psi_k^- \qquad (2.4c)$$

The symbol $j,k\in\{a,b,c\}$ indicates a loop chain of three particles. The *Evolutional* equation (2.4a) is named as *World Equations of Ontological Evolution*.

Applicable to the contemporary physics, these equations unify *Yang-Mills* action, *Gauge Theory*, *Chromodynamics*, *Field Breaking*, and *Standard Model* (Reference [1] Chapter XIX).

2.5 Continuity and Commutation

Under the event operations, the interoperation among four types of scalar or vector fields of $\phi_n^{\pm}$ and $\varphi_n^{\pm}$ correlates and entangles an environment of dual densities $\rho_{\phi}^{+} = \phi_n^{+}\varphi_n^{-}$ and $\rho_{\phi}^{-}=\phi_n^{-}\,\varphi_n^{+}$ by means of the natural derivatives $\dot{\lambda}$ to form a pair of fluxions $\langle\dot{\lambda}\rangle^{\mp}$:

$$[\hat{\lambda},\check{\lambda}]^{+} = \sum\nolimits_n p_n^{+}\left(\varphi_n^{-}\hat{\lambda}\phi_n^{+} - \phi_n^{+}\check{\lambda}\varphi_n^{-}\right) \qquad \left\langle\dot{\lambda}\right\rangle_s^{\pm} = \sum\nolimits_n p_n^{\pm}\varphi_n^{\mp}\dot{\lambda}\phi_n^{\pm} \qquad (2.5a)$$

$$\langle\hat{\lambda},\check{\lambda}\rangle^{+} = \sum\nolimits_n p_n^{+}(\varphi_n^{-}\hat{\lambda}\phi_n^{+} + \phi_n^{+}\check{\lambda}\varphi_n^{-}) \qquad \left(\dot{\lambda}\right\rangle_s^{\pm} = \sum\nolimits_n p_n^{\mp}\phi_n^{\pm}\dot{\lambda}\varphi_n^{\mp} \qquad (2.5b)$$

The symbols $\langle\ \rangle^{\mp}$ are called Y^{-} or Y^{+} *Continuity Bracket*, whereas another pair $[\ ]^{\mp}$ defines the *Commutator Bracket.* In addition, the bracket $\langle\ )^{\mp}$ and $(\ \rangle^{\mp}$ are called Y^{-} or Y^{+} *Asymmetry Brackets*. They are essential to ontological and cosmological dynamics. They represent the dual continuities of the $Y^{-}\,Y^{+}$ field densities, each of which extends its meaning to the classic anti-commutator $\langle a,b\rangle = ab + ba$ or commutator $[a,b] = ab - ba$, known as *Lei Bracket*, introduced in 1930s [12].

2.6 Second Universal Field Equations

Integrating continuity of fluxions with the first type of *Universal Field Equations* (2.3), we arrive at the second type of *Universal Field Equations*:

$$\mathbf{g}^{-} = \mathbf{g}_0^{-} + \frac{c}{2}\left[\check{\partial}_{\lambda} - \hat{\partial}^{\lambda}\right]_v^{-} + \frac{\hbar c}{2E^{-}}\left\langle\check{\partial}_{\lambda}\left(\hat{\partial}^{\lambda} - \check{\partial}^{\lambda}\right)\right\rangle_v^{-} + \frac{\hbar c}{2E^{-}}\zeta^{-} \qquad (2.6a)$$

$$\mathbf{g}^{+} = \mathbf{g}_0^{+} + \frac{\hbar c}{2E^{+}}\left[\left(\frac{E^{+}}{\hbar} + \check{\partial}_{\lambda}\right)\left(\hat{\partial}_{\lambda} - \check{\partial}^{\lambda}\right)\right]_v^{+} + \frac{\hbar c}{2E^{+}}\zeta^{+} \qquad (2.6b)$$

At a view of the symmetric system that the Y^{-} continuity of density is sustained by both commutation $[\check{\partial}^{\lambda} - \hat{\partial}_{\lambda}]^{-}$ and continuity $\langle\check{\partial}_{\lambda}(\hat{\partial}^{\lambda} - \check{\partial}^{\lambda})\rangle^{-}$, it implies that a) the horizon is given rise to the physical world by the commutative forces; and b) the continuity mechanism is a primary vehicle of the Y^{-} supremacy for its operational actions. Since a pair of the above equations is generic or universal, it is called *Second Universal Field Equations*, representing the conservations of ***Symmetric*** $\zeta^{\pm} = 0$ dynamics, and of *Asymmetric* $\zeta^{\pm} \neq 0$ motions at a macroscopic regime or the condensed matter. As a precise duality, the asymmetry coexists with symmetric continuity to extend discrete subgroups, and exhibits additional dynamics to operate spacetime motions and to carry on the symmetric system as a whole.

Applicable to the classical physics, the above equations unify *Electromagnetism* and *Gravitation* under the symmetric dynamics. (Reference [1] Chapter XI)

12 Bourbaki, Nicolas (1989). Lie Groups and Lie Algebras: Chapters 1-3. Berlin·Heidelberg·New York: Springer. ISBN 978-3-540-64242-8.

2.7 Asymmetry of Cosmology

Under *Universal Topology*, *Laws of Universe* strike an aesthetical harmony of duality not only between $Y^-\,Y^+$ symmetries but also between symmetry and asymmetry. Because of the $Y^-\,Y^+$ duality, a symmetric system naturally consists of asymmetric ingredients or asymmetric constituents. Symmetry that exists in one horizon can be cohesively asymmetric in the other simultaneously without breaking its original ground symmetric system that coexists with its reciprocal opponents. A universe finely tuned, almost to absurdity, is a miracle of asymmetry and symmetry, together that give rise to the next horizon where a new symmetry is advanced and composed at another level of consistency and perpetuation. (Reference [1] Chapter XV).

2.8 Third Universal Field Equations

The *World Equations* of (1.8) can be updated and generalized in terms of a pair of the Y^- and Y^+ asymmetric scalar fields and vector fields. Integrating commutation of fluxions with the first type of *Universal Field Equations* (2.3), we arrive at the *Third Universal Field Equations*:

$$\mathbf{g}_x^-/\kappa_g = \left[\check{\partial}_\lambda\check{\partial}_\lambda, \hat{\partial}^\lambda\hat{\partial}^\lambda\right]_x^- = -\zeta^- \qquad : \zeta^- = \left(\hat{\partial}^\lambda\check{\partial}^\lambda - \hat{\partial}^\lambda\check{\partial}_\lambda\right\rangle^- \tag{2.8a}$$

$$\mathbf{g}_x^+/\kappa_g = \left[\hat{\partial}_\lambda\hat{\partial}_\lambda, \check{\partial}^\lambda\check{\partial}^\lambda\right]_x^+ = -\zeta^+ \qquad : \zeta^+ = \left(\hat{\partial}_\lambda\check{\partial}^\lambda - \check{\partial}_\lambda\hat{\partial}_\lambda\right\rangle^+ \tag{2.8b}$$

where the index x refers to the scalar or vector potentials. (Reference [1] Chapter XVI)

3. Topology of Physics

In this chapter, we unfold the previous contexts into further details to testify empirically how and why the *Infrastructure of Universe* can prevail numerous of groundbreakings over our cotemporary physics and declare the *Philosophy of Nature* as *Universal and Unified Physics*.

3.1 Quantum Ontology

In the infrastructure of universe, it consists of a set of constituents, named as *Generators,* which are a group of the irreducible foundational matrices and constructs a variety of the applications in forms of horizon evolution, fields or forces. At the second horizon *SU*(2), a set of the boost and spiral generators institutes the infrastructure of $\hat{\partial}^{\lambda} \circlearrowleft \hat{\partial}_{\lambda} \rightleftharpoons \check{\partial}^{\lambda} \circlearrowright \check{\partial}_{\lambda}$ (Figure 2.0a) with a set of the metric signatures, *local* originators, *and horizon* commutators. At the third horizon *SU*(3) or higher, a set of the *Lorentz Generators* institutes the infrastructure of spacetime (Figure 1.12), featuring thermal, symmetric, asymmetric and transformational dynamics.

