



## The Quantum Electromagnetism and Gravity Waves in Inflective Spaces with Topological Transformations of De-formations and Re-formations: Designing an Elementary Particle

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### Abstract

The gravity waves, electromagnetic waves, and the most primitive elementary particle creation processes from completely null space are built by using the topological presentations, TPs with both event independent approach, EIA and process independent approach, PIA. The creation of gravity waves are explained by a building mechanism with the self-capability of elementary sets of thing spaces from single point spaces as a many-sided self-optimization process of the degenerations in single point space structures. The reason of invariances are explained. The time is explained as a process dissipating an energy ingredient. Deriving the equations for waves and particles from the TPs and time energy in inflective spaces are worked for above said purposes.

### 1 Introduction

The study in this paper is on the fundamental topological processes applicable to processes creating electromagnetism, gravity, and elementary particles from null space, NS. The fundamental topological principles of event independentness, FTPoEI are presented with an approach different than the perspectives in open literature in [1]-[3]. According to FTPoEI approach every process,  $P_s$  has topological presentation, TP to have capability for appearing in their domains. These TPs may not be in forms of known mathematical equations, but they are in forms arranged with curves and surfaces functionally related to each other in a scheme being constituted with a structure in a stabling state that has been harmonized according to every observer in all directions. Every  $P_s$  builds coming into being themselves up by the leading of the formation of that scheme and partially improve themselves according to this scheme. The functioning of this scheme is spontaneously assembled with an optimization process, OP. This OP is a control and command mechanism that involves all assembling, directing, and inspecting by itself until the aim of that  $P_s$  is constructed. That OP passes into the place of self-optimization as a leading process after the construction could be finished. We call *many-sided optimization, m-sO* the concept of stabling state that has been harmonized according to every observer in all directions. The m-sO constitutes building  $P_s$  in its **aim**, say **A**, from every direction according to every observer even if it is not built yet. We call *a Process of an Aim, PoA* all types of  $P_s$ s said above. The ingredients of any PoA are members of

$T_{hS}$  birthed from a sPS in a NS [1]-[3]. The principal elements, PrEs of the set defining the mechanism in the structures for any event of any  $P_s$  are correlated with measurable sets, MSs for the each of interaction processes in PrEs group according to the *principal axiom of pure existence* given at §5 in [1]. Each MS has ingredients of the *measures*, MRs, depending on some activities among PrEs in the  $T_{hS}$  of PoA. The system of the PoA arranges some acts to make the  $T_{hS}$  reaching to its aim. We call *activity, Act*, the MRs of these arrangements. The Acts are put the scheme of events in PoA. The independence of the MRs on the Acts is defined with suitable topological transformations, TTs and *Measure Functional*, MF defined from MR and Act with the equation (5) in [1].

The sPS *flits* between  $P^-$  and  $P^+$  according to the concavity effect in topological universes as explained in section 4 in [2]. There are momentary passes of both inwards-to-outwards and outwards-to-inwards. The appearance of this activity is like a pulse of light. These *flicks* incarcerate  $T_{hS}$  [2]. The sPS construes this *flicker* activity as a *pushpull, p\p effect,  $E^{p\p}$*  [3]. The *flicker activity* is the *determiner* of universal invariants in the physical process,  $P_p$  of both gravity and photon created by the Topological Processes, TPs [1]-[3]. Let the occurrence of event E pushes the occurrence of event F and alternatively, let the occurrence of event F pulls the event E. Then the events E and F are correlated to each other with p\p effect.

### 2 The Reality of Aiming the Time

All things, beside peoples live in the dominance of (e, n, p) that is equivalent to the triplet (-, 0, +) governed in the environ of (Energy, Photon, Frequency, Momentum) quartet. The first marker of the quartet involves all category of energy ingredients, i.e., electromagnetic, heath, pressure, etc. The second marker forms the most primitive and primary ingredient of building the *physical universe, PU* [1]-[3]. The quartet meshes a spatial topology in the *PU*. All the events fill a database listed in order. That order creates our time concept designed as arranging an array in a sequencing coordinate in Euclidean space. That sequencing coordinate changed to a dimension with Schwarzschild metric in Riemannian space. The self-occurrence approach to *PU*s forms the ordering *reality,  $R_y$*  of time as fitting to the energy marker in the quartet for initializing the environ realizing the *PU*. The  $R_y$  of aim, *RoA* interprets the ordering reality of time concept as an ingredient generating a process dissipating

an energy. This *RoA* brings the question below:

