The theory of idealiscience

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1 Introduction

The theory of idealiscience is an accurate theoretical model, by the model we can deduce most important laws of Physics, explain a lot of physical mysteries, even a lot of basic and important philosophical questions. For example, by idealiscience theory, we may get the real definition of electric field $\vec{E}$ and magnetic field $\vec{B}$, they are

$$\vec{E} = \frac{\alpha c}{\epsilon}(\,\nabla p + i\,\nabla\times\vec{p}\,)(1+i\,)$$

$$\vec{B} = \frac{\alpha}{\epsilon}(\,i\,\nabla p - \nabla\times\vec{p}\,)(1+i\,)$$

where i denotes imaginary unit, p denotes a physical quantity with momentum dimension, e denotes elementary charge, $\epsilon = e/2\pi$. Maxwell equations can be derived by the divergence and curl of $\vec{E}$ and $\vec{B}$.

By idealiscience theory, we can also get the theoretical values of a lot of physical constants, even some of the constants can not be deduced by traditional physical theories, such as neutron mass and Avogadro constant.

CODATA 2014 recommended value of neutron mass m_n is $m_n = 1.674927471(21) \times 10^{-27} kg$. The theoretical value of neutron mass can be expressed as

$$m_n = \frac{m_p - 4em_e - \dfrac{\alpha m_e}{e(1+\alpha)\sqrt{1-\alpha^2}} - \dfrac{4\alpha m_e(1+\alpha^2)}{e\sqrt{1-\alpha^2}}}{1-\alpha} = 1.6749274752 \times 10^{-27} kg$$

where m_p denotes the mass of proton, m_e denotes the mass of electron, a_0 denotes Bohr radius, $\hbar$ denotes reduced Planck constant, α denotes fine structure constant, c denotes speed of light, e denotes the base of natural logarithm ($e = 2.718281828\cdots$).

CODATA 2014 recommended value of Avogadro constant N_A is $N_A = 6.022140857(74) \times 10^{23}\, mol^{-1}$. M_u denotes Molar mass constant, the theoretical value of N_A can be expressed as

$$N_A = \frac{M_u}{\dfrac{m_p}{(1+\alpha)\sqrt{1-\alpha^2}} - \dfrac{4\alpha m_e(1+\alpha^2)}{e\sqrt{1-\alpha^2}}} = 6.0221408564 \times 10^{23}\, mol^{-1}$$

Another kind of physical constants can not only being derived by QED, but also being derived by idealiscience theory, the most typical constant is the theoretical value of electron magnetic moment μ_e .

CODATA 2014 recommended value of μ_e is $\mu_e = -9.284764620(57) \times 10^{-24} JT^{-1}$. The theoretical value of μ_e can be expressed as

$$\mu_e = \frac{e\hbar}{2m_e}((1 - \frac{4\alpha m_e}{m_p})\sum_{n=1}^{\infty}(-\frac{\alpha}{2\pi})^n + \sum_{n=3}^{\infty}\alpha^n - 1\,) = -9.2847646200 \times 10^{-24} JT^{-1}$$

It is clear that the theoretical value equation of μ_e being derived by the theory of idealiscience is more simpler and eleganter than the theoretical value being derived by QED. In fact, we can also deduce the theoretical magnetic moment of neutron even the theoretical mass of deuteron.

In the following sections, we will introduce the details of the theory of idealiscience.

2 Definition

σ denotes inverse operator, $\forall x$, $\sigma x = 1/x$, $\sigma\sigma x = x$. η denotes a constant, $\vec{\eta}$ denotes a constant vector.

Definition 1. *$\bigcirc$ denotes origin of truth. Define $\bigcirc$ as all the most complete everything.*

Definition 2. *ϑ denotes an alaya. Dividing $\bigcirc$ by dimensions, the total contents of every $\aleph_1$ dimensions of $\bigcirc$ can form an alaya ϑ . The nature of ϑ is the great mirror wisdom, the wisdom has ability to map contents into their mirror images.*

Definition 3. *ξ denotes a manas. Combined the total contents those corresponding to any six dimensions of ϑ into an maximum size six dimensional object, if in the logical sense, the six dimensional object meets the following conditions*

1. *Exist six degrees of freedom intrinsic rotation.*
2. *All rotation axes intersect at a same point.*
3. *Each degree of freedom has a different angle frequency.*
4. *Exist continuous reciprocal transformation which origin is the intersection of the rotating shaft.*

then the six dimensional object is a manas ξ . The nature of ξ is the equal wisdom, the wisdom has ability to transfer its characteristics between ϑ and ϕ . If ξ and ϑ have same subscript, then set ξ_i as totally apart of ϑ_i.

Definition 4. *ϕ denotes a consciousness. Dividing a manas ξ by its dimensions, the total contents of every three dimensions of ξ can form a consciousness ϕ . The nature of ϕ is the inscrutable observation wisdom, the wisdom has ability to observe or identify. If ϕ and ξ have same subscript i , then set ϕ_i as totally apart of ξ_i .*

Definition 5. *$\forall x \forall y$, if y state can be transformed into σy state by reciprocal transformation, and x can contact the adjacent two σy states as an interval, then define the interval as time quantum of y which x felt. If $x = y$, then time quantum of y which x felt can be referred to as time quantum of x .*

Definition 6. *The causal relationship of ϕ itself can be expressed as a constant with speed dimension, denoted by c , being named causal constant. Because the relative motion rate of a photon is equal to causal constant c , so c can also be called absolute light speed.*

Definition 7. *qs denotes space quantum of ϕ , represents a short length, qt denotes time quantum of ϕ , define $qs = c \cdot qt$. The value of qs is equal to Planck length.*

Definition 8. *$\forall x$, n denotes the total number dimensions of x , if the n dimensions of x can be extended to an n dimensional Euclidean space, then define the n dimensional Euclidean space as background space of x , denoted by Ex .*

Definition 9. *$\forall x \forall i \forall j$, if x_i and the mapping image which x_i maps to Ex_j are congruent, then define the congruent mapping image as outer image of x_i , denoted by x_i^j .*

Definition 10. *$\forall x$, qt denotes time quantum of x , assuming x is attached to an additional phase change besides its intrinsic rotations in every qt , denoted by θ , if θ is a constant, then define θ as phase change constant of x .*

Definition 11. *θ denotes phase change constant of ϕ , α denotes fine structure constant, define $\alpha = \sin\theta$.*

Definition 12. *$\forall \theta \forall i \forall j$, qt_i denotes time quantum of ϕ_i , θ_i denotes phase change constant of ϕ_i , if the six dimensional outer image ξ_i^j maps to the background space $E\phi_i$ then generates a three dimensional orthogonal projection which projection ratio is $\sin\theta_i$, then define the orthogonal projection as inner image of ϕ_i , denoted by $\alpha\phi_i$.*

Definition 13. *For the three dimensions of inner image* $\alpha\phi_i$ *, if none of the dimensions is a dimension of* ϕ_i *mapping to* $E\phi_i$ *, then define the inner image as a photon, denoted by* ${\alpha\phi_i}^0$ *.*

Definition 14. *For the three dimensions of inner image* $\alpha\phi_i$ *, if one of the dimensions is a dimension of* ϕ_i *mapping to* $E\phi_i$ *, then define the inner image as a vacuum quantum, denoted by* ${\alpha\phi_i}^1$ *.*

Definition 15. *For the three dimensions of inner image* $\alpha\phi_i$ *, if two of the dimensions are the dimensions of* ϕ_i *mapping to* $E\phi_i$ *, then define the inner image as an electromagnetic quantum, denoted by* ${\alpha\phi_i}^2$ *.*

Definition 16. *For the three dimensions of inner image* $\alpha\phi_i$ *, if all the dimensions are the dimensions of* ϕ_i *mapping to* $E\phi_i$ *, then define the inner image as a particle quantum, denoted by* ${\alpha\phi_i}^3$ *.*

Definition 17. $\forall x \forall r$ *,* $r \between x$ *denotes the logic interface which origin is the geometric center of* x *and its radius is equal to* r *,* $r \smile x$ *denotes the inner surface of* $r \between x$ *,* $r \frown x$ *denotes the outer surface of* $r \between x$ *, define* $r \between x$ *as logic surface of* x *.*

