Pointwise Gauge Field and Relativistic Structure

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Abstract
The quantization element concept of which infinite pointwise is mechanics element and space-time geometry possesses random “asymmetry and nonuniformity” and other factors is proposed; combination of gauge field and relativistic structure (circle logarithm) is proposed, which includes gravitational field, electromagnetic field, nuclear field, thermodynamic field and photon field to constitute pointwise quantum eleven-dimensional space and the first and second gauge invariance and build relativistic structure (circle logarithm), realizing “exact solution within [0-1/2-1] [0/1/2-1] under the topological variation rule without specific contents”. It is provided with a superiority of conciseness, self-consistency and zero error, and is widely applicable to physics, astronomy and mechanics fields.
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1. Introduction

In 1954, Yang Zhenning and R. L. Mills proposed the theory with positioned isospin invariance and directly extended it to other non-Abel gauge transformation group .which is called quantum gauge field[1].
In 1967-1968, S. Weinberg and A. Salam proposed that the corresponding gauge field quantum is a massless photon through vacuum spontaneous symmetry breaking mechanism (Higgs mechanism) that makes non-Abel gauge field obtain quality proposed by Higgs et al., which is called Weak Quantum Electronic Dynamics (QED).
In 1964, M. Gail-Man and G. Zwick established the invariant strong interaction theory under transformation of the SU(3) domain after proposing the image of hadron constituted by quark, and there are 8 species of gluon as corresponding gauge field quantum which is called Quantum Chromodynamics (QCD).
In 1905-1915, Einstein established the general relativity and special relativity .revealed the macroscopic cosmic gravitational field[2].
Sharp contradiction has been generated between Quantum theory and relativity as well as macroscope (non-uniformity) and microscope (uniformity) [3]. It is a very attractive idea that whether the various interactions — electromagnetism, weak force, strong force, gravitational force, thermal power and photon field have been known as six kinds of mechanical interactions, and constituted a complete and unified new pointwise gauge field, which satisfies the derivation of symmetry principle with gauge transformation and the derivation that gauge field is free of mass element. As well as with the infinite program, infinite set of reciprocity[4] and symmetry expansion[5].
In 2000, the United States Kerry Institute of Mathematics to the standard field as one of the seven mathematical problems in the 21st century.
Quantization unit body which proposed infinite pointwise quantization (including randomized uniform and non-uniform, symmetric and asymmetric, continuous and discontinuous, qualitative and non-qualitative quantization) can be taken as the equivalent replacement of 11-dimensional (massless photons) geometric space-time concept. achieve “topological variation

rules without quality- heat- space-time and accurate solution in the range of [0~1/2~1] $^{[0\sim 1/2\sim 1]}$", which is called "pointwise gauge field (circle logarithm, super symmetric cell matrix)".

2. Pointwise quantization and combination

2.1 Basic definition

Definition 1 Pointwise and Pointwise Equation: the pointwise is infinite quantization element with various interaction (including photodynamic field, gravitational field, electromagnetic field, quark field, gluon field and thermodynamic field) and quantized 11-dimensional geometric space-time, including unlimited program novel pointwise mechanics equation $\{L [\psi (x_\beta), A_\mu (x_\beta)]\}^Z$ constituted by randomized "uniform and non-uniform, symmetric and asymmetric, continuous and discontinuous, qualitative and non-qualitative quantization".

Definition 2 Combination Coefficient of Pointwise. The pointwise quantum has a variety of combinations from "1-1" to "11-11" in 11-dimensional space.

$$(C_{1+p})=(S!)/(P!)= (S-0)(S-1)\dots(S-p)!\ / (p-0)(p-1)\dots(1)!;$$

Definition 3 Sample Space of Pointwise

$$\{r_H^{11}\}^Z = \{L [\psi(x_\beta), A_\mu(x_\beta)]_h\}^Z= \sum\sum\{r_h^{11}\}^Z =\sum\prod\{r_h^{11}\}^Z$$