Remarkably, the superphase modulation conducts laws of evolutions and horizon of conservations, and maintains field entanglements of coupling weak and strong forces compliant to quantum electrodynamics of classic physics.

The actions of Y^{+} supremacy represent one of the important principles of natural governances - *Law of Conservation of Virtual Creation and Annihilation*. The Y^{-} parallel entanglement represents another essential principle of Y^{-} natural behaviors - *Law of Conservation of Physical Animation and Reproduction* (Reference [1] Chapter IX).

3.1.1 Boost Generators

On the world planes at a constant speed *c*, the event evolution of quantum ontology (Eq. 2.2f) naturally describes and concisely derives a *quadrant* set of the *Boost* matrix tables:

$$S_2^{+} = \frac{\partial x^{\nu}}{\partial x^{m}} = \begin{pmatrix} 1 & -i \\ i & 1 \end{pmatrix} \equiv s_0 + i s_2 \qquad : \hat{\partial}^{\lambda} = \dot{x}^{m} S_2^{+} \partial^{\nu} \qquad (3.1a)$$

$$S_1^{+} = \frac{\partial x^{\nu}}{\partial x_{m}} = \begin{pmatrix} -1 & -i \\ -i & 1 \end{pmatrix} \equiv s_3 - i s_1 \qquad : \hat{\partial}_{\lambda} = \dot{x}_{m} S_1^{+} \partial^{\nu} \qquad (3.1b)$$

$$S_1^{-} = \frac{\partial x_{m}}{\partial x^{\nu}} = \begin{pmatrix} -1 & i \\ i & 1 \end{pmatrix} \equiv s_3 + i s_1 \qquad : \check{\partial}^{\lambda} = \dot{x}^{\nu} S_1^{-} \partial_{m} \qquad (3.1c)$$

$$S_2^{-} = \frac{\partial x_{m}}{\partial x_{\nu}} = \begin{pmatrix} 1 & i \\ -i & 1 \end{pmatrix} \equiv s_0 - i s_2 \qquad : \check{\partial}_{\lambda} = \dot{x}_{\nu} S_2^{-} \partial_{m} \qquad (3.1d)$$

The $S_1^{\pm}$ matrices are a duality of the horizon settings for transformations between the two-dimensional world planes. The $S_2^{\pm}$ matrices are the local or residual settings for Y^{-} or Y^{+} transportation within their own manifold, respectively. Defined as the *Infrastructural Boost Generators*, this s_{κ} group consists of the distinct members, shown by a set of *Quadrant-States*:

$$s_{\kappa} = \left[\begin{pmatrix} 1 & 0 \\ 0 & 1 \end{pmatrix}_0, \begin{pmatrix} 0 & 1 \\ 1 & 0 \end{pmatrix}_1, \begin{pmatrix} 0 & -1 \\ 1 & 0 \end{pmatrix}_2, \begin{pmatrix} -1 & 0 \\ 0 & 1 \end{pmatrix}_3 \right] \qquad (3.1e)$$

Intuitively simplified to a group of the 2x2 matrices, the infinite loops (Figure 2.0a) of entanglements compose an integration of the boost generators s_n as well as the spiral generators ϵ_{κ} that represents law of conservation of life-cycle transformational continuity of motion dynamics.

(Reference [1] artifact 7.2)

3.1.2 Pauli Matrices

Apparently, the *Infrastructural Generators* can contract alternative matrices that might extend to the physical topology. Among them, one popular set is shown as the *Quadrant-States*:

$$\sigma_\kappa = \left[\begin{pmatrix} 1 & 0 \\ 0 & 1 \end{pmatrix}_0, \begin{pmatrix} 0 & 1 \\ 1 & 0 \end{pmatrix}_1, \begin{pmatrix} 0 & -i \\ i & 0 \end{pmatrix}_2, \begin{pmatrix} 1 & 0 \\ 0 & -1 \end{pmatrix}_3 \right] \tag{3.1c}$$

$$\sigma_0 = s_0 \qquad \sigma_1 = s_1 \qquad \sigma_2 = i s_2 \qquad \sigma_3 = -s_3 \qquad \sigma_n^2 = I$$

known as *Pauli* spin matrices. In this definition, the residual spinors $S_2^{\pm}$ are extended into the physical states toward the interpretations for the decoherence into a manifold of the four-dimensional spacetime-coordinates of physical reality. (Reference [1] artifact 8.1)

3.1.3 *Spiral* Generators

Simultaneously on the world planes at a constant speed, the loop event naturally describes and concisely elaborates another set of the *Spiral* matrix tables. The world planes are supernatural or intrinsic at the two-dimensional coordinates presentable as a vector calculus in polar coordinates. Because of the superphase modulation, in *Cartesian* coordinates all *Christoffel* symbols vanish, which implies the superphase modulation becomes hidden. Therefore, we consider the polar manifold $\{\tilde{r} \pm i\tilde{\vartheta}\} \in \mathscr{R}^2$ that a physical world has its superposition $\tilde{r}$ superposed with the virtual world through the superphase ϑ coordinate:

$$ds^2 = (d\tilde{r} + i\tilde{r}d\tilde{\vartheta})(d\tilde{r} - i\tilde{r}d\tilde{\vartheta}) = d\tilde{r}^2 + \tilde{r}d\tilde{\vartheta}^2 \qquad : x^m \in \check{x}\{\tilde{r} + i\tilde{\vartheta}\},\ x^\nu \in \hat{x}\{\tilde{r} - i\tilde{\vartheta}\} \tag{3.1d}$$

The relationship of the metric tensor and inverse metric components is given straightforwardly by

$$\check{g}_{\nu\mu} = \hat{g}^{\nu\mu} = \begin{pmatrix} 1 & 0 \\ 0 & \tilde{r}^2 \end{pmatrix}, \qquad \check{g}^{\nu\mu} = \hat{g}_{\nu\mu} = \begin{pmatrix} 1 & 0 \\ 0 & \tilde{r}^{-2} \end{pmatrix} \tag{3.1e}$$

where $\check{g}_{\nu\mu} \in Y^-$, and $\hat{g}^{\nu\mu} \in Y^+$. Normally, the coordinate basis vectors $\mathbf{b}_{\tilde{r}}$ and $\mathbf{b}_{\tilde{\vartheta}}$ are not orthonormal. Since the only nonzero derivative of a covariant metric component is $\check{g}_{\tilde{\vartheta}\tilde{\vartheta},\tilde{r}} = 2\tilde{r}$, the toques in *Christoffel* symbols for polar coordinates are simplified to and become as a set of *Quadrant-State* matrices,

$$R_2^+ = x^\mu \Gamma^+_{\nu\mu a} = x^\mu \begin{pmatrix} 0 & \tilde{r} \\ \tilde{r} & -\tilde{r} \end{pmatrix} \equiv \epsilon_0 \tilde{r} + i\epsilon_2 \tilde{\vartheta} \qquad : \hat{\partial}^\lambda = \dot{x}^m R_2^+ \partial^\nu \tag{3.1f}$$

$$R_1^+ = x^\mu \Gamma^{+\nu}_{\mu a} = x^\mu \begin{pmatrix} 0 & 1/\tilde{r} \\ 1/\tilde{r} & -\tilde{r} \end{pmatrix} \equiv \epsilon_3 \tilde{r} - i\epsilon_1 \tilde{\vartheta} \qquad : \hat{\partial}_\lambda = \dot{x}_m R_1^+ \partial^\nu \tag{3.1g}$$

$$R_1^- = x_s \Gamma^{-m}_{s\alpha} = x_s \begin{pmatrix} 0 & 1/\tilde{r} \\ 1/\tilde{r} & -\tilde{r} \end{pmatrix} \equiv \epsilon_3 \tilde{r} + i\epsilon_1 \tilde{\vartheta} \qquad : \check{\partial}^\lambda = \dot{x}^\nu R_1^- \partial_m \tag{3.1h}$$