Definition 18. $\forall \vec{v} \forall x \forall r$ *,* $\vec{v}$ *denotes a vector, the starting point of* $\vec{v}$ *is at the center of* x *, the norm of* $\vec{v}$ *is equal to* r *.* A *denotes the set composed of* $\vec{v}$ *, if* $\vec{r} \in A$ *can uniquely represent* $r \between x$ *, then replaces* $\vec{r}$ *as* $\vec{r} \between x$ *, define* $\vec{r} \between x$ *as logic vector of* x *.*

Definition 19. $\forall i \in \{1,2,3\}$ *,* r_i *denotes the logical radius of* ϕ *,* ω_i *denotes the intrinsic rotation frequency parameters of* ϕ *, set* $\omega_1 > \omega_2 > \omega_3 > 0$ *, if* $\omega_i r_i = c$ *, then replaces* r_i *as* γ_i *, define* γ_i *as intrinsic radius of* ϕ *.*

Definition 20. $\forall x, \forall i \in \{1,2,3\}$ *, define* $\alpha\gamma_i \between x$ *as action surface of* x *.*

Definition 21. $\forall x, \forall i \in \{1,2,3\}$ *, define* $\gamma_i \between x$ *as feature surface of* x *.*

Definition 22. $\forall x, \forall i \in \{1,2,3\}$ *, define* $\gamma_i/\alpha \between x$ *as orbit surface of* x *.*

Definition 23. $\forall x, \forall i \in \{1,2,3\}$ *, define* $\alpha\vec{\gamma}_i \between x$ *as action vector of* x *.*

Definition 24. $\forall x, \forall i \in \{1,2,3\}$ *, define* $\vec{\gamma}_i \between x$ *as feature vector of* x *.*

Definition 25. $\forall x, \forall i \in \{1,2,3\}$ *, define* $\vec{\gamma}_i/\alpha \between x$ *as orbit surface of* x *.*

Definition 26. $\forall i \in \{1,2,3\}$ *, assuming the recognition logic of* ϕ *identifies* $\alpha\vec{\gamma}_i$ *,* $\vec{\gamma}_i$ *and* $\vec{\gamma}_i/\alpha$ *and then generates a comprehensive logic feeling result, define the logic feeling result as elementary particle, the classical radius of the elementary particle is equal to* $\alpha\gamma_i$ *, the feature radius of the elementary particle is equal to* γ_i *, the orbital radius of the elementary particle is equal to* γ_i/α *.*

Definition 27. $\forall i \in \{1,2,3\}$ *, assuming the rotation of* $\vec{\gamma}_i/\alpha \between \alpha\phi$ *can form a phase wave, define the phase wave as material wave, the wave amplitude is the mode of* $\vec{\gamma}_i/\alpha$ *, the wavelength is the circumference of revolution by the ending point of* $\vec{\gamma}_i/\alpha \between \alpha\phi$ *.*

Definition 28. $\forall i \in \{1,2,3\}$ *,* θ *denotes the phase change constant of* ϕ *,* v *denotes the inner speed of elementary particle, define* $v = c\sin\theta = \alpha c$ *, the nature of* v *is the projection of causal constant* c *, it can be used to express the revolution velocity of the ending point of* $\alpha\vec{\gamma}_i \between \alpha\phi$ *around the center of* $\alpha\phi$ *.*

Definition 29. $\forall x \forall y \forall \beta$ *,* v *denotes the relative rate between* $\alpha\phi_x$ *and* $\alpha\phi_y$ *,* β *denotes the phase change between* $\vec{\gamma}_1 \between \alpha\phi_x$ *and* $\vec{\gamma}_1 \between \alpha\phi_y$ *, define* $v = c\sin\beta$ *.*

Definition 30. *$\forall x \forall y \forall \beta$, β denotes the phase difference between x and y , if the relative rate between x and y can be expressed as $v = c \sin \beta$, and ϕ believes in the view of x , the intrinsic causal relationship of y can be expressed as $u = c \cos \beta$, then define u as relative light speed.*

Definition 31. *χ denotes Chaos, ζ denotes the set composed of all the intrinsic parameters of ϕ , define*

$$\chi = \phi - \zeta$$

Definition 32. *ϱ denotes data, qt denotes time quantum of ϕ , $\forall n \in \mathbb{N}^+$, if ϕ takes causal constant c as a parameter to measure the reciprocal transformation of Chaos χ , and the measure results can be constituted an infinite set $\{1cqt\chi, 2cqt\chi, 3cqt\chi, \cdots\}$, then define $\varrho = ncqt\chi$, the meaning is an element of $\{1cqt\chi, 2cqt\chi, 3cqt\chi, \cdots\}$, the nature is a measurement result that ϕ measures the reciprocal transformation of Chaos χ .*

Definition 33. *$\dot{\varrho}$ denotes data quantum, define $\dot{\varrho} = cqt\chi$.*

Definition 34. *If ϕ takes causal constant c as a parameter to establish the logical relationship of all the elements of $\{1cqt\chi, 2cqt\chi, 3cqt\chi, \cdots\}$ according to the sequence of natural numbers, then the logic relation will be called data wave, define $\delta = \varrho \cdot c$.*

Definition 35. *$\dot{\varphi}$ denotes information quantum, define $\dot{\varphi} = \alpha\dot{\varrho}$.*

Definition 36. *φ denotes the information of $r \between \alpha\phi$, if $r = nqs$, $n \in \mathbb{N}$, then define $\varphi = n\dot{\varphi}$.*

Definition 37. *At the same time that ϕ being mapped to inner image $\alpha\phi$, data wave δ will be mapped to $\alpha\delta$ by the same mapping rules, ϕ will take causal constant c as a parameter to analysis $\alpha\delta$, and then resolves the mapping image $\alpha\delta$ as a series of complex three dimensional spherical waves those wave speed is equal to absolute light speed c , the complex three dimensional spherical waves being named information wave, denoted by ψ , define $\psi = \varphi \cdot c$.*

Definition 38. *$\forall i \in \{1, 2, 3\}$, if in the view of ϕ that*

1. *$\alpha\gamma_i \smile \alpha\phi$ is equivalent to $\gamma_i/\alpha \frown \sigma\alpha\phi$*
2. *$\alpha\gamma_i \frown \alpha\phi$ is equivalent to $\gamma_i/\alpha \smile \sigma\alpha\phi$*
3. *$\gamma_i/\alpha \smile \alpha\phi$ is equivalent to $\alpha\gamma_i \frown \sigma\alpha\phi$*
4. *$\gamma_i/\alpha \frown \alpha\phi$ is equivalent to $\alpha\gamma_i \smile \sigma\alpha\phi$*

then define

1. *the set $\{\alpha\gamma_i \between \alpha\phi, \gamma_i/\alpha \between \alpha\phi\}$ is the i-th layer Taiji of $\alpha\phi$*
2. *the set $\{\alpha\gamma_i \between \sigma\alpha\phi, \gamma_i/\alpha \between \sigma\alpha\phi\}$ is the i-th layer Taiji of $\sigma\alpha\phi$*

where

1. *$\alpha\gamma_i \smile \alpha\phi$ is the i-th layer Yin eye of $\alpha\phi$*
2. *$\alpha\gamma_i \frown \alpha\phi$ is the i-th layer Yang eye of $\alpha\phi$*
3. *$\gamma_i/\alpha \smile \alpha\phi$ is the i-th layer Yang fish of $\alpha\phi$*
4. *$\gamma_i/\alpha \frown \alpha\phi$ is the i-th layer Yin fish of $\alpha\phi$*

symmetrically

1. *$\alpha\gamma_i \smile \sigma\alpha\phi$ is the i-th layer Yang eye of $\sigma\alpha\phi$*
2. *$\alpha\gamma_i \frown \sigma\alpha\phi$ is the i-th layer Yin eye of $\sigma\alpha\phi$*
3. *$\gamma_i/\alpha \smile \sigma\alpha\phi$ is the i-th layer Yin fish of $\sigma\alpha\phi$*
4. *$\gamma_i/\alpha \frown \sigma\alpha\phi$ is the i-th layer Yang fish of $\sigma\alpha\phi$*

Definition 39. *e denotes elementary charge, define e as an intrinsic parameter of ϕ , it can be used to sign the information wave those passing through Taiji Yin and Yang eyes or Taiji Yin and Yang fishes.*

Definition 40. *ϵ denotes electric quantum, define*

$$\epsilon = \frac{e}{2\pi}$$

Definition 41. *$\forall x$, ex denotes electric x , define ex as the product of elementary charge e and x , its meaning is elementary charge e being used to sign x as ex .*