Definition 4 Average Sample Space of Pointwise $\approx$ refers to equivalent

$$\begin{aligned}\{r_{0H}^{11}\}^Z &=\sum[(C_{1+h}^{-1})^k\sum\{ L [\psi(x_\beta), A_\mu(x_\beta)]_h \}^Z\\ &= \sum[(C_{1+h}^{-1})^k\prod\{ L [\psi(x_\beta), A_\mu(x_\beta)]_h \}^Z = \sum\sum\{ L [\psi(x_0), A_\mu(x_0)]_0 \}^Z\\ &= \sum\prod\{ L [\psi(x_0), A_\mu(x_0)]_0 \}^Z= \sum\sum\{r_0^{11}\}^Z =\sum\prod\{r_0^{11}\}^Z;\end{aligned}$$

Definition 5 11-dimensional geometric space element $\{r^{11}\}Z$ with positive, middle and negative properties is composed of the three forms of neutrino oscillation (u_e, u_ψ, u_φ), the 8th order matrix of Gell-mann and the Einstein gravitational three-dimensional space. Definition of regularization coefficients in various combinations of pointwise 11-dimensional geometric sample spaces is as follows: Including

$$\begin{aligned}\{r_{0H}^{11}\}^Z&=\sum_{i=h} (C_{1+h}^{-1})\prod_{i=h}L [\psi(x_\beta), A_\mu(x_\beta)]= \sum_{i=h}(C_{1+h}^{-1})\sum_{i=h}L [\psi(x_\beta), A_\mu(x_\beta)]\\ &\approx \sum\prod L [\psi(x_0), A_\mu(x_0)]\approx \sum\sum L [\psi(x_0), A_\mu(x_0)]\\ &= (1/1) \{r_0\}^{K(Z\pm 0)} + (1/11)\{r_1\}^{K(Z\pm 1)}+ (1/55)\{r_2\}^{K(Z\pm 2)} + (1/165)\{r_3\}^{K(Z\pm 3)}\\ &\quad+(1/330)\{r_4\}^{K(Z\pm 4)}+1/462)\{r_5\}^{K(Z\pm 5)}+ (1/462)\{r_6\}^{K(Z\pm 6)} +(1/330)\{r_7\}^{K(Z\pm 7)}\\ &\quad+ (1/165)\{r_8\}^{K(Z\pm 8)} +(1/55)\{r_9\}^{K(Z\pm 9)} + (1/11)\{r_{10}\}^{K(Z\pm 10)}+ (1/1)\{r_{11}\}^{K(Z\pm 11)}\\ &= \{2\}^{11}\{r_0\}^Z =2048\{r_0\}^Z =1024\{C^2\}^{[Z-1]}\end{aligned}$$

Converted to 2048 pointwise energy particles (or 1024 quantum bits) in 11-dimensional $\{r_0^{11}\}^Z$,

Definition 6 Power Function Equation

$$\begin{aligned}Z = Z/T,t &= K(S\pm N\pm N\pm p) /T,t = K(S\pm N\pm N\pm p\pm 0)+ K(S\pm N\pm N\pm p\pm 1)+\dots\\ &\quad+ K(S\pm N\pm N\pm p\pm p)+\dots+ K(S\pm N\pm N\pm p\pm q) /T,t;\end{aligned}$$

Abbreviated as: $= K\{ (Z\pm 0) ,(Z\pm 1),\dots,(Z\pm p),\dots,(Z\pm q) \}/T,t;$

Where K= (+1,0,±0,-1); (S±N) refers to infinite dimension; (±N) refers to finite dimensional order; (±N) refers to calculus order; (±P) refers to polynomial order; T (temperature) t (time). For time and thermodynamic functions are synchronized with geometric space, they are no longer described except it is necessary.

Where $L [\psi(x_\beta), A\mu(x_\beta)]$ (particle, scalar); $L [\psi(x^2{}_\beta), A\mu(x^2{}_\beta)]$ (wave, vector); (C_{1+p}) refers to regularization coefficient of pointwise combination; { } refers to combination set of pointwise; (S!) refers to factorial of number of combinations, and (P!) refers to factorial of the order.

Where {} refers to set; the lower footnotes of $_{h,\ H,\ 0h,\ 0H}$ refer to set of sample space and average sample space of total items and sub-items.

In particular, the values can be zero, defect, error in the combination of regularization coefficients; pointwise position cannot be vacant so as to ensure the stability of "error" automatically eliminating process of "defective point quantum" and regularization.