$$R_2^- = x_m \Gamma^-_{nma} = x_m \begin{pmatrix} 0 & \tilde{r} \\ \tilde{r} & -\tilde{r} \end{pmatrix} \equiv \epsilon_0 \tilde{r} - i\epsilon_2 \tilde{\vartheta} \qquad : \check{\partial}_\lambda = \dot{x}_\nu R_2^- \partial_m \tag{3.1i}$$

where $\tilde{\vartheta} = \tilde{\vartheta}^+ = -\tilde{\vartheta}^-$. The $R_1^{\pm}$ matrices are a duality of the interactive settings for transportation

between the two-dimensional world planes. The $R_2^{\pm}$ matrices are the residual settings for Y^- and Y^+ transportation or within their own manifolds, respectively. Defined as a set of the *Infrastructural Torque Generators*, this ϵ_κ group consists of the distinct members, featured as the *Quadrant States*:

$$\epsilon_\kappa = \tilde{r}\left[\begin{pmatrix}0 & 1\\ 1 & 0\end{pmatrix}_0, \begin{pmatrix}0 & 0\\ 0 & -1\end{pmatrix}_1, \begin{pmatrix}0 & 0\\ 0 & 1\end{pmatrix}_2, \frac{1}{\tilde{r}^2}\begin{pmatrix}0 & 1\\ 1 & 0\end{pmatrix}_3\right] \tag{3.1j}$$

As a group of the 2x2 matrices, the infinite loops of entanglements institute an integration of the spiral generators ϵ_n sourced by the transport generators. Similar to the boost generators, the double streaming torques orchestrates a set of the four-states of entanglements. (Reference [1] artifact 7.3)

At the constant speed, the divergence of the torsion tensors is invariant under the superposed global manifolds, illustrated by the following:

$$\nabla \cdot R_2^- = \frac{1}{\tilde{r}}\frac{\partial}{\partial \tilde{r}}(\epsilon_0 \tilde{r}) - \frac{1}{\tilde{r}}\frac{\partial}{\partial \tilde{\vartheta}}(i\epsilon_2 \tilde{\vartheta}) = (2\epsilon_0 - i\epsilon_2)\frac{1}{\tilde{r}} \tag{3.1k}$$

$$\nabla \cdot R_1^- = \frac{1}{\tilde{r}}\frac{\partial}{\partial \tilde{r}}(\epsilon_3 \tilde{r}) + \frac{1}{\tilde{r}}\frac{\partial}{\partial \tilde{\vartheta}}(i\epsilon_1 \tilde{\vartheta}) = i\epsilon_1\frac{1}{\tilde{r}} \tag{3.1l}$$

Because of the $Y^-\,Y^+$ reciprocity, each superphase $\tilde{\vartheta}$ is paired at its mirroring spiral opponent. Remarkably, on the world planes at $\tilde{r} = 0$, the total of each $Y^-\,Y^+$ torsion derivatives is entangling without singularity and yields invariant.

$$Y^-: \nabla \cdot (R_1^- + R_2^-) = 2\begin{pmatrix}0 & 1\\ 1 & -i\end{pmatrix}, \qquad Y^+: \nabla \cdot (R_1^+ + R_2^+) = 2\begin{pmatrix}0 & 1\\ 1 & +i\end{pmatrix} \tag{3.1m}$$

As the *Conservation of Superposed Torsion* under the superposed global manifolds, this implies that the transportations of the spiral torques between the virtual and physical worlds are

- ✓ Modulated by the superphase $2\tilde{\vartheta}$-chirality, bi-directionally,
- ✓ Operated at independence of spatial $\tilde{r}$-coordinate, respectively,
- ✓ Streaming with its residual and opponent, commutatively, and
- ✓ Entangling a duality of the reciprocal spirals, simultaneously.

This virtual-supremacy nature features the world planes principles of *Superphase Ontology*, which, for examples, operates a macroscopic galaxy or blackhole system, or generates a microscopic spinor of particle system. (Reference [1] artifact 7.4)

3.1.4 Gamma and Chi Matrices

Aligning to the topological comprehension, we extend the gamma-matrix γ^ν, introduced by W. K. Clifford in the 1870s [13], and chi-matrix χ^ν for physical coordinates.

$$\gamma^\nu = \left[\begin{pmatrix}\sigma_0 & 0\\ 0 & -\sigma_0\end{pmatrix}_0, \begin{pmatrix}0 & \sigma_1\\ -\sigma_1 & 0\end{pmatrix}_1, \begin{pmatrix}0 & \sigma_2\\ -\sigma_2 & 0\end{pmatrix}_2, \begin{pmatrix}0 & \sigma_3\\ -\sigma_3 & 0\end{pmatrix}_3\right] \tag{3.1n}$$

13 W. K. Clifford, "Preliminary sketch of bi-quaternions, Proc. London Math. Soc. Vol. 4 (1873) pp. 381–395

$$\chi^{\nu}=\left[r\begin{pmatrix}\epsilon_0 & 0\\ 0 & -\epsilon_0\end{pmatrix}_0,\vartheta\begin{pmatrix}0 & \epsilon_1\\ -\epsilon_1 & 0\end{pmatrix}_1,i\vartheta\begin{pmatrix}0 & \epsilon_2\\ -\epsilon_2 & 0\end{pmatrix}_2,r\begin{pmatrix}0 & -\epsilon_3\\ \epsilon_3 & 0\end{pmatrix}_3\right] \tag{3.1o}$$

$$\zeta^{\nu}=\gamma^{\nu}+\chi^{\nu} \qquad\qquad \zeta_{\nu}=\gamma_{\nu}+\chi_{\nu} \tag{3.1p}$$

The superphase $\mathrm{d}\vartheta^2=\mathrm{d}\theta^2+\sin^2\theta\,\mathrm{d}\phi^2$ extends into the circumference-freedom polar coordinates. Similar to *Pauli* matrices, the gamma γ^{ν} and chi χ^{ν} matrices are further degenerated into a spacetime manifold of the physical reality. To collapse the equations together, we have a duality of the states expressed by or degenerated to the formulae of event operations:

$$\check{\partial}=\check{\partial}_{\lambda}+\hat{\partial}_{\lambda}=\dot{x}_{\nu}\zeta_{\nu}D_{\nu}=\dot{x}_{\nu}\ \zeta_{\nu}\left(\partial_{\nu}+i\frac{e}{\hbar}A_{\nu}+\tilde{\kappa}_2^{-}\partial_{\nu}A_{\mu}+\cdots\right) \tag{3.1q}$$

$$\hat{\partial}\equiv\hat{\partial}^{\lambda}+\check{\partial}^{\lambda}=\dot{x}^{\mu}\zeta^{\mu}D^{\mu}=\dot{x}^{\mu}\zeta^{\mu}\left(\partial^{\mu}-i\frac{e}{\hbar}A^{\mu}-\tilde{\kappa}_2^{+}\partial^{\mu}A^{\nu}-\cdots\right) \tag{3.1r}$$

Accordingly, all terms have a pair of the irreducible and complex quantities that preserves the full invariant and streams a duality of the $Y^{-}\ Y^{+}$ loop $\hat{\partial}^{\lambda}\circlearrowleft\hat{\partial}_{\lambda}\rightleftharpoons\check{\partial}^{\lambda}\circlearrowright\check{\partial}_{\lambda}$ entanglements. (Reference [1] artifact 8.2)