**Question 1 (Reality of Aiming the Time, *RoAT*):** Is the time a dissipative energy?

**Experiment 1 (Loosing and re-gaining process for distance- The walking reality experiment):** If some time passed then we cannot gain it again (*the Passed Time, [tPT]*). Let us consider walking a distance L in a convenient path and measure the time we spent, say [tPT<sub>1</sub>]. We walk back the same path spending time of [tPT<sub>2</sub>]. If we walk a distance L then we can walk back so we may re-gain the distance L. At the first stage of walking event, we begin in a path with distance L as in front of us. At the second stage of event order the path with distance L stays at our back. The path is still behind of us, but domain is same in 1<sup>st</sup> and 3<sup>rd</sup> stages according to the coordinate lines directions. This situation is comprehensible as a *re-gaining process for distances* in the  $R_y$  of *PU*. The state of the path and L is the same at 1<sup>st</sup> and 3<sup>rd</sup> stages but the markers of time are different: the [tPT<sub>1</sub>] at 1<sup>st</sup> stage but [tPT<sub>1</sub>]⊕[tPT<sub>2</sub>]=[tPT<sub>3</sub>] at the 3<sup>rd</sup> stage. We can gain a spatial loose, but we may not re-gain a temporal loose. In classical approach, CA we put t instead of [tPT] and write t<sub>1</sub>+t<sub>2</sub>=t<sub>3</sub> instead of [tPT<sub>1</sub>]⊕[tPT<sub>2</sub>]=[tPT<sub>3</sub>] in there [tPT] corresponds to an energy ingredient while t corresponds to an ordering sequence parameter in event process and assigned to the span between consecutive elements in that sequence.

**Principle 1 (Un-preservability of time):** The spatial processes may be conservable but temporal processes may not be conservable.

**Result 1:** (a) Temporal events are dissipative processes therefore temporal realities are energy ingredients.  
(b) If there is some time spent then at least one thing exists generated by the dissipation of an energy ingredient, say *time energy*  $T^E$  that corresponds to the *time span*, say  $t^s$ .

**Question 2:** (a) What are the amounts of the  $T^E$  and  $t^s$  corresponding to each other?

(b) Can any kind of energy, i.e., heat, electromagnetic, pressure, etc, be transferrable to  $T^E$ ?

**Experiment 2 (Loosing and re-gaining process for volume- The compressing-decompressing reality experiment):** Let us re-arrange the experiment 1 for a vacuum volume in a piston instead of path distance in walking exercise. Let us begin with a volume of length L in a circularly cylindrical piston at a thermodynamical equilibrium state. The distance  $\Delta L$  is lost at the piston rod side by pulling the piston rod. The  $\Delta L$  is re-gained at the piston rod side by pushing the rod. Let us compress the volume V. If the pushing force of the piston rod is not prevented, that means it is not pushed back in somehow, then the volume V keeps a packed energy. This packed energy is a  $T_h$  in  $T_hS$ . The reverse exhausts the energy doped (embedded) in V so the  $T_h$  is pushed to  $Y_e$ .

If there exists nonexistence, only then there is not any particle, any energy, besides, the time does not exist in their classical approaches. The construing processes of a *sPS* for its inwards and/or outwards may be transformed to an energy mapping, topologically, therefore the *TT* of construing process of a *sPS* may be defined as an ingredient of energy, say kinetic-like energy equivalence for outwards and potential-like energy equivalence for inwards in the topological space of mapping of inwards/outwards *Acts* of *sPS*, say [iwsAct<sup>ows</sup>]. The inwards/outwards *Acts* of *sPS* may be transformed to coordinate differences  $d\vec{r}$  and/or  $d\vec{s}$ . There is a single but binary state for [iwsAct<sup>ows</sup>] that is *iws* and/or *ows*, only. The coordinate differencing for *TT* of [iwsAct<sup>ows</sup>] differs from ordinary differentiating due to the singularity coming from binary nature of the process so we use  $d_B\vec{r}$  and/or  $d_B\vec{s}$  instead of  $d\vec{r}$  and/or  $d\vec{s}$  and call *binary differential*  $d_B$ . The self-construing process of *sPS* for itself is an *Act* connected to  $\vec{r} = (iws)\vec{e}_{iws} \oplus (ows)\vec{e}_{ows}$  in the *TT domain topology* of *sPS*, say [TTsPS]. The *iws* and *ows* are the *states for inwards and outwards Acts* of *sPS*, respectively. The  $\vec{e}_{iws}$  and  $\vec{e}_{ows}$  are the unit vectors directing the *iws/ows Acts* of *sPS* in [TTsPS].

