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A Quantum Ground Operator

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Abstract
The ground operator is the operator that underlies every action of a field and that preserves the energy state of a system, maintaining the law of conservation of energy of the dynamical system given in the Lagrangian and giving it a direction in space-time. Said operator will be a fundamental part in the system transformations in field theory and to define the field intentionality. An immediate application is in nanotechnology.

Keywords: Action Integral, Energy States, Field Intentionality, Intention Integral, Lagrangian, Operator of Spatial Correlation, Phase Space, Quantum Ground Operator, Symplectic Bundles, Symplectic Realities

1. Introduction

We consider $\mathbb{M} \cong \mathbb{R}^3 \times I_t$, the space-time of certain particles $x(t)$, in movement, and let L, the Lagrangian that explains certain law of movement that governs the movement of the set of particles in $\mathbb{M}$, of such way that the energy conservation law is applied for the total action of each one of its particles [1]. The movement of all the particles of the space $\mathbb{M}$, is given geometrically for its tangent vector bundle $T\mathbb{M}$.Then the action due to L, on $\mathbb{M}$, is defined as:

$$\Im_L : T\mathbb{M} \to \mathbb{R}, \qquad (1)$$

with rule of correspondence

$$\Im_L\big(x(t)\big) = FluxL\big(x(t)\big)x(t), \quad (2)$$

and whose energy law of movement is

$$E = \Im - L, \quad (3)$$

where we have the Lagrangian $L \in C^\infty(T\mathbb{M}, \mathbb{R})$, defined as [1]

$$L(x(t), \dot{x}(t), t) = K(x(t), \dot{x}(t), t) - V(x(t), \dot{x}(t), t), \quad (4)$$

If we want to calculate the action defined in (1) along a path $\Gamma = x(t)$, we have that the action is

$$\Im_L = \int_\Gamma L(x(t), \dot{x}(t), t)dt, \quad (5)$$

If this action involves an intention (is to say, is an intentional action) then the action is translated in all the possible field configurations, considering all the variations of the action along the fiber derivative defined by the Lagrangian L. Then we can define the operator that remains as the support of all these variations as the ground operator

$$O_c: T\mathbb{M} \to T\mathbb{M}^*, \quad (6)$$

with correspondence rule

$$\upsilon \mapsto O_c(\upsilon), \quad (7)$$

Then for any $w \in T\mathbb{M}$, we have

$$O_c(\upsilon)w = \frac{d}{dt} L(\upsilon + tw)\Big|_{t=0}, \quad (8)$$

Thus $O_c(\upsilon)w$, is the derivative of L, along the fiber in direction w. In the case of $\upsilon = x'(t)$, and $q = x(t) \in \mathbb{M}$, we have $L(q, \upsilon) = K - V = \frac{1}{2} < \upsilon, \upsilon > -V(q)$, [1]we can see that the 2-form can be re-wite as sesquilinear form $O_c(\upsilon)w =< O_c\upsilon, w >$, [2] so we recover that usual map $S^b: T\mathbb{M} \to T\mathbb{M}^*$, (with ^{b},Euclidean in $\mathbb{R}^3$) associated with the bilinear form $<,>$. Here is where the spin structure subjacent appears in the momentum of the particle $x(t)$.

Then we can resume the before with the following diagram:

$$\begin{array}{ccccc} & T\mathbb{M} \xrightarrow{O_c} T\mathbb{M}^* \xrightarrow{O_c(\upsilon)} \Omega^2(\mathbb{M}) & \\ \mathfrak{I}\downarrow \quad \nwarrow & \downarrow \pi \quad \searrow\cong & \downarrow O_c(\upsilon)w, \quad (9) \\ & \mathbb{R} \xrightarrow{\Gamma} T\mathbb{M} \xrightarrow{L} \Omega^1(\mathbb{M}) & \end{array}$$

As we can see $T\mathbb{M}^*$, [3]carries a canonical symplectic form, which we can call ω. Then considering the ground operator O_c, we obtain a closed 2-form ω_L, on $T\mathbb{M}$, such that:

$$\omega_L = (O_c)^*\omega, \quad (10)$$

If we consider the local coordinates $(\phi_i, \partial_\mu \phi_i)$, to ω_L, modeling the space-time $\mathbb{M}$, through $\mathcal{H}$ −spaces, we have that (10) can be re-writtene it as:

$$\omega_L = \frac{\partial^2 L}{\partial \phi^i \partial \partial_\mu \phi^j} d\phi^i \wedge d\phi^j + \frac{\partial^2 L}{\partial \phi^i \partial \partial_\mu \phi^j} d\phi^i \wedge d\partial_\mu \phi^j, \quad (11)$$