3. Derivation of pointwise gauge field

3.1 Combination of pointwise gauge field

according to mechanical equation of Yang-Mills (Equation 11.3.17)

$L[\psi(x),A_\mu(x)] = -\psi^-(\gamma_\mu(d/dx_\mu)+m_\beta)\psi - (1/4)F_{\mu\nu}F_{\mu\upsilon} + I\, e\psi^-\gamma_\mu\psi A_\mu$

expanding to pointwise gauge field

$L[\psi(x_\beta),A_\mu(x_\beta)]^Z = [\psi^-(\gamma_\mu(d^Z/dx^Z{}_{\mu\beta})+m_\beta)\psi + (1/4)F_{\mu\nu\beta}F_{\mu\upsilon\beta} + I\, m_\beta e\psi^-\gamma_{\mu\beta}\psi A_{\mu\beta}]^Z$ （1）

$M_\beta = (m_p + m_n)$ mass-to-charge ratio: β = (proton + neutron) / electron mass = 3674.836363;

the ratio of quantum pointwise combinations constitutes four parts of mechanical equations:

***Item 1*:** combination of Dirac mechanical equation {M} (gravitation-quark)

$\{r_3,r_6,r_9\}^{+Z}=\{r^3\}^{+Z}$; coefficient $(C_{1+3}, C_{1+6}, C_{1+9})$;

***Item 2*:** combination of Maxwell electromagnetic equation {Q} (electromagnetism-gluon)

$\{r_2,r_4,r_8\}^{-Z}=\{r^4\}^{-Z}$; coefficient $(C_{1+2}, C_{1+4}, C_{1+8})$;

***Item 3*:** $\{r_5,r_{10}\}^{\pm Z}=\{r^5\}^{\pm Z}$ of thermal equation {R}; coefficient (C_{1+5}, C_{1+10});

***Item 4*:** combination of geometric sample space in photon equation {C}

$\{r_0 \sim r_{11}\}^{0Z}=\{r^2\}^{0[Z-1}=\{C^2\}^{0[Z-1]}=C^2$; coefficient $(C_{1+0}\sim C_{1+11})$

3.2 Interaction of pointwise gauge field

Traditional gauge field belongs to the contribution of quantum equilibrium state, and the gauge invariance is determined by $\{I\, Qe\psi^-\gamma_\mu\psi A_\mu\}\ \alpha$. Uniform and non-uniform quantization pointwise is introduced to make $\{M_g\}$ (gravitational mass), {Q} (electromagnetic charge), {C} (photon) and {R} (thermal particle) a self-consistent whole through the equivalent replacement of 11-dimension $\{r_1\sim r_{11}\}^Z$) sample space, called pointwise gauge field.

(1) Gauge field of interaction between gravitation

The mechanical characteristics of normal gravitational field: entangled state converges towards the boundary: the central force is strong while the boundary force is weak, and the center of sphere is collected with the gravisphere of each level and becomes the sub-unit of the gravitation quantum. and the gravitational constant: $G_N = \mathbf{6.6726}\times10^{-11}N\cdot m^2/kg^2$;

$\{I\, Mg\, e\psi^-\gamma_\mu\psi D_\mu\}G_N \approx L[\psi(x_\beta),A_\mu(x_\beta)]^Z = M\{r^3\}^{+Z}$; （K=+1）；

(2) Gauge field of electromagnetism and electromagnetic field

Mechanical characteristics of normal electromagnetism: (entangled state diverges towards the boundary), the central force is weak while the boundary force is strong, and the energy (is like donut). Therefore, the planet boundary and the spherical surface are collected with ionized layer and become the electromagnetic unit state. and the electromagnetic interaction coupling constant

$k = \mathbf{1.380658}\times10^{-23}J\cdot m^2\cdot k^{-1}$;

$\{I\, Qe\psi^-\gamma_\mu\psi C_\mu\}k \approx L[\psi(x_k),A_\mu(x_k)]^Z = Q\{r^4\}^{-Z}$; （K=-1）；

(3) Gauge field of interaction between gravitation and electromagnetic field

$\{I\, e\,\{M_\beta\psi^-\gamma_\mu\psi G_\mu\}G_k \approx L[\psi(x_\beta),A_\mu(x_\beta)]^Z = M_\beta\{r^{3+4}\}^{0Z}$; （K=0）；

(4) Gauge field of interaction between electromagnetism and quark field

$\{I\, e\,\{M_w\psi^-\gamma_\mu\psi A_\mu\}\alpha_w \approx L[\psi(x_\beta),A_\mu(x_\beta)]^Z = M_w\{r^4+r^2+r\}^{0Z}$; （K=0）；