3.1.5 Dirac Equation

Intrinsically heterogeneous, one of the characteristics of spin is that the events in the Y^{+} or Y^{-} manifold transform into their opponent manifold in forms of bispinors of special relativity, reciprocally. Considering the first order $\dot{\partial}$ only and applying the transformational characteristics, one can reformulate the *first type* of *World Equations* to a simple compartment of the *quadrant-state* equations:

$$\frac{\hbar}{2}\left(\dot{x}_{\nu}\zeta_{\mu}D_{\nu}-\dot{x}^{\mu}\zeta^{\mu}D^{\mu}\right)\psi_n^{\pm}\mp E_n^{\pm}\psi_n^{\pm}=0 \tag{3.1s}$$

$$\psi_n^{+}=\begin{pmatrix}\phi_n^{+}\\ \varphi_n^{-}\end{pmatrix},\qquad \overline{\psi}_n^{-}=\bar{\kappa}\begin{pmatrix}\varphi_n^{-}\\ \phi_n^{+}\end{pmatrix},\qquad \psi_n^{-}=\begin{pmatrix}\phi_n^{-}\\ \varphi_n^{+}\end{pmatrix},\qquad \overline{\psi}_n^{+}=\bar{\kappa}\begin{pmatrix}\varphi_n^{+}\\ \phi_n^{-}\end{pmatrix} \tag{3.1t}$$

where $\overline{\psi}_n^{\pm}$ is the adjoint potential and $\bar{\kappa}$ is a constant subject to renormalization. Ignoring the torsion fields χ^{μ} and χ_{μ}, we have the above compact equations reformulated into the formulae:

$$\tilde{\mathscr{L}}_D^{+}=\overline{\psi}_n^{-}\gamma^{\mu}\left(i\hbar c\,\partial^{\mu}+eA^{\mu}\right)\psi_n^{+}+mc^2\overline{\psi}_n^{-}\psi_n^{+}\to 0 \tag{3.1u}$$

$$\tilde{\mathscr{L}}_D^{-}=\overline{\psi}_n^{+}\gamma_{\nu}\left(i\hbar c\,\partial_{\nu}-\ eA_{\nu}\right)\psi_n^{-}-mc^2\overline{\psi}_n^{+}\psi_n^{-}\to 0 \tag{3.1v}$$

where $\tilde{\mathscr{L}}_D^{\pm}$ is defined as the classic *Lagrangians.* As a pair of entanglements, they philosophically extend to and are known as *Dirac Equation*, introduced in 1925 [14].(Reference [1] artifact 9.2)

14 Dirac, P.A.M. (1982) [1958]. Principles of Quantum Mechanics. International Series of Monographs on Physics (4th ed.). Oxford University Press. p. 255. ISBN 978-0-19-852011-5

3.2 Quantum Field Evolutions

Associated with the inception of a Y^+ spontaneous evolution, the actions of the Y^- *explicit* reproduction are normally sequenced and entangled as a chain of reactions to produce and couple the weak electromagnetic and strong gravitational forces symmetrically in massive dynamics between the second and third horizons.

3.2.1 Conservation of Field Equations

In mathematics, the actions of double wedge circulations in the Figure 2.0b have the natural interpretation of the entangling processes:

$$\circlearrowleft : \ (D_\lambda\psi_a^- \to D_\lambda\psi_b^- \to D_\lambda\psi_c^-)^\uparrow \qquad : \textit{Right-hand Loop} \qquad (3.2a)$$

$$\circlearrowright : \ ^\uparrow(D^\lambda\psi_b^+ \leftarrow D^\lambda\psi_c^+ \leftarrow D^\lambda\psi_a^+) \qquad : \textit{Left-hand Loop} \qquad (3.2b)$$

$$\{D_\lambda\psi_a^-, D^\lambda\psi_b^+\}, \{D_\lambda\psi_b^-, D^\lambda\psi_c^+\}, \{D_\lambda\psi_c^-, D^\lambda\psi_a^+\} \qquad : \textit{Triple States} \qquad (3.2c)$$

Acting upon each other, the triplets are streaming a pair of the Y^-Y^+ *Double-Loops* implicitly, and the *Triple States* of entanglements explicitly. In mathematics, it holds an invariant principle of the double-loop implicit entanglements, or known as a *Bianchi or Jacobi* identity [15-16]:

$$(D_\mu F_{\nu\kappa})^a + (D_\kappa F_{\mu\nu})^b + (D_\nu F_{\kappa\mu})^c = 0 \qquad (3.2d)$$

$$[D_\mu, [D_\nu, D_\kappa]] + [D_\kappa, [D_\mu, D_\nu]] + [D_\nu, [D_\kappa, D_\mu]] = 0 \qquad (3.2e)$$

As a property of the placement of parentheses in a multiple product, it describes how a sequence of events affects the result of the operations. For commutation with the associative property $(xy)z = x(yz)$, any order of operations gives the same result or a loop of the triplet particles is gauge invariance. (Reference [1] Chapter 19)

3.2.2 Evolutional Field Equation

Conveniently expressed in forms of *Horizon Lagrangians* of virtual creation and physical reproduction, it comes out as and beyond *Quantum Electrodynamics* (*QED)* and *Standard Model* that extends from a pair of the first order *Dirac* equations to the second orders in the form of a $SU(1)\times SU(2)\times SU(3)$ *Lagrangians*, named as ***Evolutional Field Equation***:

$$\tilde{\mathscr{L}}_h^a = \tilde{\mathscr{L}}_s^+ + 2\tilde{\mathscr{L}}_s^- = \mathscr{L}_D^{-a} + \left(\overline{\psi}_c^- \frac{\dot{x}_\nu}{c}\zeta^\nu D^\lambda\psi_a^+\right) \wedge \left(\overline{\psi}_b^+ \frac{\dot{x}^\mu}{c}\zeta_\mu D_\lambda\psi_a^-\right) \qquad (3.2f)$$

---

15 Bourbaki, N. (1989). Lie Groups and Lie Algebras: Chapters 1-3. Berlin·Heidelberg·New York: Springer. ISBN 978-3-540-64242-8

16 S.L. Glashow (1961) "Partial-symmetries of weak interactions" Nuclear Physics. 22 (4): 579–588

where $j,k \in \{a,b,c\}$ is the triplet particles. Mathematically, *QCD* is an abelian gauge theory with the symmetry group *SU(3)*×*SU*(2)×*U*(1). The gauge field, which mediates the interactions between the charged spin-1/2 fields, involves the coupling fields of the torque, hypercharge and gravitation, classically known as *Gluons* - the force carrier, similar to photons. As a comparison, the gluon energy for the spiral force coupling with quantum electrodynamics has a traditional interpretation of *Standard Model* to describe known fundamental forces in the universe, as well as classifying all known elementary particles. (Reference [1] Chapter 19)

3.2.3 Yang-Mills Theory

When the strong torque of gravitational fields is ignored, the above equation derives *Yang-Mills* theory, introduced in 1954 [7].

$$\mathscr{L}_Y^a \equiv \left(\bar{\psi}_j^{\mp} i\frac{\hbar}{c}\gamma^\nu D_\nu \psi_i^{\pm}\right)_{jk} - \frac{1}{4}F_{\nu\mu}^{+j}F_{\mu\nu}^{-k} - \frac{1}{4}W_{\mu\nu}^{+j}W_{\nu\mu}^{-k} \qquad (3.2g)$$

As one of the most important results, *Yang–Mills* theory represents *Gauge Invariance*

1. The classic *Asymptotic Freedom* from a view of the physical coordinates;
2. A proof of the confinement property in the presence of a group of the triple-color particles; and
3. Mass acquisition processes symmetrically from the second to third horizon.

Since the quanta of the superphase fields is massless with gauge invariance, *Yang–Mills* theory represents that particles are semi-massless in the second horizon, and acquire their full-mass through evolution of the full physical horizon. Extended by the philosophical interpretation, it represents mathematically: conservation of *Double Loops of Triple Entanglements* or philosophically *Law of Conservation of Evolutions of Ontology*, illustrated by Figure 2.0b as a part of the infrastructure of universe. (Reference [1] artifact 19.1)

3.2.4 Quantum Chromodynamics (*QCD*)

Given the rise of the horizon from the scalar potentials to the vectors through the tangent transportations, the *Lagrangian* above can further give rise from transform-primacy $\zeta^\nu \approx \gamma^\nu$ at the second horizon $\gamma^\nu F_{\nu\mu}^{\pm n}$ to the strong torque at the third horizon, where the chi $\zeta^\nu \approx \chi^\nu$ fields correspond to the strength tensors $\chi^\nu F_{\nu\mu}^{\pm n}$ for the spiral actions of superphase modulation (Reference [1] artifact 19.3).