Then the variation of the action from the operator $O_c = d\mathfrak{I}(\phi) = L(\phi,\ \partial_\mu \phi) d\phi$, is translated in the differential

$$d\mathfrak{I}_L(\phi)h = \int_\Gamma \left(\frac{\partial L}{\partial \phi} - \frac{d}{dt} \frac{\partial L}{\partial \dot{\phi}} \right) (x(t),\ \dot{x}(t), t) dt, \quad (12)$$

where $h(t): \Gamma \to T\mathbb{M}$, and is such that $\tau_{\mathbb{M}} \circ h = \Gamma$, and $h(x_1) = h(x_2) = 0$, to extreme points of Γ, $x(s_1) = q$, and $x(s_2) = p$. The total differential (12) is the symplectic form ω_L, that constructs the application of the field intention expanding $2n$ −coordinates in Hamilton spaces [1,2]. The space $\mathfrak{X}(\Omega(\Gamma))$, is the space of differentiable vector fields on $\Omega(\Gamma)$, and $\Omega(\Gamma)$, is the manifold of trajectories (space-time of curves) that satisfies the variation principle given by the Lagrange equation that expresses the force $F(x_j(t))$ $(j = 1, 2, \dots, n)$ generated by a field. The operator O_c, is an operator that involves the Lagrangian but directing this in one specific fiber (direction) is to say, prefixing that Lagrangian action in one direction. Remember that the operator can be saw as the 2-form $O_c: T\mathbb{M} \to T\mathbb{M}^* \to \Omega^2(\mathbb{M})$, whose correspondence rule is $\upsilon \mapsto O_c(\upsilon) \mapsto O_c(\upsilon)w$, where $w = L(\upsilon)$, with L, the classic Lagrangian. The operator O_c, has values in $\Omega^1(\mathbb{M})$, as values $L(\upsilon)$. This defines the quantum ground that gives "state support" to any quantum transformation. If we locally restrict to O_c, is to say, on the tangent space $T_x\mathbb{M} \times T_x\mathbb{M}, \forall\ x \in \mathbb{M}\ (\cong \Omega(\Gamma))$, we have that:

$$O_c: T_x\mathbb{M} \times T_x\mathbb{M}\ (\cong_{locally} T\mathbb{M}) \to T_x\mathbb{M}^*, \quad (13)$$

with rule of correspondence

$$(\upsilon, w) \mapsto O_c(\upsilon)w, \quad (14)$$

In the forms language,the ground operator comes given by the map $\omega_L: T\mathbb{M} \to T\mathbb{M}^*$, with rule of correspondence given by (10). The quantum ground shape a continuous flux of energy with an intention, involving a smooth map π, (defined in the example 1). Then the conscience quantum ground operator is related with the action as is established in the diagram (9), in the first cycle of the diagram

Proposition. 1. 1. The diagram (9) is commutative.

Proof. By construction and nature of the operator O_c, considering further that the diagonals in the diagram cycles that are the identity and an isomorphism.

2. Ground Operator Basic Properties.

We consider the phase space as the space of points

$$\mathcal{H} = \{\phi(x) \in [m] \mid [m] \subset T\mathbb{M}^*\}^4, \quad (15)$$

Points of phase space are called states of the particle system acting in the cotangent space of $\mathbb{M}$ Thus, to give the state of a system, one must specify their configuration and momentum

Here is the high usefül of the quantum ground eperater, since in quantum mechanics, the Hamiltonian operator, often simply called the Hamiltonian, is a central concept. It represents the total energy, of a quantum system and is crucial fer understanding its behavior. While the Hamiltonian is typically defined based en the system's classical energy expression, there are scenarios where a ground state operator can be useful in defining or simplifying the Hamiltonian. Of fact placing a slab in a floor can be analogous in the quantum context to placing an energy state in a hole of a Hamiltonian manifold. In more research could be very useful this quantum operator to stabilize and minimize the snergy in a quantum system. In a quantum context. the analogy of placing a slab en a fleor to stabilize it can be compared to stabilizing an energy state in a Hamiltonian potential or manifold. In both cases, a stable. lowest-energy. configuration is sought. In the quantum context. this refers to an eigenstate of the Hamiltonian which represents a stationary state of the system.

Then $\forall\, p_1, p_2, , \ldots, p_n \in \mathbb{M}$, are n −particles with finite arragement of their states $\phi_1, \phi_2, \ldots, \phi_n \in \mathcal{H}$, given by the structure $C_*(\mathbb{M}) = C_{n,m}$ (configuration space[5] in $\mathbb{M}$), which consider configurations from Γ, until to the particles of the material reality in $\mathbb{M}$.