### 3 Formations of Elementary Particles

The principle below relates the gradation and degradation processes between distinct states of  $P_p$ s between NS and  $T_hS$ . Let  $Y_e$  and  $V_e$  be TUs in NS and  $T_hS$ , respectively.

**Principle 2 (The most primitive principle of degradation and/or gradation processes):** The  $V_e$  becomes a  $P_p$  with a pushing effect of the  $Y_e$  to pass itself outwards by itself. The  $V_e$  pulls the  $Y_e$  because of asking to return to its original state through the  $p\backslash p$  effect process.

The most primitive object in the  $P_p$  of  $V_e$  appears and then disappears due to the degradation into the  $P_p$  of  $Y_e$  in microcosmic MR. Sequential gradation and degradation processes may catch other  $V_e'$  graded from another  $Y_e'$ . The  $V_e$  pushes  $V_e'$  and then  $V_e'$  pushes  $V_e$  as an appearance of push\pull between  $Y_e$  and  $V_e$  from  $P_p$ s. The gradations of  $V_e''$ ,  $V_e'''$ , and etc., are increased the effect of pulling among members of  $V_e$  totally; therefore, degradation of  $V_e$ 's become very rare because  $Y_e \equiv Y_e' \equiv Y_e''$ , always. If the quantity of  $V_e$ 's becomes increasing up to infinity then  $V_e$ 's cannot be degraded into  $P_p$ s of  $Y_e$ 's' domain and  $Y_e$ 's cannot be graded into  $P_p$ s of  $V_e$ 's' domain any more. This condition removes the disappearance the  $V_e$ 's and generation of  $V_e$ 's from  $Y_e$ 's after all. If there are two collections of  $V_e$ 's, only, close to each other then they will appear as pulling each other because of both  $V_e$  and  $V_e'$  pull  $Y_e$ . There are a single pushing effect but a pair of pulling effects in this case in  $P_p$ s of  $Y_e$ 's' domain. This situation generates isolated two  $V_e$ 's in  $P_p$ s of  $V_e$ 's' domain and the effect between them changes to pulling effect because they will remember and call their original state in their history. We denote the result of  $E^{p\backslash p}$  as  $F^{p\backslash p}$  and call forcing force. The residue of tendency to return into  $P_p$ s of  $Y_e$ 's' domain is construed as gravity.

## 4 The Design of Gravity Topologies

A point itself in a topological space, TS is a complete space at its inside. This complete space is schemed in two forms: i) structured with a topology and/or ii) unstructured topologically, this means any topology is not formed in this space yet. The interface point, PI of two neighbor point spaces is an imaginary point. If we separate two neighbor point spaces  $PS_0$  and  $PS_1$  from each other, then this interface point is vanished or cancelled or removed from  $P_s$ . The PI in here is something like the *pseudo-germ of the point* in a Riemannian geometry. An isolated Single Point is a space by itself. We call **Point Space, sPS** this single point either it is isolated, and/or it is not isolated from the other single points [1]. There is infinite amount of **principal directions** for any sPS. Our perceptions can detect only three of them but a fourth of them is derived from three of them with evaluations and measured by devices fabricated according to the algorithm of these evaluations. The specific coefficient in these evaluations is known as time and it makes our understanding of  $P_{p,s}$  easy more than models excepting the concept of time; therefore, adding principal dimensions more than all three spatial directions are dimensions imaginarily embedded into our model for construing the events, but do not come from the true  $P_p$ . This is a half-to-half proof of the availability of gradation and degradation of  $T_{hS}$  of  $V_e$  from entities of  $Y_e$  by a construing algorithm. This algorithm designs Gravity Topologies, GTs. The pseudo-coordinate of time is removed by the use of Result 1 in §2 and time energy in §6.

*Result 2:* (a) There are sPSs more than one in a  $T_{hS}$ , always. (b) There are more than one alternative PS,  $P_{AS}$  in-to-in an  $P_{AS}$ , always.

If an  $P_{AS}$  is degenerated, then the new PSs occur to make compact and preserving the PSs on  $P_{AS}$ s structures [1]-[3]. If a PS is degenerated, then new  $P_{AS}$ s occur to make compacting and preserving the  $P_{AS}$  to hold the PSs as existed for both  $V_e$  domain and/or  $Y_e$  domain. The degeneration of both  $P_{AS}$  and/or PS involve accompaniment both  $P_{AS}$ s and/or PSs. While a PS builds a  $T_{hS}$  there is not any condition restricting and/or preventing the penetration of PS and/or  $P_{AS}$  in each other. The reason of this situation comes from they are not different members from each other since any topology on both PS and  $P_{AS}$  is not designed yet. Building process in there goes together a topology that the occurrence of the process sketches its mesh structure. A control mechanism begins to work when the process of building  $T_{hS}$  finishes. PSs cannot penetrate in  $P_{AS}$ s after the control conditions are processed at near environ of PS but if an  $P_{AS}$  succeeds to penetrate in a PS it pulls other  $P_{AS}$ s in PS to build new PSs, this creates  $T_{hS}$  in the PS.