Definition 42. *e^+ denotes positive charge, define $e^+ = +e$, the value of e^+ is equal to the electric charge of proton, being used to sign the information wave those passing through Taiji Yang eye and Taiji Yang fish.*

Definition 43. *e^+ denotes negative charge, define $e^- = -e$, the value of e^- is equal to the electric charge of electron, being used to sign the information wave those passing through Taiji Yin eye and Taiji Yin fish.*

Definition 44. *When ϕ signs the information waves those passing through Taiji Yin and Yang eyes or Taiji Yin and Yang fishes by elementary charge e , if exist some other contents don't belong to Taiji category, but the contents still being attached to charge properties temporarily because they can not being distinguished any difference with Taiji contents by ϕ , then define the operation that ϕ temporarily attaches the charge properties to those contents as charge blessing.*

Definition 45. *A denotes action, define*

$$A = \frac{1}{4\pi}\frac{d\varphi}{dt}$$

Definition 46. *$\hbar$ denotes action quantum, define*

$$\hbar = \frac{\dot{\varphi}}{4\pi qt}$$

Definition 47. *h denotes substance quantum, define $h = 2\pi\hbar$, the value of h is equal to Planck constant.*

Definition 48. *E denotes energy, define*

$$E = \frac{dA}{dt}$$

Definition 49. *$\vec{F}$ denotes force field, define*

$$\vec{F} = \nabla E$$

Definition 50. *$\dot{m}_s$ denotes rest mass quantum, define*

$$\dot{m}_s = \frac{\dot{\varphi}}{4\pi qs^2}$$

Definition 51. *$\widetilde{m}$ denotes field mass, S denotes the total area of information distribution surface, define*

$$\widetilde{m} = \frac{\varphi}{S}$$

Under normal circumstances, information distribution surface is equal to the information wavefront, if the information wave can only spreading in two dimensional conditions, then S will be the area of the circle being determined by the information wave radius.

Definition 52. *m denotes particle mass, $\forall i \in \{1, 2, 3\}$, define m as the field mass being determined by elementary particle's feature radius γ_i .*

Definition 53. $\vec{P}$ *denotes traditional momentum, define*

$$\vec{P} = m\vec{v}$$

Definition 54. p *denotes scalar field momentum, define*

$$p = \widetilde{m}c$$

Definition 55. $\vec{c}_s$ *denotes the light speed vector along the direction of gradient,* $\vec{p}_s$ *denotes irrotational vector field momentum, define*

$$\vec{p}_s = \widetilde{m}\vec{c}_s$$

Definition 56. $\vec{c}_v$ *denotes the light speed vector along the direction of curl,* $\vec{p}_v$ *denotes solenoidal vector field momentum, define*

$$\vec{p}_v = \widetilde{m}\vec{c}_v$$

Definition 57. $\vec{p}$ *denotes vector field momentum, define*

$$\vec{p} = \vec{p}_s + \vec{p}_v$$

Definition 58. $\vec{E}$ *denotes electric field, define*

$$\vec{E} = \frac{\alpha c}{\epsilon}(\, \nabla p + i\, \nabla \times \vec{p}\,)(1 + i\,)$$

Definition 59. $\vec{B}$ *denotes magnetic field, define*

$$\vec{B} = \frac{\alpha}{\epsilon}(\, i\, \nabla p - \nabla \times \vec{p}\,)(1 + i\,)$$

Definition 60. *According to Buddhist world view, Sumeru Mountain and Saline sea are on the earth wheel, the water wheel is under the earth wheel, the wind wheel is under the wind wheel. Jambudvipa located on the Saline sea in the south of Sumeru Mountain. Human beings are the people living on Jambudvipa. Define this kind of world as small world.*

3 Postulate

Postulate 1. *The recognition ability of* ϕ *is limited.*

Postulate 2. ϕ *can not distinguish reciprocal symmetric worlds and imaginary worlds.*

Postulate 3. *In the view of* ϕ *, the action of any elementary particle is equal to substance quantum* h *.*

Postulate 4. *In the view of* ϕ *, the electric substance quantity of any elementary particle is equal to* $e\hbar$ *.*

Postulate 5. *Under the circumstance that* $\gamma_1 \between \alpha\phi$ *within the range of* $\gamma_2 \between \alpha\phi$ *,* ϕ *can not construct the field mass of any logic interface inside from* $\gamma_2 \smile \alpha\phi$ *.*

Postulate 6. $\forall i \in \{1, 2, 3\}$ *,* ϕ *can only distinguish the reciprocal transformations along the radial those fixed points at* $\gamma_i \between \alpha\phi$ *interfaces.*

Postulate 7. $\forall i \in \{1, 2, 3\}$ *,* ϕ *believes that in the orbit interface* $\gamma_i/\alpha \between \alpha\phi$ *, there exist a logic mirror image which radius is equal to* $\alpha\gamma_i$ *, the basic properties of the logic mirror image is same as* $\alpha\gamma_i \frown \sigma\alpha\phi$ *.*

Postulate 8. *$\forall i \in \{1,2,3\}$, ϕ believes that in the orbit interface $\gamma_i \between \alpha\phi$, there exist a logic mirror image which radius is equal to $\alpha^2\gamma_i$, the basic properties of the logic mirror image is same as $\alpha^2\gamma_i \frown \sigma\alpha\phi$.*

Postulate 9. *$\forall i \in \{1,2,3\}$, ϕ believes that information wave ψ can be mutual superimposed at $\gamma_i \between \alpha\phi$ with the reciprocal symmetry information wave $\alpha\sigma\psi$, the direction of positive information wave is the direction of ψ , the direction of negative information wave is the opposite direction of ψ .*

Postulate 10. *ϕ believes that the information mapping between $\alpha\phi$ and $\sigma\alpha\phi$ can only occur at the logic interface that information wave or information wave projection far away side.*

Postulate 11. *ϕ believes that in the view of relative motion object, the meanings of absolute light speed c and relative light speed u need to be exchanged, that means u and c have the symmetry of observation angle.*

Postulate 12. *Wind wheel of small world provides an acceleration to earth wheel. At the end of every qt , ϕ will refresh the coordinate system, twist the flat area of Jambudvipa to be the globe, and twist all kinds of flat area of the small world that ϕ felt to the corresponding objects in the universe.*

4 Proposition

Proposition 1. *The relationship of c , u and v can be expressed as*

$$c^2 = u^2 + v^2$$

Proof. By Def 30 , if $v = c\sin\beta$, then $u = c\cos\beta$, so

$$c^2 = u^2 + v^2$$

□

Proposition 2. *qs denotes space quantum of ϕ , qL denotes space quantum of the moving object which ϕ felt, then the length shrinkage formula can be expressed as*

$$qL = qs\sqrt{1 - \frac{v^2}{c^2}}$$

Proof. By Pro 1 we get

$$c^2 = u^2 + v^2$$

then

$$\frac{u^2}{c^2} = 1 - \frac{v^2}{c^2}$$

By Def 7 we get

$$c = \frac{qs}{qt}$$

If ϕ measures time by qt , then set $u = qL/qt$, so

$$\frac{u}{c} = \frac{qL}{qs} = \sqrt{1 - \frac{v^2}{c^2}}$$

then we get

$$qL = qs\sqrt{1 - \frac{v^2}{c^2}}$$

□

Proposition 3. *qt denotes space quantum of ϕ , qT denotes space quantum of the moving object which ϕ felt, then the time expansion formula can be expressed as*

$$qT = \frac{qt}{\sqrt{1 - \frac{v^2}{c^2}}}$$

Proof. By Pro 1 we get

$$c^2 = u^2 + v^2$$

then

$$\frac{u^2}{c^2} = 1 - \frac{v^2}{c^2}$$

By Def 7 we get

$$c = \frac{qs}{qt}$$

If ϕ measures length by qs , then set $u = qs/qT$, so

$$\frac{u}{c} = \frac{qt}{qT} = \sqrt{1 - \frac{v^2}{c^2}}$$

then we get

$$qT = \frac{qt}{\sqrt{1 - \frac{v^2}{c^2}}}$$

□

Proposition 4. *m_s denotes the rest mass of an object, m_v denotes the moving mass of the object, then the relationship between m_s and m_v can be expressed as*

$$m_v = \frac{m_s}{\sqrt{1 - \frac{v^2}{c^2}}}$$

Proof. By Def 46 and Def 50 , $\dot{m}_s$ can be expressed as

$$\dot{m}_s = \frac{\dot{\varphi}}{4\pi qs^2} = \frac{4\pi qt\hbar}{4\pi qs^2} = \frac{\hbar}{cqs}$$