Likewise, let $\pi: T^*\mathbb{M} \to \mathbb{M}$, be (like given by the commutative diagram (9)) and let be

$$\gamma: \mathbb{R} \to TC_{n,m}, \quad (16)$$

a curve followed by a particle p, such that $\pi \circ \gamma: \mathbb{R} \to \mathbb{M}$. Then (16) describes the curve in the configuration space, which also describes the sequence of configuration through which the particle system passes to different strata of co-dimension one. Every strata corresponds to a phase space of m, particles that are moved by the curve γ, and directed from their m, states $d\phi(x)$, by π, to n, particles p. The image of the ground operator on the space-time $\mathbb{M}$, includes all the possible configuration spaces. Then the quantum ground operator has the following functional properties. Let $x, x' \in \Omega(\Gamma) \subseteq \mathbb{M}$, two particles in the space-time moving through trajectories in $TC_{n,m}$, with energy states $\phi, \phi' \in \mathcal{H}$. We consider the correlation operator $\mathfrak{D}(x - x')$,[6] when these particles are correlationed:

$$\mathfrak{D}(x - x') = \lim_{T\to\infty} \frac{1}{T} \int_0^{T-\tau} x(t+\tau)x'(t)dt, \quad (17)$$

Also we consider the Dirac function

$$\delta(t) = \begin{cases} \infty, t = 0 \\ 0, t \neq 0 \end{cases}, \quad (18)$$

with their fundamental properties. Then are true the following properties of the operator O_c:

i). $\mathfrak{D}(x - x')\phi(x) = \delta(x - x')\phi(x), \forall\, x, x' \in \mathbb{M}$: ;[7]

ii). $O_c(x)\phi\big(x'(t)\big) = \mathfrak{D}(x - x'), \forall\, x, x' \in \mathbb{M}$, and $t \leq s$,

iii). $\int_{\mathcal{H}} O_c\big(\phi(t)\big)d\phi = \mathfrak{J}_{O_c}$; $\frac{d\mathfrak{J}_{O_c}(\phi(t))}{d\phi} = O_c\big(s(t)\big)$, in the unlimited space,

iv). $O_c = \delta(t - t')$, if and only if $\frac{\delta x(t)}{\delta x(t')} = \delta(t - t'), \forall\, t \leq s$, then $F\big(x(t)\big) = x(t)$, v). $\mathfrak{D}^{-1}(x-x')O_C(x(t)) = -\Delta_F(x-x')\delta(x-x'), \forall\, x.x' \in \mathbb{M}$, and $t \leq s$,

vi). $\int_{\mathcal{H}} O_c\left(\phi(t)\right)d\phi = \int_{\Omega} \mathfrak{D}(x-x')x(t)d\left(x(t)\right)$.

All properties are demonstrated in [2], the reader can to find all details in this reference.

Also we have as consequence of i), ii), and vi) that:

$$\int_{\mathcal{H}} \boldsymbol{O}_c(x,x',t)\phi(x)d\left(x(t)\right) = \int_{\mathbb{M}} \phi(x)\delta(x-x')dx(t) = \phi(x'), \quad (19)$$

There are more non-elemental properties or non-basic related with the evolution operator in quantum mechanics and relations with Laplacians and other operators. Also some functions, as the weight function. The citation let see these properties. Considering (9) and some functional analysis facts, we can consider the following lemma [3-5].

Lemma 2. 1. Let $\mathbb{M} = M \times I_t$, the unlimited space of the space-time. A particle $x(t)$, that is focalized by an field given for the weight function $w(t,s)$, comes given for

$$x(s) = \int_{\mathbb{M}} \phi(x')x(t)dx(t) = \int_{-\infty}^{\infty} \delta(t-s)x(t)dt, \quad (20)$$

Then to time $t = s$, begin the perturbation.

Proof. We consider the function $w(t,s)$, like a Green function on the interval $t \geq s$. Given that this function is focalized for a field which is feeding of the proper energy of the deep quantum operator O_c, (*since the energy of the field affects the particle energy*), then $\boldsymbol{O}_c\left(x(t),x'(t)\right)x(t) = \nabla^2 w(t,s) = \delta(t-s)$,. By the nature of Green function of $w(t,s)$, we have.

$$\int_{\mathbf{M}} \phi(x')x(t)dx(t)$$

$$= \int_{I_t}\left[\int_M \phi(x)\delta(x-x')dx(t)\right]x(t)\mu_t$$

$$= \int_{-\infty}^{+\infty} O_c\left(x(t)\right)x(t)\mu_t = \int_{-\infty}^{+\infty} \nabla w(s,t)x(t)\mu_t = \int_{-\infty}^{+\infty} \delta(t-s)\,x(t)dt, \quad (21)$$

Then all particle $x(t)$, in the space-time $M \times I_t$, affected by this regime to the time $t = s$, and after, take the form

$$\int_{-\infty}^{s} O_c\left(x(t)\right)x(t)dt + \int_{s}^{+\infty} O_c\left(x(t)\right)x(t)dt = 0 + \int_{s}^{+\infty} \delta(t-s)x(t)dt, \quad (22)$$

where the first integral is equal to cero, because not exist perturbation before of s, (the evolution happens after of the time $t \geq s$, [8]. But this evolution is anomalous, since to all $t < s$, includes (had an existing energy by the field) a captive energy not assimilated to $t = s$, (this energy is summed to the given producing an energy perturbation or energy bundle)) [6,7].