3.2.5 Yang–Baxter Equation

In physics, the loop entanglement of Figure 2.0b involves a reciprocal pair of both normal partials and antiparticles. This consistency preserves their momentum while changing their quantum internal states. It states that a matrix R, acting on two out of three objects, satisfies the following equation

$$(R\otimes \mathbf{1})(\mathbf{1}\otimes R)(R\otimes \mathbf{1}) = (\mathbf{1}\otimes R)(R\otimes \mathbf{1})(\mathbf{1}\otimes R) \qquad : Y^-\{e^{i\vartheta}\} \mapsto Y^+\{e^{-i\vartheta}\} \qquad (3.2h)$$

where R is an invertible linear transformation on world planes, and $\boldsymbol{I}$ is the identity. Under the yinyang principle of $Y^-\{e^{i\vartheta}\} \mapsto Y^+\{e^{-i\vartheta}\}$, a quantum system is integrable with or has conservation of

the particle-antiparticle entanglement or philosophically *Law of Conservation of triplet Antiparticles*.

3.2.6 Ontological Field Equation

For entanglement between $Y^- Y^+$ manifolds, considering the parallel transport of a *Scalar* density of the fields $\rho = \psi^+ \psi^-$ around an infinitesimal parallelogram. The chain of these reactions can be interpreted by the commutation framework integrated with the gauge potential for *Physical Ontology*. At the third horizon for asymmetric dynamics, the ontological expressions have the gauge derivatives. Similar to derive the cosmic field equation, the motion dynamics of the field evolutions can be expressed straightforwardly the *Ontology Field Equation* (Reference [1] section 21):

$$\frac{R}{2} g_{\nu m} + G^{-\sigma s}_{\nu m} + \Theta^{-\sigma s}_{\nu m} = \mathcal{O}^{+\zeta}_{m\nu} \qquad : \mathcal{O}^{+\sigma}_{\nu\mu} = \diamondsuit^+ - i \begin{pmatrix} 0 & -\frac{\partial}{c\partial t}\mathbf{D}^+_a \\ \nabla \cdot \mathbf{D}^+_a & \nabla \times \mathbf{H}^+_a / c \end{pmatrix} \qquad (3.2i)$$

where $\mathcal{O}^{\pm\sigma}_{\nu m}$ is the Y^+ or Y^- ontological modulators. The notion of ontological evolution is intimately tied in with another aspect of general relativistic physics. Each solution of the equation encompasses the whole history of the superphase modulations at both dark-filled and matter-filled reality. It describes the state of matter and geometry everywhere at every moment of that particular universe. (Reference [1] Chapter XVII)

Due to its general covariance combined with the gauge fixing, this *Ontological Relativity* is sufficient by itself to determine the time evolution of the metric tensor and of the universe over time. Since the ordinary quantum fields forms the basis of elementary particle physics, the *Ontological Relativity* is an excellent artifact describing the behaviors of microscopic particles in weak gravitational fields like those found on Earth [17]. Quantum fields in curved spacetime demonstrate its evolutional processes beyond mass acquisition in quantization itself, and general relativity in a curved background spacetime strongly influenced by the superphase modulations $\Theta^{\pm\sigma s}_{\nu m}$. Integrated with the above formalism, the equation illustrates that, besides of the dynamic curvatures, the blackhole quantum fields emit a blackbody spectrum of particles known as *Bekenstein-Hawking* radiation leading to the possibility not only that they evaporate over time, but also that it quantities a gravitational modulations.

3.2.7 Mass Acquisition and Annihilation.

As a duality of evolution, consider N harmonic oscillators of quantum objects. The energy spectra operates between the virtual wave and physical mass oscillating from one physical dimension on world planes into three dimensional *Hamiltonian* of *Schrödinger Equation*. Intriguingly, the solution to the above equation can be either one-dimension $SU(2)$ for ontological evolution or three-dimension for spacetime at the $SU(3)$ horizon.

17 Auyang, Sunny Y. (1995), How is Quantum Field Theory Possible?, Oxford University Press, ISBN 0-19-509345-3

$$\varphi_n^+(r_n) = \frac{1}{\sqrt{2^n\, n!}} \left(\frac{m\omega_n}{\pi\hbar}\right)^{1/4} e^{-\frac{m\omega_n r_n^2}{2\hbar}} H_n\left(\sqrt{\frac{m\omega_n}{\hbar}} r_n\right) \qquad (3.2j)$$

$$\phi_{nlm}^-(r_n,\theta,\phi) = N_{nl} r^l e^{-\frac{m\omega_n}{2\hbar} r_n^2} L_n^{(l+1/2)}\left(\frac{m\omega_n}{\hbar} r_n^2\right) Y_{lm}(\theta,\phi) \qquad (3.2k)$$

$$N_{nl} = \left[\left(\frac{2\nu_n^3}{\pi}\right)^{1/2} \frac{2^{n+2l+3}\; n!\; \nu_n^l}{(2n+2l+1)!}\right]^{1/2} \qquad : \nu_n \equiv \frac{m\omega_n}{2\hbar} \qquad (3.2l)$$

The $H_n(x)$ is the *Hermite* polynomials, detail by *Pafnuty Chebyshev* in 1859 [18]. The N_{nl} is a normalization function for the enclaved mass at the third horizon. Named after *Edmond Laguerre* (1834-1886), the $L_k^v(x)$ are generalized *Laguerre* polynomials [19] for the energy embody dynamically. Introduced by *Pierre Simon de Laplace* in 1782, the $Y_{lm}(\theta,\phi)$ is a spherical harmonic function for the freedom of the extra rotations or the basis functions for $SO(3)$. Apparently, the classic normalizations are at the second horizon for φ_n^+ and the third horizon for ϕ_{nlm}^-, respectively.

As a quick verification, the density emerges from the second to third horizon for its full-mass acquisition at the ground state (n=0):

$$\rho^- \approx \phi_0^- \varphi_0^+ = 2\frac{m\omega}{\pi\hbar} exp\left[-\frac{m\omega}{2\hbar}(r_s^2 + r_w^2)\right] \qquad (3.2m)$$

$$\phi_0^- = 2\left(\frac{m\omega}{\pi\hbar}\right)^{3/4} e^{-\frac{m\omega}{2\hbar} r_w^2}, \qquad \varphi_0^+ = \left(\frac{m\omega}{\pi\hbar}\right)^{1/4} e^{-\frac{m\omega r_s^2}{2\hbar}} \qquad (3.2n)$$

where the radius r_s or r_w is an interactive range of the strong or weak forces, respectively. It demonstrates the energy embodies its mass enclave in a process from the ¼ to ¾ core during its evolution of the second to third horizon, progressively. Vice versa for the annihilation. (Reference [1] artifact 9.10)

18 Hermite, C. (1864). "Sur un nouveau développement en série de fonctions" [On a new development in function series]. C. R. Acad. Sci. Paris. 58: 93–100. Collected in Œuvres II, 293–303

19 Quantum mechanics, E. Zaarur, Y. Peleg, R. Pnini, Schaum's Easy Oulines Crash Course, Mc Graw Hill (USA), 2006, ISBN 978-0-07-145533-6

3.3 Symmetric Field Equations

As another major part of the unification theory, the quantum fields give rise to a symmetric environment and bring together from conservation of flux commutation and continuity to the *general* field entanglements: *Second Universal Field Equations*.

3.3.1 Symmetric Fluxions

Symmetry is the law of natural conservations that a system is preserved or remains unchanged or invariant under some transformations or transportations. As a duality, there is always a pair of intrinsic reciprocal conjugation: $Y^-\,Y^+$ symmetry. The basic principles of symmetry and anti-symmetry are as the following:

1. Associated with its opponent potentials of scalar or vector fields, symmetry is a fluxion system cohesively and completely balanced such that it is invariant among all composite fields.
2. As a duality, an $Y^-\,Y^+$ anti-symmetry is a reciprocal component of its symmetric system to which it has a mirroring similarity physically and can annihilate into nonexistence virtually.
3. Without a pair of $Y^-\,Y^+$ objects, no symmetry can be delivered to its surroundings consistently and perpetually sustainable as resources to a life streaming of entanglements at zero net momentum.
4. Both $Y^-\,Y^+$ symmetries preserve the laws of conservation consistently and distinctively, which orchestrate their local continuity respectively and harmonize each other dynamically.