(5) Gauge field of interaction between gluon and quark field

$\{I\, e\,\{M_\beta\psi^-\gamma_\mu\psi A_\mu\}\alpha_s \approx L[\psi(x_\beta),A_\mu(x_\beta)]^Z = M_p\{r^4+(r^2+r)\}^{0Z}$; （K=0）；

(6) Gauge field of interaction between quark and quark field

The mechanical characteristics of normal strong force field: entangled state diverges towards the boundary, the central force is weal while the boundary force is strong, (spinning+ radiation + vibration) and the surface is collected with quark layer, constituting a strong force unit of "quark confinement". The force coupling constant $\alpha_s = \mathbf{G_s^2/4\pi hc}$;

$\{I\, e\,\{M_s\psi^-\gamma_\mu\psi A_\mu\}\alpha_s \approx L[\psi(x_s),A_\mu(x_s)]^Z = M_s\{2\times(r^2+r)\}^{-Z}$; （K=-1）；

(7) Gauge field of interaction between gluon and gluon field

The mechanical characteristics of normal gluon field: entangled state diverges towards the boundary, the central force is strong while the boundary force is weak, the vibrations of two gluons are perpendicular to each other and the gluon field spins, vibrates and radiates as per the bi-directional plane, and the weak interaction coupling constant includes: α_w=$\mathbf{g_s^2/4\pi hc\ sin^2Q_w}$; upper and lower spinning $\{r^{\pm 2}\}$;

$$\{I\ e\ \{Q_w\psi^-\gamma_\mu\psi A_\mu\}\alpha_w \approx L[\psi(x_w),A_\mu(x_w)]^Z = Q_w\{2\times(r^2+r^2)\}^{+Z};\qquad (K=+1);$$

(8) Gauge field of interaction between gravitation and gluon field

$$\{ie\psi_q^{-}\{Q\psi^-\gamma_\mu\psi_q B_\mu\}G_g \approx L[\psi(x_\beta),A_\mu(x_\beta)]^Z = Q\{r^3+(r^2+r^2)\}^{0Z};\qquad (K=0);$$

(9) Gauge field of interaction between gravitation and quark field

$$\{ie\psi_q^-Q\gamma_\mu\psi_q E_\mu\}G_g \approx L[\psi(x_\beta),A_\mu(x_\beta)]^Z = Q\{r^3+(r+r^2)\}+^Z;\qquad (K=+1);$$

(10) Gauge field of interaction between electromagnetism and gluon field

$$\{I\ e\ \{M_w\psi^-\gamma_\mu\psi A_\mu\}\alpha_w \approx L[\psi(x_\beta),A_\mu(x_\beta)]^Z = M_w\{r^4+2\times r^2\}^{-Z};\qquad (K=-1);$$

(11) Gauge field of interaction between thermodynamic fields

The eight-dimension (stage) form with three-dimension (stage) neutrino proved in the experiment [p282] means that the optical particle may be 11-dimension combination or decomposition and interacts with the thermal force ion. The mechanical characteristics: the central force and the boundary force in the discrete state are pairing, and Z =±(S±N±N±p±5)

Thermal force constant $\boldsymbol{\sigma}$=**5.6703**$\times 10^{-8}\cdot m^{-2}\cdot K^{-4}$;

$$\{IR\psi_q^-Q\gamma_\mu\psi_q R_\mu\}\boldsymbol{\sigma} \approx L[\psi(x_\beta),A_\mu(x_\beta)]^Z = R\{r^5, r^{10}\}^{\pm 0Z};\qquad (K=\pm 0);$$

(12) Optical force field of quantum

That neutral photon and neutrino can achieve 11-dimensioanl diversified form has been proved by the experiment [p282]. The mechanical characteristics: the central force and the boundary force in the discrete state are pairing, andZ =±(S±N±N±p±11);