By Pro 2 , qs along the moving direction will be decreased as $qs \cos\beta$, where

$$\cos\beta = \sqrt{1 - \frac{v^2}{c^2}}$$

$\dot{m}_v$ denotes mass quantum of the moving object, then $\dot{m}_v$ will be identified as

$$\dot{m}_v = \frac{\hbar}{cqs\cos\beta} = \frac{\dot{m}_s}{\cos\beta}$$

$\forall k \in \mathbb{R}^+$, if $m_s = k\dot{m}_s$, then

$$\frac{m_s}{m_v} = \frac{k \cdot \dot{m}_s}{k \cdot \dot{m}_v} = \cos\beta$$

so we get

$$m_v = \frac{m_s}{\sqrt{1 - \frac{v^2}{c^2}}}$$

□

Proposition 5. *P_i denotes a moving object, ϕ_i denotes a rest observer relative to P_i , $\vec{v}_{ij}$ denotes the relative velocity between P_i and P_j which ϕ_i felt, β_{ij} denotes the phase difference between the two feature vectors $\vec{\gamma}_1 \between P_i$ and $\vec{\gamma}_1 \between P_j$ of P_i and P_j , qt_{ij} denotes time quantum of ϕ_j which ϕ_i felt, $\vec{v}_{13}$ denotes the synthesis velocity of $\vec{v}_{12}$ and $\vec{v}_{23}$, then in the view of ϕ_1 , the formula of synthesis velocity will be*

$$v_{13}{}^2 = v_{12}{}^2 + v_{23}{}^2 - \frac{v_{12}{}^2 v_{23}{}^2}{c^2} + 2|\vec{v}_{12}||\vec{v}_{23}| \cos^3 \beta_{12} \cos^2 \beta_{23} \cos\theta$$

Proof. By Pro 3 , the moving object exists time dilation effect, so

ϕ_1 believes qt_{12} of P_2 will be

$$qt_{12} = qt_1 \cos\beta_{12} \tag{1}$$

ϕ_1 believes qt_{13} of P_3 will be

$$qt_{13} = qt_1 \cos\beta_{13} \tag{2}$$

ϕ_1 believes P_3 has double time dilations connected by ϕ_2 . Because time is scalar, so double time dilations can be multiplied directly.

Assuming $\vec{v}_{12} \perp \vec{v}_{23}$, because under orthogonal condition, the velocity component of $\vec{v}_{23}$ along the direction of $\vec{v}_{12}$ is 0 , then ϕ_1 and ϕ_2 will feel the same time dilation of P_3 along the direction of $\vec{v}_{23}$, so under the condition of $\vec{v}_{12} \perp \vec{v}_{23}$, ϕ_1 will believe

$$qt_{13} = qt_1 \cos\beta_{12} \cos\beta_{23} \tag{3}$$

Put (2) into (3) , we get

$$\cos\beta_{13} = \cos\beta_{12} \cos\beta_{23} \tag{4}$$

where

$$\cos\beta_{12} = \sqrt{1 - \frac{v_{12}{}^2}{c^2}}$$

$$\cos\beta_{13} = \sqrt{1 - \frac{v_{13}{}^2}{c^2}}$$

$$\cos\beta_{23} = \sqrt{1 - \frac{v_{23}{}^2}{c^2}}$$

Put them into (4) , we get

$$v_{13}{}^2 = v_{12}{}^2 + v_{23}{}^2 - \frac{v_{12}{}^2 v_{23}{}^2}{c^2} \tag{5}$$

Known that the parallelogram law of vector synthesis is

$$c^2 = a^2 + b^2 + 2ab\cos\theta$$

θ denotes the angle of $\vec{v}_{12}$ and $\vec{v}_{23}$ that ϕ_1 felt, after add cosine correction item $2|\vec{v}_{12}||\vec{v}_{23}|\cos\theta$, (5) will be expanded to the formula of arbitrary velocity vector synthesis.

In the view of ϕ_1 , the velocity vector norm can be regarded as a kind of average speed, For the average speed $|\vec{v}_{12}|$ and $|\vec{v}_{23}|$, length contraction coefficient of numerator and time expansion coefficient of denominator can be superimposed, then the proportions of $|\vec{v}_{12}|$ and $|\vec{v}_{23}|$ are $\cos^2\beta_{12}$ and $\cos^2\beta_{23}$. Because the adjacent edge of $\cos\theta$ is the length of $\vec{v}_{12}$ direction, belong to moving coordinate system, so $\cos\theta$ has the length contraction coefficient $\cos\beta_{12}$. Changing cosine correction item

$$2|\vec{v}_{12}||\vec{v}_{23}|\cos\theta$$

into

$$2|\vec{v}_{12}||\vec{v}_{23}|\cos^3\beta_{12}\cos^2\beta_{23}\cos\theta$$

Combined with (5) , we get

$$v_{13}{}^2 = v_{12}{}^2 + v_{23}{}^2 - \frac{v_{12}{}^2 v_{23}{}^2}{c^2} + 2|\vec{v}_{12}||\vec{v}_{23}| \cos^3 \beta_{12} \cos^2 \beta_{23} \cos \theta$$

□

Proposition 6. *$\forall n \in \mathbb{N}$, if $r = nqs$, then $\psi = 2hr$.*

Proof. By Def 46 we get

$$\hbar = \frac{\dot{\varphi}}{4\pi qt}$$

By Def 36 , $\forall n \in \mathbb{N}$, if $r = nqs$, then $\varphi = n\dot{\varphi}$, so

$$\psi = \varphi \cdot c = n\dot{\varphi} \cdot c = 4\pi\hbar \cdot ncqt = 2h \cdot ncqt$$

Because $r = nqs = ncqt$, so $\psi = 2hr$.

□

Proposition 7. *r denotes the radius of ψ , p denotes the scalar field momentum of the information wavefront which radius is r , $\hbar$ denotes action quantum, the action relationship of the elementary particle can be expressed as*

$$p \cdot r = \hbar$$

Assuming an object contains n elementary particles, the action relationship of the object can be expressed as

$$p \cdot r = n\hbar$$

Proof. By Def 51 and Pro 6 , at the position where the information wavefront radius is r , the field mass can be expressed as

$$\widetilde{m} = \frac{\varphi}{4\pi r^2} = \frac{2hr}{4\pi r^2 c} = \frac{\hbar}{rc}$$

By Def 54 we get

$$p \cdot r = \hbar$$

Known that mass can be superimposed, if an object contains n elementary particles, then

$$p \cdot r = n\hbar$$

□

Proposition 8. *If ψ can only spread under two dimensional conditions, the action relationship under this condition can be expressed as*

$$p \cdot r = 4\hbar$$

Proof. Known that under the two dimensional condition, information distribution surface is a two dimensional circular surface.

By Def 51 and Pro 6 , $\widetilde{m}$ of the two dimensional information wave at radius r position can be expressed as

$$\widetilde{m} = \frac{\varphi}{\pi r^2} = \frac{2hr}{\pi r^2 c} = \frac{4\hbar}{rc}$$

By Def 54 we get

$$p \cdot r = 4\hbar$$

□

Proposition 9. *In the view of ϕ_i , the relative speed of a photon must be causal constant c .*

Proof. By Def 13 , in the view of ϕ_i , $E\alpha{\phi_i}^0$ and $E\alpha{\phi_i}^3$ are the mutually orthogonal complement spaces about the background space $E\xi_i$ of manas. Because any two vectors in orthogonal complement spaces must be mutually orthogonal, so the phase difference between $\vec{\gamma}_1 \between \alpha{\phi_i}^0$ and $\vec{\gamma}_1 \between \alpha{\phi_i}^3$ must be $\pi/2$.

By Def 29 , the relative speed between $\alpha{\phi_i}^0$ and $\alpha{\phi_i}^3$ can only be expressed as

$$v = c\sin\frac{\pi}{2} = c$$

Because the recognition of ϕ_i is confirmed by $\alpha{\phi_i}^3$ those constituting the body of ϕ_i , so in the view of ϕ_i , the relative speed of a photon must be causal constant c , that is the nature of principle of constant light speed.