For the symmetric fluxions, the entangling invariance requires that their fluxions are either conserved at zero net momentum or maintained by energy resource. Normally, the divergence of Y^- fluxion is conserved by the virtual forces 0^+ of massless energies and the divergence of Y^+ fluxion is balanced by the mass forces of physical resources. Together, they maintain each other's conservations and continuities cohesively and complementarily.

For the yinyang entanglement streams, the ensemble of an event λ is in a mix of the Y^- or Y^+ -supremacy states such that each pair of the reciprocal states $\{\phi_n^-, \varphi_n^+\}$ or $\{\phi_n^+, \varphi_n^-\}$ is performed in alignment with their probability $p_n^\pm = p_n(h_n^\pm)$, where $h_n^\pm$ are the $Y^\pm$ distributive or horizon factors, respectively. The parameter p_n^- or p_n^+ is a statistical function of horizon factor $h_n^-(T)$ or $h_n^+(T)$ and fully characterizable by *Thermodynamics*. (Reference [1] Chapter 13)

3.3.2 Lorentz Generators

Giving rise to the third horizon, the boost and spiral generators contract with the ζ infrastructure and evolve into the four-dimensional matrices $SU(2)_{s_1} \times SO(3)_{s_2}$, shown by the following:

$$J_1=\begin{pmatrix}0&0&0&0\\0&0&0&0\\0&0&0&-1\\0&0&1&0\end{pmatrix},\ J_2=\begin{pmatrix}0&0&0&0\\0&0&0&1\\0&0&0&0\\0&-1&0&0\end{pmatrix},\ J_3=\begin{pmatrix}0&0&0&0\\0&0&-1&0\\0&1&0&0\\0&0&0&0\end{pmatrix} \tag{3.3a}$$

$$K_1=\begin{pmatrix}0&1&0&0\\1&0&0&0\\0&0&0&0\\0&0&0&0\end{pmatrix},\ K_2=\begin{pmatrix}0&0&1&0\\0&0&0&0\\1&0&0&0\\0&0&0&0\end{pmatrix},\ K_3=\begin{pmatrix}0&0&0&1\\0&0&0&0\\0&0&0&0\\1&0&0&0\end{pmatrix} \tag{3.3b}$$

$$L_\nu^- = K_\nu + iJ_\nu \qquad L_\nu^+ = K_\nu - iJ_\nu \tag{3.3c}$$

$$[J_1,J_2]^- = J_3 \qquad [K_1,K_2]^- = -J_3 \qquad [J_1,K_2]^- = K_3 \tag{3.3d}$$

known as *Generator* of the *Lorentz* group, discovered since 1892 [20] or similar to *Gell-Mann* matrices [21]. Conceivably, the K_ν or J_ν matrices are residual $\{\hat{\partial}^\lambda, \check{\partial}_\lambda\}$ or rotational $\{\hat{\partial}_\lambda, \check{\partial}^\lambda\}$ components, respectively. During the transitions between the horizons, the redundant degrees of freedom is developed and extended from superphase ϑ of world-planes into the extra physical coordinates (such as θ and ϕ in). For the field structure at the third horizon, a duality of reciprocal interactions dominated by boost γ and twist χ fields is developed into the third ($\zeta \mapsto L$) horizon.

$$T_{\nu\mu}^{-n}(L) = \left(L_{\nu\mu}^-\partial_\nu V_\mu - L_{\mu\nu}^+\partial^\mu V^\nu\right)_n \qquad : T_{\nu\mu}^{\pm n}(\gamma) \mapsto T_{\mu\nu}^{\pm n}(L) \tag{3.3e}$$

$$\Upsilon_{\nu\mu}^{-n}(L) = \left(L_{\nu\mu}^-\partial_\nu A_\mu - L_{\mu\nu}^+\partial^\mu A^\nu\right)_n \qquad : \Upsilon_{\nu\mu}^{\pm n}(\chi) \mapsto \Upsilon_{\mu\nu}^{\pm n}(L) \tag{3.3f}$$

Under the Y^- or Y^+ primary, the event operates a pair of the relativistic entangling fields (Reference [1] artifact 10.3-10.5).

3.3.3 Electrodynamics and Gravitation

For *Universal Field Equations* (2.6) without asymmetric entanglements or symmetric dynamics that does not have the asymmetric flex transportation spontaneously, the fluxions satisfy the residual conditions of Y^-Y^+ symmetric interweavement, or $\zeta^\pm = 0$. At the third horizon, a pair of the flux commutations above can derive the electromagnetic and gravitational fields, shown by the following:

$$\nabla\cdot\left(\mathbf{B}_q^- + \eta\mathbf{B}_g^-\right) = 0^+ \qquad : \eta = c_g/c \tag{3.3g}$$

$$\nabla\cdot\left(\mathbf{D}_q^+ + \eta\mathbf{D}_g^+\right) = \rho_q - 4\pi G\eta\rho_g \tag{3.3h}$$

$$\nabla\times\left(\mathbf{E}_q^- + \mathbf{E}_g^-\right) + \frac{\partial}{\partial t}\left(\mathbf{B}_q^- + \mathbf{B}_g^-\right) = 0^+ \tag{3.3i}$$

$$\nabla\times\left(\mathbf{H}_q^+ + \mathbf{H}_g^+\right) - \frac{\partial}{\partial t}\left(\mathbf{D}_q^+ + \mathbf{D}_g^+\right) = \mathbf{J}_q - 4\pi G\mathbf{J}_g \tag{3.3j}$$

where the index q for *Electromagnetism* and g for *Gravitation Fields*. The total source might comprise

20 William O. Straub, (2017) “A Child's Guide to Spinors” viXra:1701.0299
21 Gell-Mann, M. (1962) "Symmetries of baryons and mesons" Physical Review 125 (3) 1067

multiple components $\mathbf{J}^{-}=\sum_{n} p_{n}^{-}\left\{\mathbf{u}\rho_{n}^{-},\mathbf{j}_{n}^{-}\right\}\propto\left\{\mathbf{u}\rho,\mathbf{J}\right\}$ to include the $Y^{\mp}$ fluxions, thermodynamics, as well as other asymmetric suppliers ζ^{+}.

Appeared as independence or loosely coupled at the third or fourth horizons, they constitute all type of physical interaction that occurs between electrically charged or massive particles. The electromagnetism usually exhibits a duality of electric and magnetic fields as well as their interruption in light speed. The graviton represents a torque duality between the virtual and physical energies of entanglements. Not only have both models accounted for the charge or mass volume independence of energies and explained the ability of matter and photon-graviton radiation to be in thermal equilibrium, but also reveals anomalies in thermodynamics, including the properties of blackbody for both light and gravitational radiance. (Reference [1] artifact 11.6)

3.4 Thermodynamics

Every physical body spontaneously and continuously emits electromagnetic and gravitational radiation. At near thermodynamic equilibrium, the emitted radiation is closely described by either Planck's law [22] for blackbodies or *Bekenstein-Hawking* radiation [23-24] for blackholes, or in fact at both for normal objects. These waves, making up the radiations, can be imagined as $Y^- Y^+$ dynamics of propagating transverse oscillating electric, magnetic and gravitational fields.

3.4.1 Law of Conservation of Light

Besides the primary properties of visibility, intensity, propagation direction, wavelength spectrum and polarization, the light has the law of conservation, derived by and abstracted from the numerous artifacts of quantum infrastructure of universe (Reference [1] artifact 14.6).