Optical force constant: to be determined;

$$\{I\ e\ Q\psi^-\gamma_\mu\psi F_\mu\}\mathbf{C_g} \approx L[\psi(x_\beta),A_\mu(x_\beta)]^Z = \{r^1\sim r^{11}\}^{\pm 0Z};\qquad (K=0);$$

$$\{r_0^2\}^{\pm(Z\pm 11)} = \{MC^2\} = hu;$$

The sample spaces of interaction of the above mechanical field form pointwise gauge field $L\{\psi(x),A_\mu(x)\}^Z$ and introduce the combination coefficient and force coupling constant of each level:

$$\begin{aligned} L\{\psi(x_\beta),A_\mu(x_\beta)\}^Z &= \{\psi^-(\gamma_\mu(d^Z/dx^Z{}_{\mu\beta})+m_\beta)\psi - (1/4)F_{\mu\nu\beta}F_{\mu\upsilon\beta} \pm IM_\beta\psi\gamma_\mu\psi^- \\ &\quad \bullet [A_\mu,B_\mu,C_\mu,D_\mu,E_\mu,F_\mu,G_\mu,H_\mu]\}^Z \bullet [G_N,\ k,\alpha,\ \alpha_s,\alpha_w,\ G_g,\ \alpha_w,\ \boldsymbol{\sigma},\mathbf{C}_g] \\ &= \sum[(C_{1+h}^{-1})^k\sum\{r_h^{11}\}^k]^Z = \sum[(C_{1+h}^{-1})^k\prod\{r_h^{11}\}^k]^Z = \{r_{0h}^{11}\}^Z; \end{aligned}\qquad (2)$$

There are no mechanical elements based on circle logarithm-relativistic structure. Whether force coupling constants (G_N, $k,\alpha,\alpha_s,\alpha_w$, G_g, α_w, $\boldsymbol{\sigma},\mathbf{C}_g$) and interaction constants $[A_\mu,B_\mu,C_\mu,D_\mu,E_\mu,F_\mu,H_\mu,R_\mu]$ exist does not affect the calculation process.

Note: "d" refers to partial derivative mark, which can be solved by integral equation.

Derivation 1: **homology circle logarithm (the first gauge invariance)**

Homology circle logarithm= sub-item field/total item field=1

$$(1-\eta_h^2)^Z = L[\psi(x_\beta), A_\mu(x_\beta)]_h / L[\psi(x_\beta), A_\mu(x_\beta)]_H = \sum\sum(1-\eta_{h[ijk]}^2)^Z = \sum\prod(1-\eta_{h[ijk]}^2)^Z$$

$$= \begin{vmatrix} (1-\eta_{h1}^2)^{K(Z\pm 0)} & 0 & 0 \dots 0 \dots 0 \\ 0 & (1-\eta_{h2}^2)^{K(Z\pm 1)} & 0 \dots 0 \dots 0 \\ \dots\dots & & \\ 0 & 0 \dots & (1-\eta_{hp}^2)^{K(Z\pm p)} \dots 0 \\ 0 & 0 \dots 0 \dots & (1-\eta_{hq}^2)^{K(Z\pm q)} \end{vmatrix} = \begin{vmatrix} \{L[\psi(x), A\mu(x)]_h / L[\psi(x), A\mu(x)]_H\}^{K(Z\pm 0)} \\ \{L[\psi(x), A\mu(x)]_h / L[\psi(x), A\mu(x)]_H\}^{K(Z\pm 1)} \\ \{\cdots\} \\ \{L[\psi(x), A_\mu(x)]_h / L[\psi(x), A_\mu(x)]_H\}^{K(Z\pm p)} \\ \{L[\psi(x), A_\mu(x)]_h / L[\psi(x), A_\mu(x)]_H\}^{K(Z\pm q)} \end{vmatrix}$$

$$= (1-\eta_{h1[ijk]}^2)^Z + (1-\eta_{h2[ijk]}^2)^Z + \dots + (1-\eta_{hp[ijk]}^2)^Z + \dots + (1-\eta_{hq[ijk]}^2)^Z$$

$$= \{0\sim(1/3)^2,(2/3)^2,(2/3)^2\}^{\{0\sim 1\}Z} = \{0\sim 1\}^{\{0\sim 1\}Z};\qquad (3)$$

It reflects quantization of various combinations of pointwise and their distribution rules.

Where: $(1-\eta_{h[ijk]}^{2})^{Z}$ refers to the mapping (projection) of circle logarithm in the three-dimensional [ijk] coordinates.