□

Proposition 10. *P denotes an arbitrary space position, U denotes position potential energy, $\hbar$ denotes substance quantum, $\widetilde{m}$ denotes field mass, r denotes the distance between P and an elementary particle, then the position potential energy of P which the elementary particle contributed can be expressed as*

$$U = -\frac{\hbar c}{r} = -\widetilde{m}c^2$$

Proof. Known that elementary particles have wave particle duality, the position potential energy of P which being contributed by elementary particles totally come from their information waves.

By Def 36 , for an information wave ψ which radius is r , the total amount of its information can be restored to the information quantum $\dot{\varphi}$ by time inversion. Because the speed of information wave is equal to absolute light speed c , so the total time of inversion process can be expressed as

$$\triangle t = \frac{r}{c}$$

By Def 46 , $\dot{\varphi}$ corresponds to $\hbar$. By Def 48 , the relationship between position potential energy U and action A can be expressed as

$$A = \int_{\triangle t}^{0} U dt = \hbar$$

After the definite integral, by Pro 7 we get

$$U = -\frac{\hbar c}{r} = -\widetilde{m}c^2$$

□

Proposition 11. *Law of universal gravitation*

$$\vec{F} = G\frac{m_1 m_2}{r^2}\vec{1}$$

Proof. a and b denote two elementary particles, for the gravity between a and b , assuming the mass of both a and b are all $\dot{m}_s$, by Pro 10 , position potential energy which a contributed to b can be expressed as

$$U = -\frac{\hbar c}{r}$$

$\vec{1}$ denotes unit vector, by Def 49 , the gravity which a applied to b can be expressed as

$$\vec{F_0} = \frac{dU}{dr}\vec{1} = \frac{\hbar c}{r^2}\vec{1}$$

By 46 and Def 50 , the rest mass quantum

$$\dot{m}_s = \frac{\dot{\varphi}}{4\pi q s^2} = \frac{4\pi q t \hbar}{4\pi q s^2} = \frac{\hbar}{cqs}$$

m_1 denotes the mass of object A , m_2 denotes the mass of object B , set $m_1 = k_1\dot{m}_s$, $m_2 = k_2\dot{m}_s$, where $k_1, k_2 \in \mathbb{N}$, then the gravity which A applied to B can be expressed as

$$\vec{F} = \sum_{i=1}^{k_1}(\sum_{j=1}^{k_2}\vec{F}_0) = k_1 k_2 \frac{\hbar c}{r^2}\vec{1} = \frac{k_1\dot{m}_s \cdot k_2\dot{m}_s}{r^2}\frac{\hbar c}{\dot{m}_s{}^2}\vec{1}$$

Define gravity constant as

$$G = \frac{\hbar c}{\dot{m}_s{}^2}$$

then we get

$$\vec{F} = G\frac{m_1 m_2}{r^2}\vec{1}$$

□

Proposition 12. *Newton's second law*

$$\vec{F} = \frac{d(m\vec{v})}{dt}$$

Proof. m denotes the mass of an object, assuming the net force $\vec{F}$ acts on the object then producing a small displacement $\triangle\vec{x}$ along the direction of $\vec{F}$. By Def 49 we get

$$\triangle E = \vec{F} \cdot \triangle\vec{x}$$

The differential action of the object is

$$dA = \triangle\vec{x} \cdot d(m\vec{v})$$

By Def 48 we get

$$\triangle E = \frac{dA}{dt} = \frac{d(m\vec{v})}{dt}\triangle\vec{x} = \vec{F} \cdot \triangle\vec{x}$$

so the accurate expression of Newton's second law can be expressed as

$$\vec{F} = \frac{d(m\vec{v})}{dt}$$

□

Proposition 13. *v denotes the micro relative speed of a elementary particle, the wavelength of matter wave can be expressed as*

$$\lambda = \frac{h}{mv}$$

Proof. By Def 27 , the wavelength of material wave λ is equal to the circumference of revolution by the ending point of $\vec{\gamma}_i/\alpha \between \alpha\phi$. r denotes the wave amplitude of the material wave, then

$$\lambda = 2\pi r$$

By Def 52 , the mass of elementary particle is the field mass where being determined by the orbital radius r . Because the inner speed of the elementary particle is $v = \alpha c$, by Pro 7 we get

$$h = 2\pi\widetilde{m}c\alpha r = \lambda m v$$

so we get

$$\lambda = \frac{h}{mv}$$

□

Proposition 14. *Schrödinger equation*

$$i\hbar\frac{\partial}{\partial t}\psi(\vec{r},t) = -\frac{\hbar^2}{2m}\nabla^2\psi(\vec{r},t) + V(\vec{r},t)\psi(\vec{r},t)$$

Proof. By Def 27 , matter wave is a kind of phase wave, it can only be the plane monochromatic wave. A denotes wave amplitude, $\vec{k}$ denotes wave vector, ω denotes angular frequency, the matter wave equation in plural forms can be expressed as

$$\psi(\vec{r},t) = Ae^{i(\vec{k}\vec{r}-\omega t)} \tag{6}$$

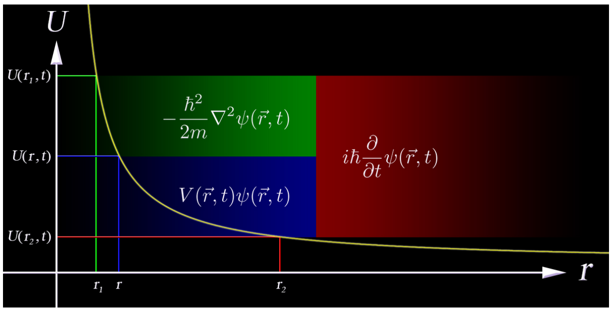

Figure 1: Schrödinger equation

As shown in Figure 1 , $U(\vec{r},t)$ denotes the potential energy of position $\vec{r}$ at t moment. Without loss of generality, let $\vec{r}$ of $\psi(\vec{r},t)$ points to space regain (r_1, r_2) . By Pro 10 , $U(\vec{r},t)$ must among $U(\vec{r}_1,t)$ and $U(\vec{r}_2,t)$.

Assuming the potential energy difference between two adjacent energy levels totally corresponds to the angular frequency of a matter wave, then the orbital potential energy difference between $U(\vec{r}_1,t)$ and $U(\vec{r}_2,t)$ can be expressed as

$$U(\vec{r}_1,t) - U(\vec{r}_2,t) = \hbar\omega$$

By Pro 13 we get $\lambda = h/mv$, because the definition of the wave vector is $\vec{k} = 2\pi/\vec{\lambda}$, so

$$\frac{k^2\hbar^2}{2m} = \frac{1}{2}mv^2 \tag{7}$$

Derivative (6) by time

$$\frac{\partial}{\partial t}\psi(\vec{r},t) = -i\omega\psi(\vec{r},t)$$

then

$$U(\vec{r}_1,t)\psi(\vec{r},t) - U(\vec{r}_2,t)\psi(\vec{r},t) = i\hbar\frac{\partial}{\partial t}\psi(\vec{r},t) \tag{8}$$

For two order partial derivative on (6) by r , we get

$$\frac{\partial^2}{\partial r^2}\psi(\vec{r},t) = -k^2\psi(\vec{r},t)$$

Assuming the energy difference between $U(\vec{r}_1,t)$ and $U(\vec{r},t)$ can be expressed as the kinetic energy of the particle, it can be expressed as

$$U(\vec{r}_1,t) - U(\vec{r},t) = \frac{1}{2}mv^2$$

Put it into (7) , we get

$$(U(\vec{r}_1,t) - U(\vec{r},t))\psi(\vec{r},t) = -\frac{\hbar^2}{2m}\frac{\partial^2}{\partial r^2}\psi(\vec{r},t) \tag{9}$$

Assuming $V(\vec{r},t)$ is the energy difference between $U(\vec{r},t)$ and $U(\vec{r}_2,t)$, that is

$$V(\vec{r},t) = U(\vec{r},t) - U(\vec{r}_2,t)$$

then we get

$$V(\vec{r},t)\psi(\vec{r},t) = (U(\vec{r},t) - U(\vec{r}_2,t))\psi(\vec{r},t) \tag{10}$$

After combined (8) (9) (10) , we get one dimensional Schrödinger equation

$$i\hbar\frac{\partial}{\partial t}\psi(\vec{r},t) = -\frac{\hbar^2}{2m}\frac{\partial^2}{\partial r^2}\psi(\vec{r},t) + V(\vec{r},t)\psi(\vec{r},t)$$

It can be extended to three dimensional Schrödinger equation

$$i\hbar\frac{\partial}{\partial t}\psi(\vec{r},t) = -\frac{\hbar^2}{2m}\nabla^2\psi(\vec{r},t) + V(\vec{r},t)\psi(\vec{r},t)$$

□

Proposition 15. *All the inner mirror images outside the spherically symmetric gravitational source contains the intrinsic velocity, the direction of the velocity is from the spherically symmetric gravitational center to the mirror image, the intrinsic rate can be expressed as*

$$v = \sqrt{\frac{2GM}{r}}$$

Proof. By Pos 12 , earthman twists the small world into universe by the recognition logic of his own ϕ .