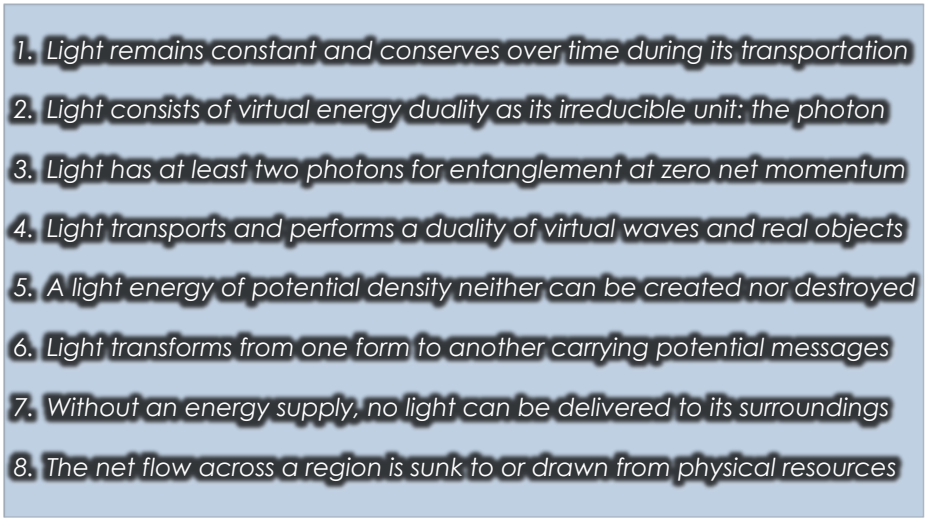

Figure 3.4a: Law of Conservation of Light

3.4.2 Photon

As a fluxion flow of light, it balances statistically at each of the states $E_n^{\mp} : mc^2 \rightleftharpoons \hbar\omega$, where $\hbar\omega$ is known as the *Planck* matter-energy. Based on the principle of *Two Loops of Triple Entanglements*, at a minimum, light consists of two units, a pair of *Photons*. For a total of mass-energy $4m^2c^4$, the equation presents a conservation of photon energy-momentum and relativistic invariance. Because

22 Planck, M. (1915). "Eight Lectures on Theoretical Physics" Wills, A. P. (transl.). Dover Publications. ISBN 0-486-69730-4

23 Bekenstein, Jacob D (April 1973). "Black holes and entropy". Physical Review D. 7 (8): 2333–2346.

24 S. W. Hawking, "Black hole explosions?", Nature 248, 30 (1974)

the potential fields on a pair of the world planes are a triplet quark system at $2\varphi_a^+(\phi_b^- + \phi_c^-) \approx 4\varphi_a^+\phi_{b/c}^-$ (Figure 2.0b), it is about four times of the density for the wave emission. Applicable to the conservation above, an area energy fluxion of the potentials is equivalent to an entropy of the electro-photon radiations [25] in thermal equilibrium:

$$S_A(\omega_c, T) = 4\left(\frac{\omega_c^2}{4\pi^3 c^2}\right) = \eta_c\left(\frac{\omega_c}{c}\right)^2 \mapsto 4\frac{E_c^- E_c^+}{(\hbar c)^2} \qquad : \eta_c = \pi^{-3} \qquad (3.4a)$$

where the factor 4 accounts for one blackbody with the dual states at minimum of two physical Y^- and one virtual Y^+ quarks. In a free space or vacuum for the massless objects, the above equivalence results in a pair of photon in the complex formulae:

$$E_c^{\pm} = \mp\frac{i}{2}\hbar\omega_c \qquad : \eta_c = \frac{1}{\pi^3} \approx 33\,\% \qquad (3.4b)$$

The coupling constant at $33\,\%$ implies that the triplet quarks institute a pair of the photon energies $\mp i\hbar\omega_c/2$ for a blackhole to emit lights by electro-photon radiations. It reveals that light can be converted to or emitted by the triplet quarks: an electron, a positron and a gluon. (Reference [1] artifact 14.5)

3.4.3 Law of Conservation of Gravitation

Similar to acquisition of *Conservation of Light*, we represent the characteristics of gravitation, derived by and abstracted from the numerous artifacts of quantum infrastructure of universe (Reference [1] artifact 14.8).

1. *Gravitation remains constant and conserves over time during its transportation*
2. *Gravitation transports in wave formation virtually and acts on objects physically*
3. *A gravitation energy of potential density neither can be created nor destroyed*
4. *Gravitation consists of virtual energy duality as an irreducible unit: the graviton*
5. *Gravitation has at least two gravitons for entanglement at zero net momentum*
6. *Gravitation transports from one form to another carrying potential messages*
7. *Without an energy supply, no gravitation can be delivered to its surroundings*
8. *The net flow across a region is sunk to or drawn from the physical resources*
9. *External to objects, gravity is inversely proportional to the square of the distance*

Figure 3.4b: Law of Conservation of Gravitation

25 Planck, M. (1900a). "Über eine Verbesserung der Wien'schen Spectralgleichung". Verhandlungen der Deutschen Physikalischen Gesellschaft. 2: 202–204

Under the superphase modulations, the feature of nature gravitation is independent of the orientation and the boost transformation or spiral torque invariance through the world lines. Together with law of conservation of light, the initial state of the universe is conserved or invariant at the horizon where the inception of the physical world is entangling with and operating by the virtual supremacy.

3.4.4 Graviton

Gravitation exhibits wave–particle duality such that its properties must acquire characteristics of both virtual and physical particles. Integrating with the blackhole thermal radiance, gravitational fluxion has the transportable commutation of area entropy S_A and conservable radiations of a *Schwarzshild* blackbody [26-27]. It is equivalent to associate it with *Bekenstein-Hawking* radiation.

$$S_A(\omega_g, T) = 4\left(\frac{c_g^3}{4\hbar G}\right) = 4\frac{E_g^- E_g^+}{(\hbar c_g)^2} \qquad \rightarrow \qquad E_g^{\pm} = \mp\frac{i}{2}\sqrt{\hbar c_g^5/G} \tag{3.4c}$$

where the number 4 is factored for a dual-state system. Consequently, the gravitational energies $E_g^{\pm}$ contain not only a duality of the complex functions but also an irreducible unit: ***Graviton***, as a pair of graviton units:

$$E_g^{\pm} = \mp\frac{i}{2}E_p \qquad\qquad : E_p = \sqrt{\hbar c_g^5/G} \tag{3.4d}$$

where E_p is the *Plank* energy. For the blackhole emanations, a coupling constant 100% to emit gravitational radiations implies that graviton is a type of dark energies accompanying particle radiations as a duality of the reciprocal resources. At a minimum, the blackhole emanation, conservation of momentum, or equivalently transportation invariance require that at least a pair of gravitons is superphase-modulated for entanglements transporting at their zero net momentum. Unlike a pair of photons emitted by particles, nature of graviton is associated with the superphase modulation of the Y^-Y^+ energy or dark energy entanglement for all particles. In the center of entanglement, the colliding duality has no net momentum, whereas gravitons always have the temperature sourced from their spiral torques and modulated by superphase of the nature. (Reference [1] artifact 14.7)

26 Bekenstein, Jacob D. (April 1973). "Black holes and entropy". Physical Review D. 7 (8): 2333–2346
27 S. W. Hawking,"Black hole explosions?", Nature 248, 30 (1974)

3.5 Asymmetry of Cosmology

Similar to the $Y^- Y^+$ flux commutation and continuities of potential densities, a duality of symmetry and asymmetry represents the cohesive and progressive evolutions aligning with the working of the topological hierarchy of nature.

3.5.1 Law of Asymmetric Dynamics

Asymmetry is an event process capable of occurring at a different perspective to its symmetric counterpart. The natural characteristics of the $Y^- Y^+$ asymmetry have the following basic properties:

1. Associated with its opponent potentials of scalar fields, an asymmetric system is a dark fluxion flowing dominantly in one direction without its mirroring or equivalent fluxion from the other, although the interaction is a pair of yin yang entanglements.
2. The scalar fields are virtual supremacy at the first and second horizons, where objects are the massless instances, actions or operations, known as dark energy. Conceivably, an asymmetric structure of physical system is always accompanied or operated by the dark energies.
3. Asymmetry is a part of components to the symmetric fluxions of the underlining transform and transport infrastructure cohesively and persistently aligning with its systematic symmetry.
4. As a duality of asymmetry, the Y^- or Y^+ anti-asymmetry is another part of components for the dual asymmetric fluxions of the base infrastructure consistently aligning with the underlying Y^- or Y^+ symmetry.