**Definition 1 (The Purest Dust):** We call *purest dust, pD* the 1<sup>st</sup>  $T_{hS}$  coming into being at the earliest formation stage of  $T_{hS}$  from NS. *The purest dust, tPD* is the 1<sup>st</sup>

initial  $T_h$  iff there exists available one. The collections of pDs are **Pure Dusts Family, pDF**.

If the first  $T_h$  that is de-generated from a sPS with Topological Perturbations, TP by itself, then the deformations in sPS continue until a topology is performed that is controlled by the *community* of first  $T_{hS}$ .  $T_{hS}$  create themselves from NS as ensuring the total MR of NS stays the same at early stages of gravity in  $T_{hS}$ . These most primitive  $T_{hS}$  are entities of **Pure Dusts Family, pDF**. A  $T_h$  comes into a  $P_p$  like a sPS *incarcerated into a topological form*. The fundamental ingredients design the elementary particles in  $P_{p,s}$ . When a fundamental particle incarcerated in a  $T_{hS}$  it perturbs the topological structure of  $T_{hS}$  around itself in all.

*Example:* Not only the mass but a photon too deforms the topology of the space around itself according to  $E^{pp}$  activities. Act is to construe something like energy by NS. The independence of MR on the Acts obeys *the rule of TTs that brings principal pseudo-direction time as time energy,  $T^E$  into  $V_e$* .

The MR defines known constant  $h$  given by Planck and construes the invariance of speed of light,  $c$  in environ detectable by us as shown in equations (1)-(2):

$$h = E_{ph} \times (1/T_L), c = h \times (1/M_{ph}) \times (1/T_L). \quad (1)$$

$$\lim_{sPS \rightarrow ph} (E_{sPS}/M_{sPS}) = (T_L)^2 c = \text{constant}. \quad (2)$$

The E, M, and T are energy, momentum, and period and indices ph and L are photon and light, respectively. The reason of invariance is L'Hospital's rule applied in equation (2). The *purest dust, PD* or pDF forms the space around themselves that they are construed as appearance of pure illumination only by the outwards  $T_{hS}$ s; i.e., there is nothing except illumination, i.e., there is not any source of this Act. The words typed bold and italic are concepts defined into physics first here as explaining the formation steps of  $P_{p,s}$ . Equation (4) below generates the formation of **zero Acts, ie., like zero-energy, having non-zero TTs** and these TTs are inversible as being proved in (3)-(5):

$$\{TT \text{ of } \lim_{E, M \rightarrow 0} (E/M)\} = \{TT \text{ of } 1\}. \quad (3)$$

$$TT^{-1}\{1\} = 0. \quad (4)$$

$$TT\{-1\} \oplus TT\{0\} \oplus TT\{1\} = 1. \quad (5)$$

Entirely good construing  $P_p$  depends on evaluations of formations, de-formations, and re-formations in  $P_s$  with topological structures designed in inflective operators.

## 5 The Designing Elementary Particles

The de-formations at the sPSs of a NS create the  $T_{hS}$ s. These de-formations are self-designed with TTs. The independence of the MRs on the Acts is defined with suitable TTs. The PS activity is construable iff the TTs of both NS and PS are supplying equation (6) below because of section 5 in [1], where NB is **Null Ball**:

$$\{\text{TTs of NS} = \{\text{TTs of PS}\} \equiv \{\text{TTs of NB}\}. \quad (6)$$

The NB is an ingredient of NS and has MR zero. If a MR except zero is related to a sPS then we call **Point Ball** and illustrate with PB. Every NB has ingredients from two PBs at least so that equation (7) below is supplied, where MRs of  $PB^\eta$  and NB are equivalently identical:

$$\text{MR}(\text{NB}) = \text{MR}(PB^\tau) \oplus \text{MR}(PB^\sigma) \oplus \text{MR}(PB^\eta). \quad (7)$$

The ingredients  $PB^\tau$  and  $PB^\sigma$  meshes topology of  $T_hS$ ; hence, a  $P_p$  begins to form. We call **pins** these MRs. The  $PB^\tau$  and  $PB^\sigma$  has TTs with presentations in Dirac's  $\delta$  distribution and TTs defined in equations (6)-(7). We call **re-formation from de-formation** these TTs.