In the small world, ϕ of Jambudvipa people twists the inertial acceleration which wind wheel apply to water wheel as the gravity of earth, that is the reason why the equivalent of inertial mass and gravitational mass in earthman's view.

Because ϕ of Jambudvipa people refreshes universe illusion every qt , so for any earthman, ϕ resets relationship between background space and absolute coordinate system of the small world.

Because ϕ always believe $E\phi$ is static, in the absolute coordinate system of the small world, when the coordinate origin of $E\phi$ moves into space point P_0 , ϕ will believe P_0 relative $E\phi$ static, when the coordinate origin of $E\phi$ moves into space point P_1 , ϕ will also believe P_1 relative $E\phi$ static, so ϕ will believe that there must has a relative speed $\vec{v}$ between P_0 and P_1 .

Because ϕ refreshes the origin of $E\phi$ every qt , that means when ϕ arrive P_1 , it will believe P_1 relative $E\phi$ static, so when the origin of $E\phi$ at P_0 and ϕ refresh $E\phi$, in order to guarantee the consistency of logic, ϕ must believe the front P_1 is far away from its own with relative speed $\vec{v}$, so that when the coordinate origin of $E\phi$ moves into P_1 , P_1 and ϕ can happen to be the relatively static state.

In the coordinate system of the small world, ϕ believes the space point in the acceleration direction has relative speed. Because ϕ of Jambudvipa people twists the small world into universe by the logic of his own feelings, so the relative speed of the small world will also be twisted correspondingly.

M denotes the total mass of earth, r denotes the radius of earth globe. Because ϕ of Jambudvipa people twists the inertial acceleration as the gravity of earth, so earthman will believe

$$a = G\frac{M}{r^2}$$

Assuming P_0 corresponds to the barycentre of earth, P_1 denotes the position of earthman, r denotes the distance of P_0 and P_1 , then in the small world

$$r = \frac{1}{2}at^2$$

so

$$a = G\frac{M}{r^2} = \frac{GM}{r \cdot \dfrac{1}{2}at^2} = \frac{2GM}{r \cdot at^2}$$

At t_0 moment, ϕ of P_0 will believe the relative speed of P_1 can be expressed as $v = at$, so in earthman's view, v will be twisted as

$$v^2 = a^2t^2 = \frac{2GM}{r}$$

then v is equal to the escape speed, that is

$$v = \sqrt{\frac{2GM}{r}}$$

Because in the small world, P_1 is in front of P_0 , so the direction of intrinsic velocity points from the spherically symmetric gravitational source center to P_1 .

Because ϕ_i of people construct universe illusion logically based on feelings, so the intrinsic velocity applicable to the space points outside various gravitational sources in the universe.

□

Proposition 16. *Photon passing through outside of any spherically symmetric gravitational source contains the logical relationship*

$$v^2dt^2 = c^2dt^2\cos^2\beta - \frac{dr^2}{\cos^2\beta} - r^2(d\theta^2 + \sin^2\theta d\varphi^2)$$

Proof. By Pro 15 , because ϕ_i twists the inertial acceleration as the gravity of the gravitational source, so all the inner images outside a gravitational source will contain the intrinsic velocities.

S denotes a spherically symmetric gravitational source, $P(r, \theta, \varphi)$ denotes a space point outside S with the coordinate (r, θ, φ) , M denotes the mass of S , ϕ denotes an observer outside S , $\vec{v}$ denotes the intrinsic velocity of the space point $P(r, \theta, \varphi)$. By Pro 15 we get

$$v = \sqrt{\frac{2GM}{r}}$$

In the view of ϕ , at position $P(r, \theta, \varphi)$, the line element vector of a photon $\alpha{\phi_i}^0$ will be

$$\vec{c}dt = d\vec{r} + \vec{r}d\theta + \vec{r}\sin\theta d\varphi$$

Because the photon at $P(r, \theta, \varphi)$ has been contained the intrinsic velocity, so ϕ will believe $\vec{c}dt$ of the photon $\alpha{\phi_i}^0$ has length contraction effect.

Because every line element vector of photon outside S has length contraction effect, so ϕ will believe if in the view of photon $\alpha{\phi_i}^0$, $\vec{c}dt$ need to be restored the status before the length contraction.

By Pos 11 , relative light speed u and absolute light speed c have the symmetry of observation angle. Because the relative velocity of photon $\alpha{\phi_i}^0$ has nothing to do with observation angle, so if we change the observation angle from ϕ to $\alpha{\phi_i}^0$, the content of relative light speed u and absolute light speed c need to be exchanged, then ϕ will believe the relationship in the view of its own

$$v^2dt^2 = c^2dt^2 - u^2dt^2$$

need to be changed into the relationship in the view of $\alpha{\phi_i}^0$

$$v^2dt^2 = u^2dt^2 - c^2dt^2$$

Because any two vectors among $d\vec{r}$, $\vec{r}d\theta$, $\vec{r}\sin\theta d\varphi$ are orthogonal each other, and the directions of $d\vec{r}$ and $\vec{v}$ are exactly the same, so only the direction $d\vec{r}$ has length contraction.

By Def 29 we get $v = c\sin\beta$, so

$$\sin^2\beta = \frac{v^2}{c^2} = \frac{2GM}{c^2r}$$

$$\cos^2\beta = 1 - \frac{v^2}{c^2} = 1 - \frac{2GM}{c^2r}$$

After restored dr^2 to $dr^2/\cos^2\beta$, we get the line element vector relationship of $P(r,\theta,\varphi)$, that is

$$c^2dt^2 = \frac{dr^2}{\cos^2\beta} + r^2d\theta^2 + r^2\sin^2\theta d\varphi^2$$

Because $u = c\cos\beta$, so in the view of ϕ , the relationship of any photon $\alpha\phi_i{}^0$ in $P(r,\theta,\varphi)$

$$v^2dt^2 = u^2dt^2 - c^2dt^2$$

can be expressed as

$$v^2dt^2 = c^2dt^2\cos^2\beta - \frac{dr^2}{\cos^2\beta} - r^2(d\theta^2 + \sin^2\theta d\varphi^2)$$

The formula is equivalent to Schwarzschild exterior solution of Einstein field equation.

$$ds^2 = c^2(1 - \frac{2GM}{c^2r})dt^2 - (1 - \frac{2GM}{c^2r})^{-1}dr^2 - r^2(d\theta^2 + \sin^2\theta d\varphi^2)$$

□

Proposition 17. *As shown in Figure 2 , v denotes the revolution velocity value of stars those around the galactic center, r denotes the distance between the star and the galactic center, curve A denotes the expected revolution velocity value of the stars under the condition of Newton's law of gravitation, curve B denotes the actual observation velocity value of the stars.*

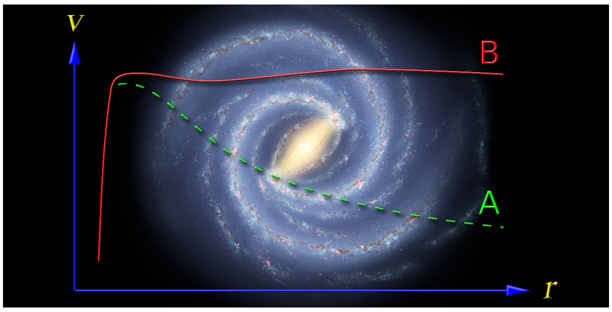

Figure 2: Galaxy rotation curve

In the view of ϕ , v of stars will basically remain constant at the edge of the galaxy.

Proof. S denotes a gravitational source in the universe, M_0 denotes the mass of S , P denotes a space point outside S , r denotes the distance between P and the centroid of S , qU denotes the minimum non-zero potential energy which ϕ felt, $U(r)$ denotes the gravitational potential energy of P which S contributed.