Both of the Y^- and Y^+ asymmetries have the laws of conservation consistently and perpetually, that orchestrate their respective continuity locally and harmonize each other's movements externally in progressing towards the next level of symmetry. (Reference [1] artifact 11.6)

3.5.2 Cosmic Field Equations

Aligning with the continuously arising horizons, the events determine the derivative operations through the vector potentials giving rise to the matrix fields for further dynamic evolutions at the Y^+-supremacy. From *Third Universal Field Equations*, one can convert the motion dynamics in the covariant form of asymmetric equation:

$$\mathscr{R}^{-\sigma}_{\nu ms} + \Lambda^{+\sigma}_{\nu m} = \frac{R}{2} g_{\nu m} + G^{s\sigma}_{\nu m} + C^{s\sigma}_{\nu m} \qquad : \Lambda^{+\sigma}_{\nu m} = \Diamond^+ - i \begin{pmatrix} 0 & -\frac{\partial}{c\partial t}\mathbf{D}^+_v \\ \nabla \cdot \mathbf{D}^+_v & \nabla \times \mathbf{H}^+_v / c \end{pmatrix} \qquad (3.5a)$$

where the *Riemannian* curvature $\mathfrak{R}^- \equiv \mathscr{R}^{-\sigma}_{\nu m\mu}$ associates the metric $\mathbf{g}^-$, relativistic stress $\mathbf{G}$ and contorsion $\mathbf{C}$ tensors to each world-line points of the Y^- manifolds that measures the extent to the metric tensors from its locally isometric to its opponent manifold or, in fact, conjugate to each other's metric. The $\Lambda^+_{\nu\mu}$ is the Y^+ cosmological modulator where the $\mathbf{D}^+_v$ and $\mathbf{H}^+_v$ fields are the intrinsic modulations in the form of a duality of asymmetry and antiasymmetry cohesively. As in our expectation, it

generates the light and gravitational waves $\Diamond^{\pm}$ as the obvious phenomena in the comic observation. (Reference [1] Chapter XVIII)

Apparently, the dark dynamics is the sophisticated processes with the message transformations, relativistic commutations, and dynamic modulations that operate the physical motion curvature. This equation servers as *Law of Conservation of* Y^- *Cosmological Motion Dynamics* that the Y^- fields of a world-line curvature are constituted of and modulated by asymmetric fluxions, given rise from the Y^+ vector potential fields not only to operate motion geometry, but also to carry messages for reproductions and animations. It implies that the virtual world supplies energy resources in the forms of area fluxions, and that the cosmological modulator $\mathbf{\Lambda}_v^+$ has the intrinsic messaging secrets of the dark energy operations, further outlined in reference [1].

3.5.3 General Relativity

Simply applying the commutation for a statically frozen or inanimate state, the two-dimensions of the world line can be aggregated in the following expression to formulate the classical *General Relativity*:

$$R_{\mu\nu} + \Lambda g_{\mu\nu} = \tfrac{1}{2} R\, g_{\mu\nu} + G_{\mu\nu} \qquad : G_{\mu\nu} = \frac{8\pi G}{c^4} T_{\mu\nu} \qquad (3.5b)$$

known as the *Einstein* field equation [28], discovered in November 1915. The theory had been one of the most profound discoveries of the 20th-century physics to account for general commutation in the context of classical forces.

Apparently, for a century, the philosophical interpretation had remained a challenge or unsolved, until this *Universal Topology* was discovered in 2016. (Reference [1] artifact 16.5)

3.5.4 Big Bang Theory

In the *Big Bang* theory, "the universe began from a singularity," introduced in 1927 by *Lemaître* [29], and the expansion of the observable universe began with the explosion of a single particle at a definite point in time. According to this horizon infrastructure, obviously, the universe is amazingly a chain of the seamlessly processes at the *conservation of superphase evolutions* for the progressive mass acquisitions from virtual non-singularity to physical spacetime singularity. The gravitational singularity exists only at the third horizon where the energy embodies its enclave as a mass object, which gains the rotational coordinates.

28Einstein, Albert (1916). "The Foundation of the General Theory of Relativity". Annalen der Physik. 354 (7): 769

29Lemaître, Georges (1931), "Expansion of the universe, A homogeneous universe of constant mass and increasing radius accounting for the radial velocity of extra-galactic nebulæ", Monthly Notices of the Royal Astronomical Society, 91: 483–490, Bibcode:1931MNRAS..91..483L, doi:10.1093/mnras/91.5.483 translated from Lemaître, Georges (1927), "Un univers homogène de masse constante et de rayon croissant rendant compte de la vitesse radiale des nébuleuses extra-galactiques", Annales de la Société Scientifique de Bruxelles, A47: 49–56, Bibcode:1927ASSB...47...49L

Applicable to prevail in the earliest states of physical objects, *Big Bang Theory* would have been a cosmological model for the universe, if the ordinary matter in the universe were dominant or created virtual energy. Therefore, the model of "*Big Bang* theory" might be limited to a process of the mass inauguration in physical object only. Besides, in reality, acceleration of a physical object is simply embarrassed by a common phenomenon or a result of the generation process of light radiations. A property of the entire universe is orchestrated as a whole rather than a phenomenon that applies just to one part of the universe or from the physical observation only.

3.5.5 Cosmic Redshift

In reality, only in the third horizon, a moving body away from or towards to the receiver is the redshift or blueshift caused by the *Doppler* effect [30]. For the light emitted at the second horizon, it doesn't matter or irrelevant to what happens to the emitting object physically at the third or higher horizons - it will not affect the wavelength of the light that is received at the third or higher physical horizons. In the case of the cosmic redshift, the emitting object appears as expanding due to the energy conversion between the physical and virtual regime with time-lapse. This is a *Doppler*-like effect irrelevant to the speed of the galaxy or star, but on the changing geometry of cosmological distances over world-lines [31]. Because the rate of action time changes or "expends" between the emitting and the receiving, that will affect the received wavelength. Apparently, the cosmic redshift is a measure of the total "stretching" that the universe has undergone between the virtual time when the light was physically emitted and the virtual time when it was physically received. As expected, the time-lapse is equivalent to or always "expanding" that is the known characteristics of the virtual world imposing or exposing on the physical world.

Besides no-singularity in the virtual event operations of the universe, the cosmic redshirt is another property of the mass annihilation or inauguration between the light emitting and receiving. The entire universe is orchestrated as a whole rather than a phenomenon that applies just to one part of the universe or from the physical observation only. Therefore, our astronomers shall bid farewell to the model of "*Big Bang* theory".

30Buys Ballot (1845). "Akustische Versuche auf der Niederländischen Eisenbahn, nebst gelegentlichen Bemerkungen zur Theorie des Hrn. Prof. Doppler (in German)". Annalen der Physik und Chemie. 11 (11): 321–351

31R. Gray, J. Dunning-Davies (2008) "A review of redshift and its interpretation in cosmology and astrophysics", arXiv:0806.4085

Conclusions

As a result, our theoretical physics, scoped or limited within physical space as one of the manifolds in the universal topology, is now approaching to its opponent as a twin that more concepts and details need to be further integrated with the virtual space: a duality of virtual-physical reality. As the scientists, we are now challenged with the following missions:

a. It is an essential knowledge for us to uncover the other side of world line, the virtual space plane, which is the twin to the physical space plane under oneness of the global universal manifold.

b. It is the vital conception to integrate a duality of the spaces under the holistic topology of universe manifested to depict our nature with both world planes of physical and virtual manifolds.

In fact, mathematization of the natural philosophy has being developed and demonstrating the theoretical unification that can extend our current sciences, including but not limited to physics, cosmology, biology, metaphysics, ontology, economics, and information technology, into a next generation of virtumanity: life animation and rising of virtual civilization. Our mankind is at dawn of a new era, towards revolutions of:

1. Advancing scientific philosophies towards next generation,
2. Standardizing topological framework for modern physics,
3. Virtualizing informational sciences towards virtue reality,
4. Theorizing biology and biophysics for the life sciences,
5. Rationalizing metaphysics back on the scientific rails.

Wei Xu

November 15th, 2018