## 5.1 The Physical Presentations from TTs

The wave functions in circularly cylindrical inflective sPSs are given with circularly inflective series  $\text{seng}(x_c^2/p)$ ,  $s_c(x_c^2/p)$ , and  $T_1^{(\cdot)}S_p^{(\cdot)}$  [1]-[4]. TTs come from these solutions. The Act of sPS **expanding** the sprig to  $PB^\eta$ ,  $PB^\tau$  and  $PB^\sigma$  meshing topology of  $T_hS$  is worked in inflective space. We call **inflective sphere** the form of sprig. The **inflective surface** is definition of continuous collections of inflective points. It is derived that PBs have forms of sub-structures of subatomic ingredients in  $P_p$ s. The pins are evaluatable by TTs of Legendre's Functions' decompositions [1]. Both occurrence and formation Acts obey **inversion of Act** scheme.

## 6 The Time Energy and Time Span

The measure of time span second has the definition of  $1s = 9192631770/\Delta\gamma_{CS}$  in atomic clock where  $\Delta\gamma_{CS}$  is cesium hyperfine frequency [5]. On other hand  $s = Wb/V$  in electromagnetically equivalence scheme, i.e., 1 second corresponds to the 1 unit of magnetic flux passing 1 unit of electrical potential difference; therefore, the  $t^s$  is construible as working on a flux dissipating a potential difference. The *iws* and *ows* Acts of sPS may be projected as a flux and construing process may be transferred to a potential scheme. The  $T^E$  gains physical realizability by doing above said projection and transferring. The *iws Act* and *ows Act* correspond to *state potential*,  $S^p$  but it must be emphasized that the *state potential* in here is not the *known potential states in atomic orbit* and there is not a resemblance between these two terms. The *potential* in  $S^p$  interprets the *construing process* in sPS Acts so it may be thought like *construing potential* or *construing ability*, more precisely. The *ability* is projectable to some kinds of energy, power, potential, etc. As a 1<sup>st</sup> step, let us begin with considering kinetic energy,  $E_k = (m/2)\vec{v} \cdot \vec{v}$  where  $m$  is mass,  $\vec{v}$  is velocity vector, and  $v \ll c$ , in classical mechanics applying the above said approach. We get below projection for temporal speed variation  $dt^s$  by using  $\vec{v} = \partial\vec{r}/\partial t^s$  and  $(d_B t^s)^2 = (d_B x)^2 + (d_B y)^2 + (d_B z)^2$ :

$$(d_B t^s)^2 = \frac{m}{2E_k} (d_B s_\ell)^2. \quad (8)$$

The equation (8) gives the temporal acceleration below, where  $\partial/\partial s_\ell = \vec{e}_{s_\ell} \cdot \text{grad}_{s_\ell}$  and  $s_\ell$  is iws and/or ows:

$$\frac{\partial^2}{\partial (t^s)^2} = \frac{2E_k}{m} \frac{\partial^2}{\partial (s_\ell)^2}. \quad (9)$$

**Result 3:** (i) The  $t^s$  corresponds to a distribution with the density of mass per energy in unit spatial displacement. (ii) The *time energy*  $T^E$  corresponds to a mass distribution in an energy packet with the density of  $(2E_k/m)^{-1/2}$  at a spatial displacement process.

If we place (9) in D'Alembert operator,  $\Delta - \partial^2/\partial (ct^s)^2$  then we get equations below for generation processes of particle and/or photon in a wave packet from a sPS in nonrelativistic case, respectively, where  $\Delta_B$  is Laplace's operator written with  $d_B$  and  $\Psi$  is an eigenfunction:

$$\Delta_B \Psi - \left(\frac{v}{c}\right)^2 \frac{\partial^2 \Psi}{\partial (s_\ell)^2} = 0. \quad (10)$$

$$\Delta_B \Psi - \frac{\partial^2 \Psi}{\partial (s_\ell)^2} = 0. \quad (11)$$

The solutions of (10)-(11) in inflective spaces are worked.

## 7 Conclusions

The  $P_p$ s for elementary particles, gravity, and QED are built by using TPs with an event and process independent approach. The  $P_p$ s given with wave equation are derived from TPs. The invariance mechanisms are proven with TTs. The reason of gravity is explained. The TPs building elementary particle, gravity, and electromagnetism from completely NS are given with single TT and unique  $P_p$ .

## References

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