By Pro 10 we get

$$U = -\frac{\hbar c}{r}$$

In the gravitational field of S , there must exist a distance $\dot{r}_0$ cause $|U(\dot{r}_0)| = qU$. When $r > \dot{r}_0$, then $|U(r)| < qU$, so ϕ will believe $U(r) = 0$ because the value of $U(r)$ is too small to be processed, that means when $r > \dot{r}_0$, ϕ will believe $\vec{F}(r) = 0$, so the range of gravity is limited.

X denotes an object located at position P , m_0 denotes the real mass of X and $m_0 < M_0$. Because X can also affect S , so if we consider X affect S , by Pro 10 , there must exist a distance $\dot{x}_0$ cause $|U(\dot{x}_0)| = qU$.

Because $m_0 < M_0$, so $\dot{x}_0 < \dot{r}_0$, then the gravity's range of S is longer than the gravity's range of X . When the distance between S and X is longer than $\dot{x}_0$ and less than $\dot{r}_0$, then S can impose gravity on X , but X can not impose gravity on S , so the gravity is one-way effect under this condition. Without loss of generality, we analysis S effects X .

$\dot{r}_0$ denotes the maximum gravity's range of S , $\dot{r}_k$ denotes the gravity's range of S , $\mathbb{N}^+$ denotes natural number set without 0 , $\forall k \in \mathbb{N}^+$, if

$$L_k = \dot{r}_{k-1} - \dot{r}_k > qs$$

and

$$U(\dot{r}_{k-1}) - U(\dot{r}_k) = qU$$

then define L_k as the k-th free distance of S , define $\dot{r}_k$ as the k-th standard distance of S .

Considering X in L_k of S , by Pro 11 , the gravity of S at k-th standard distance $\dot{r}_k$ will be

$$\vec{F}(\dot{r}_k) = G\frac{M_0 m_0}{\dot{r}_k^2}\vec{1}$$

When $r \in (\dot{r}_k , \dot{r}_{k-1})$, set $\triangle r = r - \dot{r}_k$, because $\triangle r$ does not big enough to cause at least qU potential energy's change amount, so ϕ will believe $\triangle U(r) = 0$.

By Def 49 , the change amount of gravity nearby the position r will be

$$\triangle\vec{F}(r) = \frac{dU(r)}{dr}\vec{1} = 0$$

so the gravitational relations in L_k will be

$$\vec{F}(r) = \vec{F}(\dot{r}_k) - \triangle\vec{F}(r) = G\frac{M_0 m_0}{\dot{r}_k^2}\vec{1} = \vec{\eta}$$

Assuming exist logical mass change effect in L_k , shown as

$$M = M_0\frac{r}{\dot{r}_k} \tag{11}$$

and

$$m = m_0\frac{r}{\dot{r}_k} \tag{12}$$

then the gravity equation in L_k will be

$$\vec{F}(r) = G\frac{Mm}{r^2}\vec{1} = \vec{\eta} \tag{13}$$

Assuming L_k at the edge of distant galaxies is a macroscopic distance, then in L_k , the mass of stars will have corresponding logical changes. If the centripetal force entirely come from gravity, by (12) and (13) we get

$$\vec{F}(r) = G\frac{Mm}{r^2}\vec{1} = m\frac{v^2}{r}\vec{1} = m_0\frac{r}{\dot{r}_k}\frac{v^2}{r}\vec{1} = m_0\frac{v^2}{\dot{r}_k}\vec{1} = \vec{\eta}$$

Because m_0 and $\dot{r}_k$ are all constants, so in L_k , the value of linear velocity of stars those at the edge of galaxies will remain constant.

□

Proposition 18. *Gravitational red shift*

$$z = (1 - \frac{2GM}{c^2 r})^{-\frac{1}{2}} - 1$$

Proof. M denotes the mass of gravitational source. By Pro 15 , at the position where the distance from gravitational source center is r , the escape speed will be

$$v = \sqrt{\frac{2GM}{r}}$$

By Pro 3 we get

$$\frac{qt}{qT} = \sqrt{1 - \frac{2GM}{c^2 r}} \tag{14}$$

f_0 denotes the original frequency of a spectrum, f denotes the observed frequency of spectrum, z denotes red shift value. Known the definition of z is

$$z = \frac{f_0 - f}{f} \tag{15}$$

For gravitational red shift, because the space point has intrinsic velocity in the gravitational field nearby the light source, so f is the twisted frequency due to time dilation effect.

qT denotes the time quantum of light source which ϕ identified, qt denotes the time quantum of ϕ away from the gravitational source, set $qT = k/f$ and $qt = k/f_0$, where $k \in \mathbb{R}^+$, put them into (14) and (15) , then the gravitational red shift formula can be expressed as

$$z = (1 - \frac{2GM}{c^2 r})^{-\frac{1}{2}} - 1$$

□

Proposition 19. *Gravitational red shift under astronomical scale*

$$z = \frac{1}{\sqrt{1 - \eta \cdot r}} - 1$$

Proof. M_0 denotes the real mass of a gravitational source, r_0 denotes the radius of gravitational source's luminous interface. By Pro 18 , the gravitational red shift value at luminous interface of the gravitational source can be expressed as

$$z_0 = (1 - \frac{2GM_0}{c^2 r_0})^{-\frac{1}{2}} - 1$$

Assuming the k-th free distance L_k is the macroscopic distance, when $r \in (\dot{r}_k , \dot{r}_{k-1})$, by (11) of Pro 17 , the mass of gravitational source can be expressed as

$$M = M_0 \frac{r}{\dot{r}_k}$$

so the gravitational red shift value will be corrected to

$$z = (1 - \frac{2GM_0}{c^2 r_0 \dot{r}_k} \cdot r)^{-\frac{1}{2}} - 1$$

Because G , M_0 , c , r_0 , $\dot{r}_k$ are all constants, so

$$\frac{2GM_0}{c^2 r_0 \dot{r}_k} = \eta$$

then the gravitational red shift formula under astronomical scale can be expressed as

$$z = \frac{1}{\sqrt{1 - \eta \cdot r}} - 1$$

It meets the cosmological red shift observations very well based on the static model of universe.

□

Proposition 20. *i denotes imaginary unit, $i^n\vec{x}$ denotes a kind of rotation operation for $\vec{x}$, it rotates $\vec{x}$ consecutive n times $\pi/2$ to the direction of imaginary dimension i .*

x_0, x_1, x_2 denote the three dimensions of $E\phi_i$, x_1, x_2, x_3 denote the three dimensions of $E\alpha{\phi_i}^2$, x_3 denotes the imaginary dimension of $E\phi_i$, x_0 denotes the imaginary dimension of $E\alpha{\phi_i}^2$.

$\vec{a}$ denotes the complex vector in $E\phi_i$, $\vec{b}$ denotes the real unit vector in $E\phi_i$. $\forall\vec{a}$, $\forall\vec{b}$, if $\vec{a}\perp\vec{b}$, in the view of ϕ_i , there must exist a unique $i\vec{a}$, makes

$$\vec{a}\times\vec{b} = -\vec{b}\times\vec{a} = i\vec{a}\cdot b$$

Proof. E denotes the four dimensional Euclidean space being expended by x_0, x_1, x_2, x_3 dimensions.

Known that $\vec{a}\perp\vec{b}$, by Def 15 , if process coordinate transformation for E , point $\vec{b}$ to the positive direction of x_1 , point $\vec{a}$ to the positive direction of x_2 , because in the view of ϕ_i , only the dimension x_3 represents the imaginary dimension, so $i\vec{a}$ can and only can point to the positive direction of dimension x_3 , that means the direction of $i\vec{a}$ is existence and uniqueness.

By the definition of vector product, for arbitrary complex vector $\vec{a}$ and arbitrary real unit vector $\vec{b}$ in $E\phi_i$, if satisfied $\vec{a}\perp\vec{b}$, in the view of ϕ_i , there must exist only one $i\vec{a}$ in a qualified three dimensional Euclidean space makes

$$\vec{a}\times\vec{b} = -\vec{b}\times\vec{a} = i\vec{a}\cdot b$$

□

Proposition 21. *S denotes arbitrary closed surface, $d\vec{B}$ denotes a differential area vector on S , the normal points outside, B denotes the total area of S , $\vec{A}$ denotes the three dimensional complex vector field composed by field quantum $\alpha{\phi_i}^2$. For S , if $\vec{A}\perp d\vec{B}$, in the view of ϕ_i , there must exist a unique complex vector field $i\vec{A}$ in physical space, makes*

$$\oint_S \vec{A}\times d\vec{B} = i\vec{A}\cdot B$$

Proof. Because the physical space is quantized, length quantum qs is the natural length unit, so in physical space, the mold of $d\vec{B}$ must be unit area qs^2 .