Derivation 2: **isomorphism circle logarithm (the second gauge invariance)**

Isomorphism circle logarithm: reciprocal (k=-1) gauge mean field/ positive number (k=+1) gauge mean field={0,1/2,1} ^{Z};

$$(1-\eta_{[ijk]}^{2})^{Z} = \{L[\psi(x_0)^{-1}, A_\mu(x_0)^{-1}]^{K[Z-1]}{}_{[ijk]} \bullet L[[\psi(x_0)^{+1}, A_\mu(x_0)^{+1}]^{K[Z+1]}{}_{[ijk]}\}$$

$$= \begin{vmatrix} (1-\eta^2)^{K(Z\pm0)} & 0 & 0 \ldots 0 \ldots 0 \\ 0 & (1-\eta^2)^{K(Z\pm1)} & 0 \ldots 0 \ \ldots 0 \\ \ldots\ldots & & \\ 0 & 0 \ldots & (1-\eta^2)^{K(Z\pm p)} \ \ldots 0 \\ 0 & 0 \ldots & 0 \ldots \ (1-\eta^2)^{K(Z\pm q)} \end{vmatrix} = \begin{vmatrix} \{L[\psi(x), A\mu(x)]_{0h} / L[\psi(x), A\mu(x)]_0\}^{K(Z\pm0)} \\ \{L[\psi(x), A\mu(x)]_{0h} / L[\psi(x), A\mu(x)]_0\}^{K(Z\pm1)} \\ \{\cdots\} \\ \{L[\psi(x), A_\mu(x)]_{0h} / L[\psi(x), A_\mu(x)]_0\}^{K(Z\pm p)} \\ \{L[\psi(x), A_\mu(x)]_{0h} / L[\psi(x), A_\mu(x)]_0\}^{K(Z\pm q)} \end{vmatrix}$$

$$= \sum(1-\eta_{[ijk]}^{2})^{Z} = \prod(1-\eta_{[ijk]}^{2})^{Z}$$

$$=(1-\eta_{[ijk]}^{2})^{+Z}+(1-\eta_{[ijk]}^{2})^{0Z}+(1-\eta_{[ijk]}^{2})^{\pm0Z}+(1-\eta_{[ijk]}^{2})^{-Z}=\{0\sim1/2\sim1\}^{\{0\sim1\}}; \quad (4)$$

It reflects isomorphism topological property of various combinations of pointwise.

Derivation 3: **limit (topological phase transition point) valve.**

It can be obtained from Definition 3, 4 and 6 that

$$(1-\eta^2)^Z = \sum[(C_{1+h}^{-1})^k\sum\{ L[\psi(x),A_\mu(x)]\}^k]^Z / \sum\{ L[\psi(x_0),A_\mu(x_0)]\}^k]^Z$$

$$\approx \sum[(C_{1+h}^{-1})^k\prod\{ L[\psi(x),A_\mu(x)]\}^k]^Z/\prod\{ L[\psi(x),A_\mu(x)]\}^k]^Z ;$$

$$= \sum(1-\eta^2)^{+Z}+\sum(1-\eta^2)^{0}+\sum(1-\eta^2)^{-Z} \quad (5.1)$$

Including:

$$(1-\eta^2)^{0Z} = \sum(1-\eta^2)^{+Z} + \sum(1-\eta^2)^{-Z}=\{0,1\};$$

$$\sum(1-\eta^2)^{+Z} \bullet \sum(1-\eta^2)^{-Z}=\{0,1\}; \quad (5.2)$$

It can be obtained from simultaneous equations of Equation (5.2) that

$$(1-\eta^2)^Z= \{(0,1/2,1)^{(0,1/2,1)}\}^{Z}; \quad (5.3)$$

3.4 Relativistic structure—pointwise gauge field

Including:

$$L [\psi(x_\beta), A_\mu(x_\beta)]^Z = (1-\boldsymbol{\eta}^2)^Z L[\psi(x_0), A_\mu(x_0)]^Z ; \quad (6)$$

$$L [\psi(x_0), A_\mu(x_0)]^{Z} = \{MC^2\}^Z=MC^2=\{h\upsilon\} ; \quad (7)$$

Unified: $$E=(1-\boldsymbol{\eta}^2)^Z MC^2 \quad (8)$$

4. Solution to and application of pointwise mechanical equation

To sum up, 11-dimension equation of pointwise quantum mechanics consists of four infinite dimension integral-differential equation or polynomial equation, which can be respectively used for solution. Boundary conditions

$$D=\{{}^{KS}\sqrt{D}\}^Z=L[\psi(D),A_\mu(D)]^Z$$

can form combination of four sub-items, which are respectively:

(parallel combination) $D = D_A + D_B + D_C + \cdots= ({}^{KS}\sqrt{D})_A+({}^{KS}\sqrt{D})_B+({}^{KS}\sqrt{D})_C+\cdots$;

Or: (serial combination) $D = D_A \bullet D_B \bullet D_C \bullet \cdots= ({}^{KS}\sqrt{D})_A \bullet ({}^{KS}\sqrt{D})_B \bullet ({}^{KS}\sqrt{D})_C \bullet \cdots$;

Boundary conditions constituting pointwise gauge field

（Entangled state）$({}^{KS}\sqrt{D})^Z=\{r^{11}\}^Z$:（Discrete state） $(D_0)^Z=\{r_0^{11}\}^Z$

$\{r^3\}^{+Z}$ (gravitation equation)

$+ \{r^4\}^{-Z}$(electromagnetic force equation)

$+ \{r^2\}^{+Z}$ (quantum wave equation and gauge field)

$+ \{r^5\}^{[0, \pm0]\}Z}$ (thermodynamic equation); (9)

(1) *Integral-differential equation of all sub-items:*

$$F\{X \pm ({}^{KS}\sqrt{D})\}^{[Z]} = L[\psi(x_\beta),A_\mu(x_\beta)] \pm L[\psi(D),A_\mu(D)]^Z$$
$$= Ax^{K(Z\pm 0)} + Bx^{K(Z-1)}D_0^{K(Z+1)}+\dots+Px^{K(Z-p)}D_0^{K(Z+p)}+\dots+ Qx^{K(Z-q)}D_0^{K(Z+q)}\pm({}^{KS}\sqrt{D});$$
$$= \{(1-\eta^2)^{K(Z\pm 0)}+ (1-\eta^2)^{K(Z\pm 1)}+\dots+(1-\eta^2)^{K(Z\pm p)}+\dots+(1-\eta^2)^{K(Z\pm q)}\}$$
$$= (1-\eta^2)^Z \{0,2\}^Z \{D_0\}^Z \;; \quad (10)$$

(2) *In integral-differential equation,*
we can convert it into primitive function through : $\{2\}^{[N+\Delta N]}$
$$F\{X\pm({}^{KS}\sqrt{D})\}^{[Z]} = F\{X\pm({}^{KS}\sqrt{D})\}^{[Z\pm\Delta]}\cdot\{2\}^{[N\pm\Delta N]}; \quad (11)$$
(3) *Entangled state or discrete state* $(1-\eta^2)^Z=({}^{KS}\sqrt{D})/\{D_0\};$ (12)
When: $(1-\eta^2)^Z=1$; it indicates discrete state.
(4) *Sum of combination coefficients*: $(1-\eta^2)^Z=\{2\}^Z$; (13)
4.1 Solution to high-dimension integral-differential equation
Including: N-order integral-differential equation $L[\psi(x),A_\mu(x)]^{[Z-N]}$, boundary conditions $D=({}^{KS}\sqrt{D})= L[\psi(D),A_\mu(D)]^Z$, Z, and the number of elements can constitute balance mechanics equation, such as Equation (10).
4.2 Discriminant: to judge the possibility of solution of Equation (10).
(1) Calculate elements of average state $\{D_0\}$ (combination of arbitrary p);
$$\{D_0\}^Z= [{}^{K(S\pm p)}\sqrt{(P/C_{1+p})}]^{[Z\pm p]} ; \quad (14)$$
(2) Meet : $0\le(1-\eta^2) =({}^{KS}\sqrt{D}) / D_0]^{[Z\pm p]}\le 1;$
(3) The coefficient (A, B, C, D…) is adjusted into $\{D_0\}^{[Z\pm p]}$ and thus conforms to the sum of regularization coefficients: $\sum C_{1+p} = \{2\}^{[Z\pm p]}$;
Where, the numerical value of elements combination can be incomplete but the coefficient can not be null.
4.3 Solution:
Solve $\{D_0\}$ through the simplest sub-item in integral-differential Equation (16):
Including: $\{D_0\}^{[Z-1]}=(B/C_{1+1}),$
$$(1-\eta^2) = ({}^{KS}\sqrt{D})\}^{[Z-1]} / \{D_0\}^{[Z-1]};$$
$$(1-\eta_h^2)^{[Z-1]} =\sum(1-\eta_h^2)^{[Z-1]} =1; \quad (15)$$
General equation: $\{D_0\}^{[Z-p]}=(P/C_{1+p}),$
$$(1-\eta^2)^{[Z-p]} = ({}^{KS}\sqrt{D})\}^{[Z-p]} / \{D_0\}^{[Z-p]}$$
$$(1-\eta_h^2)^{[Z-p]} =\sum(1-\eta_h^2)^{[Z-p]} =1; \quad (16)$$
$$\{X_{h1}\}^{[Z-1]}=[(1-\eta^2) / (1-\eta_{h1}^2)]^{[Z-1]} (B/C_{1+1}); \quad (17)$$
$$\{X_{hp}\}^{[Z-p]}= [(1-\eta^2) / (1-\eta_{hp}^2)]^{[Z-p]}(p/C_{1+1}) ; \quad (18)$$
By virtue of Equation (17) and (18), we can easily know the exact solution of every element or several combined elements in pointwise equation.