Then

$$\int_{t}^{+\infty} O_c\left(x(t)\right)x(t)dt = \int_{t}^{+\infty} \delta(t-s)x(t)dt, \quad (23)$$

3. Intentionality

We consider the fact that all field X, that acts on the space, has a forcé defined by its action $\mathfrak{I}$, along the geodesic γ_t, and a determined direction given by its tangent bundle $T\mathfrak{X}(\Omega(\Gamma))$, is to say, the field provides of direction to every point ϕ_i,, where the field X, comes given as

$$X = \sum_i \phi^i \frac{\partial}{\partial \phi^i}\Big|_{(x^i,\phi^i)}, \quad (24)$$

$\forall\, \phi_1, \phi_2, \phi_3, \ldots \in \mathfrak{X}^1$, on every particle $p_i = x_i(t), (i = 1, 2, 3, \ldots)$.

Then a direct intention is the mapping or connection

$$\nabla^{\mathfrak{I}}: T\Omega(\Gamma) \to T(\Omega(\Gamma)), (\cong T^*\mathbb{M}), \quad (25)$$

with correspondence rule

$$(x^i, \partial_t x^i) \mapsto (\phi^i, \partial_\mu \phi^i), \quad (26)$$

where each ith-spinor field produces ϕ^i, where the action $\mathfrak{I}$, of the field X, infiltrates and transmits from particle to particle in the whole space $\Omega(\Gamma)$, its intention, using a configuration given by its operator O_c, along all trajectories of $\Omega(\Gamma)$. This configuration is defined as:

$$O_c = L(\phi^i,\ \partial_\mu \phi^i) d\phi^i, \quad (27)$$

for n, particles with m, states.

Extending these intentions to the whole space $\Omega(\Gamma) \subset \mathbb{M}$, on all the elections of possible paths who statistical weight corresponds to the determined by the intention of the field, and realizing the integration in paths for an infinity of particles/fields in $T(\Omega(\Gamma))$, we have the total intention:

$$\mathcal{I}\left(\phi^i(x)\right) = \int_{T(\Omega(\Gamma))} \omega(\phi(x)) =$$

$$\lim_{N\to\infty_{\delta t \to 0}} \frac{1}{B} \int_{-\infty}^{\infty} \frac{d\phi^1}{B} \cdots \int_{-\infty}^{\infty} \frac{d\phi^n}{B} \cdots = \prod_{i=1}^{\infty} \int_{-\infty}^{\infty} e^{i\mathfrak{I}[\phi^i, \partial_\mu \phi^i]}\, d\phi^i(x(t)), \quad (28)$$

where $B = \left[\frac{m}{2\pi h i \delta t}\right]^{1/2}$, is the amplitude of its propagator and in the second integral of (28) we have expressed the Feynman integral using the form of volume $\omega(\phi(x))$, of the space of all the paths that are added in $T(\Omega(\Gamma))$, to obtain the real path of a particle (where we have chosen quantized trajectories, is to say $\int d(\phi(x))$). We consider the space-time $\mathbb{M}$, with the space $\mathbb{R}^3 \times I_t$, which is the macroscopic component of the space-time, and we call the space $\mathbb{F}$, its microscopic component of the space-time of ratio $10^{-33} cm$, (lenght of a string [2, 8-10]. Previously descrived the quantum component of the space-time given by the space $\mathcal{M}$, and the virtual space given by the space $\mathcal{N}$, (both connected), both spaces are connected by a possibilities cause space generated by the photons and material particles interacting in the material interphases C, with permanent energy that born of the bosonic field in the virtual space $\mathcal{N}$, (where are all virtual particles as Higgs boson, and more), and the material particles recombining their energy states and these are became in waves on $\mathbb{R}^3 \times I_t$, on any path of Feynman. Likewise, if $\mathcal{M} \cong \mathbb{C}^4$, [9] then $\mathbb{M} = \mathcal{M} \times \mathfrak{Q}_x$,is the complete universe (included the supersymmetries [2,10]. However what about on our quantum universe with respect to real universe (included the material part given by the atoms)?. The answer is the same, under this perspective we have an Universo of ten dimensions and $\mathbb{M} = \mathcal{M} \times \mathcal{N}$, where quantum representation of the objects (particles or bodies) $x(t)$, is the quantum space-time $\mathcal{M} = \mathbb{R}^3 \times I_t$, (which is the cosmogonist perception or Einstein perception) then the cosmo-vision of the virtual particles is $\mathbb{C}^2, \times \mathfrak{Q}_x$,[1,4]. Then the execution operator $\mathcal{I}$, given by (27) proceeds to connect virtual particles through the paths, which have path integrals on double fibration, establishing the material-quantum-virtual connection given in [1] and expressed by the operator (see the figure 1)