5. Engineering application

5.1 Universe cyclic evolution:
Process of $(1-\eta^2)^{+Z}$ (convergence of black hole)→$(1-\eta^2)^{0Z}$ thermal wormhole (thermal topological phase transition, thermal nuclear fission and cosmic bump)"→$(1-\eta^2)^{-Z}$ (expansion of white hole and newborn baby)→$(1-\eta^2)^{0Z}$ cold wormhole (cold topological phase transition and cold nuclear fission)→$(1-\eta^2)^{+Z}$ (extinction of black hole and celestial body) ;
5.2 Description of energy asymmetry:
The universe vacuum will excite and produce extremely asymmetry energy, which can be mathematically proved by polynomial equation. According to $(1-\eta^2)^{0Z}$, topological phase transition, vacuum excitation and Higgs boson, we can know:
$$(1-\eta^2)^{+Z} \{MC^2\} \to (1-\eta^2)^{-Z}\{MC^2\};.$$
Two parallel polynomials of 11-dimension energy particle $\{x\}^{[Z-11]}=\{x\}^{[Z-6]}+\{x\}^{[Z-5]}$ which are

respectively substituted into (6 prime numbers: 1, 3, 5, 7, 11 and 13) to know entangled state; (5 natural numbers: 1, 2, 3, 4 and 5) are particles in discrete state (the counting process is omitted), and thus we can know:

Mass-energy ratio: (4.758845%: 95.241155%);

Energy ratio: (1: 40.027004);

Surprisingly, the results of above-mentioned calculation are consistent with astronomy observation and test data of high-energy particle collision.

5.3 Application of vacuum excitation

According to principles of universe evolution, we can acquire a patent of super high-energy engine of “vacuum excitation”. Project name: *Cold and Negative-pressure Bi-directional Vortex Blades Aero-Engine in Bi-directional Vortex*. (**ZL201410055227.0**), date of authorization is May 2016. It is named man-made mini universe heat engine.

6. Conclusion and prospect

The fusion of traditional quantum gauge field and relativity is aimed to reveal the distinction between uniformity and non-uniformity. Through relativity structure (circle logarithm), the interference of quality and other elements is eliminated, thus realizing abstract four-arithmetic operation without specific content.

Geometric sample space of pointwise quantum {r} and $\{r^2\}$ as well as power and thermodynamic system generate various accelerated speed and energies which are reflected as duality of “wave and particle” and “speed and energy”. Through MC^2= M{C…c}= h{U…u}, integrate them into a broader entirety — relativity structure. This algorithm has advantages of conciseness, self-consistency, accuracy, and zero error. It can be generally used in fields like physics, astronomy, and mechanics.

Existing problems: coupling constants in mechanics like gravitation, heating force, nuclear force and electromagnetic force as well as phase transformation point in topology remain to be confirmed and studied.

Of course, there will be inevitable defectiveness in relativity structure; criticizing and improvement suggestions are favorably received. Exchange, popularization, and application by more experts and scholars are expected so as to innovate and develop together.

Gratitude is shown to 2016 Chinese Conference on Computational Mechanics in conjunction with International Symposium on Computational Mechanics in Hangzhou (CCCM-ISCM 2016) for making the statement that *Research and Application of Super-symmetric Element Matrix (circle logarithm)* a novel “abstract analysis” .

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