$$\mathcal{I}\left(\mathfrak{I}_{\mathfrak{Q}_x}(x(t))\right) = \oint_{\Gamma} O_c(\theta(\pi^{-1}(\sigma(\rho^{-1}))))\,\mu_s, \quad (29)$$

Theorem 3. 1 (F. Bulnes). The double fibration, establishing the material-quantum-virtual connection on $\mathbb{M} = \mathcal{M} \times \mathfrak{Q}_x$, is the intention operator (28).

Proof. The intention $\mathcal{I}$, is action and direction, as was mentioned before. The directions comes given by $O_c\left(\theta\left(\pi^{-1}(\sigma(\rho^{-1}))\right)\right)$, which by the ground operator definition given in the section 1, is $L\left(\theta\left(\pi^{-1}(\sigma(\rho^{-1}))\right)\right)\omega$. By definition of action (from the operator O_c) is had that:

$$\mathfrak{I}_{\mathfrak{Q}_x}(x(t)) = \int_{\mathbb{M}} L\left(\theta\left(\pi^{-1}(\sigma(\rho^{-1}))\right)\right)\omega, \quad (30)$$

Considering that $\mathbb{M} = \mathcal{M} \times \mathfrak{Q}_x$, then the before integral can be written using the double integral rule on the rectangle $[\mathcal{NLCC}]$ through of the quantum zone defined by the space $\mathcal{M}$ (see the figure 1A)

$$\mathcal{I}(\mathfrak{I}_{\mathfrak{Q}_x}(x(t))) = \int_{\mathfrak{Q}_x}\left\{\int_{\mathbb{M}} L\left(\theta\left(\pi^{-1}(\sigma(\rho^{-1}))\right)\right)\omega\right\} dq(s), \quad (31)$$

However, the sky (the reality) $\mathfrak{Q}_x$, is the manifold (see the figure 1B)

$$\mathfrak{Q}_x = \{x \in \mathbb{R}^3 \times I_t \mid x = q(t)\}, \quad (32)$$

Then the integral takes from the double fibration the aspect

$$\mathcal{I}(\mathfrak{I}_{\mathfrak{Q}_x}(x(t))) = \int_{\Gamma}(\int_{\mathbb{R}^3}\{\int_{\mathcal{M}} L(\theta\left(\pi^{-1}(\sigma(\rho^{-1}))\right))\omega\} d(q(s))\mu_s, \quad (33)$$

However, the integral (31) and (33) are the same. Then the intention along Γ, that directs the action can be written in general as

$$\mathcal{I}_{O_c}(q(t)) = \int_{X(\mathbb{M})} O_c(q(s))\, d(q(s)), \quad (34)$$

being this an evaluation of the action. Then finally

$$\mathcal{I}\left(\mathfrak{I}_{O_c}(q(t))\right) = \int_{\Gamma}\left[L\left(\theta\left(\pi^{-1}(\sigma(\rho^{-1}))\right)\right)\omega\right]\mu_\Gamma$$

$$= \int_{\Gamma}\left[O_c\left(\theta\left(\pi^{-1}(\sigma(\rho^{-1}))\right)\right)\right]\mu_\Gamma$$

Now we can define the space of this double fibration of quantum processing (triangle $\mathcal{NLM}$, [10]figure 1A) as:

$$\mathcal{L} = \left\{O_c(\phi, \partial_\mu\phi, x(t), t) \in C^2(\mathbb{R}^3 \times I_t) \;\middle|\; \frac{\partial^2}{\partial t^2} - \nabla^2\left(O_c(\phi, \partial_\mu\phi, x(t), t)\right) = 0\right\}, \quad (35)$$

with the quatum field states ϕ, that are in the quantum zone $\mathcal{M}$. The space $\mathcal{N}$, is the ambi-space (set of connection and field) defined by:

$$\mathcal{N} = \left\{(X, \nabla) \in \mathcal{M} \times \mathcal{L} \;\middle|\; \nabla^{xy}_{x'y'}\Psi + \Phi(X) = 0\right\}, \quad (36)$$

where ∇, is the connection of virtual field X, with the quantum field Y, and Ψ, is the field whose action is always present to create perceptions in the quantum zone connected with Φ, (2-form tha defines the operator O_c) [2,11]. The double fibration conforms the interrelation between $\mathcal{M}$, and $\mathcal{N}$ $\forall\, x(t) \in \mathcal{M}$, and give beginning to a complex submanifold (that represents the spaces where are the quantum hologram) that includes all these quantum images given by quantum holograms, why? Because these complex submanifolds, considering the causal structure given in the space-time by the light cones, of all trajectories that follows a particle in the space-time can be written using the double fibration given in the footnote 10, as

$$\Theta_x = \theta(\pi^{-1}(x)), \quad (37)$$

that are points of $\mathcal{N}$, such that $\Theta_x = \mathbb{P}^1 \times \mathbb{P}^1$, which by space-time properties to quantum level, represents the space of all light rays that transit through x, conforming a hypersurface (projective surface) that is a light surface. This surface is called the *sky* of x (see figure 1 B)) [12]. A *sky* in this context represents the set of light rays through x, that comes of the virtual field (bosons). Then the integral

$$\mathcal{I}\left(\mathfrak{I}_{Q_x}(x(t))\right) = \oint_{\Gamma} O_c\left(\theta\left(\pi^{-1}(\sigma(\rho^{-1}))\right)\right)\mu_s, \quad (38)$$

that is demonstrated in (30)-(34) is the path integral that connects virtual particles in the whole fibration being a line integral definig the feedback connection, always with the space $\{\, x(t) \in \mathcal{M} \mid \Theta_x \subset \mathcal{N} \,\}$, to the permanent field actions. Then the reality state is the obtained through the integral of perception (38), considering the fibre of the corresponding reality in the argument of the operator O_c, of the integrating from (38). All trajectories followed by the photon that has follow the arco-connected components of the global cellular structure, that is a boson cellular structure given by

$$C \subset \mathcal{M} \subset \mathcal{N}, \quad (39)$$

and is the integral for all complexes in every directions. Now lack demonstrate the "physical content" of the field from $\mathcal{N}$, passing for $\mathcal{M}$ until the material reality.

Proposition 3. 1. All transformation of a reality includes bosons of the $\mathcal{N}$ −field.

Proof. To demonstrate this, is necessary to prove that the cohomological group on $\mathcal{N}$, is the same cohomological group modulus a seated class in $\mathcal{N}$, of the material reality and the corresponding for the quantum reality. For it, result useful the stacks concept in physics and geometry, where is possible to *tack bosons* to construct superior physical spaces using bosons branes (see corollary of) [13]. On the other hand, any open numerable covering of bosons in $\mathcal{N}$, contains a finite subcovering in $\mathcal{M}$, which is guaranteed by the set of skys $\mathfrak{Q}_x$. But a sky in this context represents the set of light rays through x, (bosons) that comes of the virtual field. Then finally the theorem 3. 1, stays demonstrated.

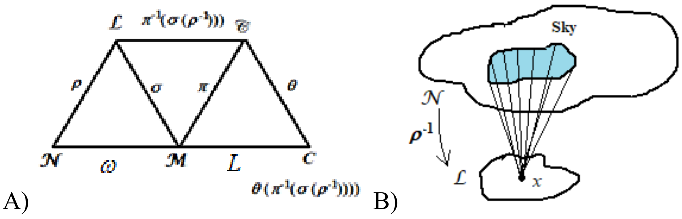


Figure 1: We consider to $\mathcal{I}$, as the intention to transform a space $\mathcal{M}$. '

The above-mentioned intention is shaped by the diagram of bi-double fibration between the levels material,

quantum and virtual reality. In a plane of reality of the space $\mathcal{N}$, we can establish a commutative diagram similar to the given in the first box of (9), considering fibers of the topological space sky $\mathfrak{Q}_x$, that at all times do that the integral submanifolds in $\mathbb{L}$, (through double fibration of $\mathcal{L}$) connect both realities determined in $\mathcal{N}$, and $\mathcal{M}$, along these submanifolds

$$\begin{array}{ccc} \mathbb{L} & \xrightarrow{[\phi]} & \mathbb{P}T\mathcal{M}^* \\ \Psi \uparrow & & \uparrow g, \\ T\mathcal{M}^* & \xrightarrow{\xi} & \mathcal{M} \end{array} \quad (40)$$

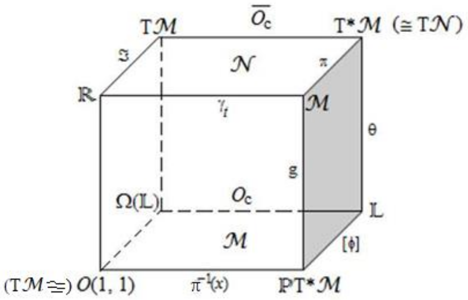
where $\mathbb{L} = \{\Psi \mid \Psi\left(\theta(\pi^{-1}(\phi))\right) = 0\}$, with homogeneous bundle

$$\mathbb{L} \to \mathbb{P}T\mathcal{M}^*|_{\pi^{-1}(\phi)} = \mathrm{O}(1,1), \quad (41)$$

where $\mathrm{O}(1,1)$, is a homogeneous bundle of lines due to that the sky $\mathfrak{Q}_x = \mathbb{P}^1 \times \mathbb{P}^1$; since the normal bundle $N \to \mathfrak{Q}_x$, in each sky $\mathfrak{Q}_x$, is isomorphic to the jet $J^1\mathrm{O}(1,1)$. In particular is satisfied the following exact sequence

$$0 \to \Omega^1 \otimes \mathrm{O}(1,1) \to N \to \mathrm{O}(1,1) \to 0, \quad (42)$$

which allows to have a composition of the reality in $\mathcal{M}$, though fields that come from $\mathcal{N}$. Then the quantum-virtual composition of both realities is given by the moduli space:



(43)

Def. 3. 1. A hyper-reality is a quantum image of the reality.

A hyper-reality follows being a reality but to a level deeper. The prefix "hyper", defines that this reality exists in a microscopic zone that requires a space of more dimensions to the transit of its objects and its transformations.

4. Conclusions

One of the most important applications of the ground operator is in nanotechnology, where the intention of the field over matter is power over matter (the power comes given by (28)), where this must be understood as the ability to transform matter through organized transformations that are predetermined by an field intention. Likewise, we can give the following principle that define the nanotechnology.

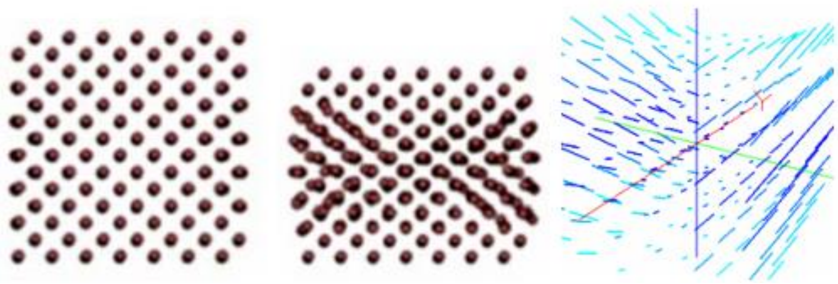


Figure 2: Examples on organization of nano matter particles or quantum particles (all stock of photons) realized in the nanotechnology.

Principle 4. 1. The nanotechnology is a science of the organization of nano-components of the matter, space or energy units with quantum intention.

For example, The atomic visualization of every nano-component is taken in implicit way by the intention. If $p_1, p_2 \ldots, p_n \in \mathbb{M}$, are n −particles with an finite arragement of the energy states $a_1, a_2, \ldots, a_m \in \mathbb{A}_{NANO}$, given by the structure $C_\bullet(\mathbb{M}) = C_{n,m}$ (configuration space on $\mathbb{M}$), which considers configurations from $\mathbb{A}_{NANO}$, until the material particles of the reality in $\mathbb{M}$. The intention from $\mathbb{A}_{NANO}$, generates the organized transforms in the space $\mathbb{M}$. Then we can define that the nano-space is the zone where there initiates an organized transformation of nano-type. All properties and definitions on the operator O_c, can be generalized to the n −dimensional case. Also its intention $\mathcal{I}$. Remember that the operator O_c, is who gives the "ground" to any field action, is to say, underlies every action of a field and that preserves the energy state of a system, maintaining the law of conservation of energy of the dynamical system given in the Lagrangian and giving it a direction in space-time. If $O_c = cte$, then this means that its value does not change at any point in space or spacetime considered. In physics, this could be interpreted as a tensor field that does not vary spatially or temporally, which could correspond to certain intrinsic properties of the physical system in question, or to the absence of certain physical phenomena. This means in nanotechnology that no exists field that acts on the physical system. Then O_c, is "pure consciousness".

Technical Notation:

O_c −Quantum ground operator. In the context of the mind studies is a conscience operator.

$T\mathbb{M}$ −Tangent bundle of the space-time $\mathbb{M}$.

$\phi(x)$ − Quantum state of the particle x.

QFT-QuantumFieldtheory.

TFT-Topological Field Theory.

$\mathfrak{I}$ −Field action.

$\mathcal{I}$ − Intentionality. This is an execution integral of the quantum ground operator O_c.

$\mathbb{M}$ − Full space-time.

ϕ − Energy state or energy field state, that is to say, the case when the points are particles following the duality field/particle.

dO_c −Second differential of the field action. Of fact in terms of the classical action is the second differential $d^2\mathfrak{I}(\phi) = 0$.

$T\mathbb{M}^*$ − Cotangentvector bundleof the full space (space-time).

γ_t − Trajectory of a particle in space, manifold or space-time.

$p, q, x(t)$ −Particles.

$\mathfrak{D}(x - x')$ − Quantum functional operator defined as $\mathfrak{D}(x - x') = (\Box_x + m^2 - i\varepsilon)\delta^n(x - x')$, and such that for their inverse $\mathfrak{D}^{-1}(x - x')$, the following functional property is had:

$$\int_{\Omega(\Gamma)} \mathfrak{D}^{-1}(x - x')\mathfrak{D}(x - x')d^n x' = \delta^n(x - x').$$

q^i −ith-generalized coordinate of a particle or body in a movement study frame.

ω_L −Lagrangian differential form, which is a differential 2-form.

$\mathrm{O}(1,1)$ −Homogeneous bundle of lines, which also satisfies (41).

$\mathcal{M}$ − Quantum zone or quantum component of the space-time $\mathbb{M}$.

$\mathcal{H}$ −Phase space or space of energy states. This is a Hamiltonian manifold.

$L(\cdot, \cdot, t)$ − Langragian functional of energy. This represents the energy conservation law in a intrinsic way of a body, particle or body set moving in the space-time.

$[m]$ − Space of m, states ϕ, of energy.

$\mathbb{A}_{NANO}$ −Spin manifold. Its points are spins corresponding to Lagrangian submanifolds.

$\mathfrak{I}_{O_c}$ −Action due to a quantum ground operator.

$\mathbb{P}^1$ −Projective space of one dimensión.

$\mathcal{N}$ −Virtual component of the space-time $\mathbb{M}$. Said space contents bosons, of many spacies, even fermions too.

$\mathbb{L}$ −Space of integral submanifolds used to construct realities in $\mathcal{M}$, and $\mathcal{N}$.

$\otimes$ −Tensor product of modules.

$C^\infty(T\mathbb{M}, \mathbb{R})$ −Space of the differentiable functionals from $T\mathbb{M}$, to $\mathbb{R}$. In this case are Lagrangians.

$O_c(\phi)$ −Intention spilled in a quantum ground state.

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Footnotes

[1] The Lagrangian can be interpreted as a 1-form, particularly in the context of integrable systems. This perspective is useful for understanding the geometric structure underlying these systems and their integrability.
[2] The Lagrangian density (in field theory) or the Lagrangian (in particle mechanics) can be related to a 2-form on a certain phase space or jet space. In the context of physics and mathematics, "phase space" and "jet space" refer to distinct mathematical constructs used to describe different aspects of a system's state. Phase space is a space where each point represents a possible state of a physical system, typically defined by position and momentum coordinates. Jet space, on the other hand, is a mathematical concept related to the study of differential equations and maps, focusing on the derivatives of functions.
[3] In this context, $T\mathbb{M}^* \cong \Omega^1(\mathbb{M})$.

[4] The corresponding cotangent space to vector fields is:

[5] In Lagrangian mechanics, configuration space (C) and the Lagrangian (L) are intrinsically related. Configuration space is the set of all possible instantaneous positions of a system, while the Lagrangian is a function that describes the dynamics of the system in terms of its kinetic and potential energy, and is defined in configuration space.
[6] In quantum mechanics, the operator $\mathfrak{O}(x - x')$, typically represents a spatial correlation function or a correlation operator related to a physical quantity at two different spatial points, x, and x'. It describes how a physical property at one location influences or is related to the same property at another location.

[7] In the general sense the functional derivative

[8] Let $\widehat{U_0}(t, s)$, the operator of evolution [9], of a thought $x(t)$, in the space of transition of the levels of conscience of O_c, to all time $t \geq s$, whose operator to limit of s (*that is to say, coming to the process of understanding of a concept*, (boundary conditions of $\widehat{U_0}(t, s)$)), satisfies [8, 9]:

$$\lim_{t \to s^+} \widehat{U}_0(t, s) = 1.$$

[9] Indeed, is possible to suppose that a component of the universe is isomorphic to four-dimensional complex space $\mathbb{C}^4$. Specifically, the complex vector space $\mathbb{C}^2$, is isomorphic to the real vector space $\mathbb{R}^4$. This means that while they have different algebraic structures (one over complex numbers and the other over real numbers), they have the same dimensionality as vector spaces and can be mapped onto each other in a way that preserves their structure.
[10] The double fibration:

$$\begin{array}{ccc} & \mathcal{L} & \\ \pi \swarrow & & \searrow \theta \\ \mathcal{N} & & \boldsymbol{\mathcal{M}} \end{array}$$