In the view of ϕ_i , if $\vec{A}\perp d\vec{B}$, by Pro 20 , for arbitrary closed surface S , there must exist a unique $i\vec{A}$ in physical space, makes

$$\vec{A}\times d\vec{B} = i\vec{A}\cdot dB$$

After integral the closed surface S , we get

$$\oint_S \vec{A}\times d\vec{B} = i\vec{A}\cdot B$$

□

Proposition 22. *Gauss's law of electric field*

$$\nabla\cdot\vec{E} = \frac{\rho}{\varepsilon_0}$$

Proof. By Pro 7 , at position r , field momentum which contributed by λ charge quantum can be expressed as

$$p = \frac{\lambda\hbar}{r}$$

Known the electromagnetic field is consisted of $\alpha{\phi_i}^2$, any $\alpha{\phi_i}^2$ has an imaginary dimension. Without loss of generality, assuming the imaginary dimension corresponds to z coordinate axis of the x, y, z coordinate system, then r in $E\phi$ can be expressed as

$$r = \sqrt{x^2 + y^2 + (iz)^2} = \sqrt{x^2 + y^2 - z^2}$$

then

$$\nabla^2 \frac{1}{r} = \frac{1-i}{r^3}$$

By Def 58 we get

$$\vec{E} = \frac{\alpha c}{\epsilon}(\,\nabla p + i\,\nabla \times \vec{p}\,)(1+i\,)$$

For the divergence of electric field

$$\nabla \cdot \vec{E} = (1+i\,)\frac{\alpha c}{\epsilon}(\,\nabla^2 p + 0\,) = (1+i\,)\frac{\lambda \alpha h c}{e}\nabla^2 \frac{1}{r} = \frac{2\lambda \alpha h c}{e r^3}$$

Define electric constant as

$$\varepsilon_0 = \frac{e^2}{2\alpha h c}$$

Because the total net charge can be expressed as λe , so

$$\varepsilon_0 \, \nabla \cdot \vec{E} = \frac{\lambda e}{r^3} = \rho$$

then we get Gauss's law of electric field

$$\nabla \cdot \vec{E} = \frac{\rho}{\varepsilon_0}$$

□

Proposition 23. *Gauss's law of magnetic field*

$$\nabla \cdot \vec{B} = ic\rho\mu_0$$

Proof. By Def 59 we get

$$\vec{B} = \frac{\alpha}{\epsilon}(\,i\,\nabla p - \nabla \times \vec{p}\,)(1+i\,)$$

By Pro 22 we get

$$\nabla \cdot \vec{B} = \frac{i}{c}\,\nabla \cdot \vec{E} = \frac{i\rho}{\varepsilon_0 c} = ic\rho\mu_0$$

where $\varepsilon_0\mu_0 = 1/c^2$.

Because ϕ can not identify the imaginary scalar $ic\rho\mu_0$, so people usually misunderstand that

$$\nabla \cdot \vec{B} = 0$$

Gauss's law of magnetic field can be accurately expressed as

$$\nabla \cdot \vec{B} = ic\rho\mu_0$$

□

Proposition 24. *Faraday's law of induction*

$$\nabla \times \vec{E} = -\frac{\partial \vec{B}}{\partial t}$$

Proof. By Def 58 and Def 59 we get

$$\triangle \vec{E} = -ic\triangle \vec{B}$$

The definition of curl can be expressed as

$$\nabla \times \triangle \vec{E} = -\lim_{V \to 0} \frac{\oint_S \triangle \vec{E} \times d\vec{S}}{V}$$

Because the closed surface which related to volume derivative can be any closed surface, so it can be assumed that the differential area vectors of closed surface S meet $d\vec{B} \perp \triangle\vec{E}$.

By Pro 21 , if $d\vec{B} \perp \triangle\vec{E}$, there must exist a unique complex vector field $i\triangle\vec{E}$, makes

$$\lim_{V\to 0} \frac{\oint_S \triangle\vec{E} \times d\vec{S}}{V} = \lim_{V\to 0} \frac{i\triangle\vec{E} \cdot S}{V} = \lim_{V\to 0} \frac{c\triangle\vec{B} \cdot S}{V}$$

For the time derivative of $\vec{B}$

$$\frac{\partial\vec{B}}{\partial t} = \lim_{\triangle t\to 0} \frac{\triangle\vec{B}}{\triangle t} = \lim_{l\to 0} \frac{c\triangle\vec{B}}{l} = \lim_{V\to 0} \frac{c\triangle\vec{B} \cdot S}{V}$$

where S can be arbitrary surface area, $l = c\triangle t$, $V = l \cdot S$.

$\triangle\vec{E}$ denotes induced electric field, abbreviated as $\vec{E}$, then we get Faraday's law of induction

$$\nabla\times\vec{E} = -\frac{\partial\vec{B}}{\partial t}$$

□

Proposition 25. *Ampere-Maxwell's law*

$$\nabla\times\vec{B} = \mu_0\vec{J} + \varepsilon_0\mu_0\frac{\partial\vec{E}}{\partial t}$$

Proof. $\triangle\vec{B}$ denotes induced magnetic field, by Pro 24 we get

$$\frac{\partial\vec{E}}{\partial t} = -ic\frac{\partial\vec{B}}{\partial t} = ic\nabla \times \triangle\vec{E} = c^2\nabla \times \triangle\vec{B}$$

Set $\varepsilon_0\mu_0 = 1/c^2$, abbreviated $\triangle\vec{B}$ as $\vec{B}$, we get

$$\nabla\times\vec{B} = \frac{1}{c^2}\frac{\partial\vec{E}}{\partial t} = \varepsilon_0\mu_0\frac{\partial\vec{E}}{\partial t} \tag{16}$$

For static magnetic field, curl $\vec{B}$ directly

$$\begin{aligned} \nabla\times\vec{B} &= (1+i)\frac{\alpha}{\epsilon}\nabla\times(i\nabla p - \nabla\times\vec{p}) \\ &= -(1+i)\frac{\alpha}{\epsilon}\nabla\times(\nabla\times\vec{p}) \end{aligned} \tag{17}$$

Because $\vec{p} = \vec{p}_s + \vec{p}_v$, where $\vec{p}_s$ denotes the irrotational vector field momentum, so

$$\nabla\times\vec{p} = \nabla\times\vec{p}_v$$

Known that curl of curl can be expressed as

$$\nabla\times(\nabla\times\vec{p}) = \nabla\times(\nabla\times\vec{p}_v) = \nabla(\nabla\cdot\vec{p}_v) - \nabla^2\vec{p}_v$$

Because $\vec{p}_v$ is the solenoidal vector field momentum, so

$$\nabla(\nabla\cdot\vec{p}_v) = 0$$

By Pro 7 , the relationship between r and $\vec{p}_v$ will be

$$\vec{p}_v = \frac{\lambda\hbar}{rc}\vec{c}_v$$

where λ denotes the total amount of net charges, $\vec{c}_v$ denotes the light speed vector along the direction of rotation, then (17) can be simplified as

$$\nabla \times \vec{B} = (1+i)\frac{\alpha}{\epsilon}\nabla^2 \vec{p}_v = (1+i)\frac{\lambda \alpha h \vec{c}_v}{ec}\nabla^2 \frac{1}{r} = \frac{2\lambda \alpha h \vec{c}_v}{ecr^3} \tag{18}$$

By the definition of ε_0 , we get

$$\alpha = \frac{e^2}{2\varepsilon_0 hc}$$

then (18) can be simplified as

$$\nabla \times \vec{B} = \frac{\lambda e \mu_0}{r^3}\vec{c}_v$$

Known the total number of charges can be expressed as λe , define current density $\vec{J}$ as

$$\vec{J} = \frac{\lambda e}{r^3}\vec{c}_v$$

we get

$$\nabla \times \vec{B} = \mu_0 \vec{J} \tag{19}$$

After combined (16) and (19) , we get Ampere-Maxwell's law

$$\nabla \times \vec{B} = \mu_0 \vec{J} + \varepsilon_0 \mu_0 \frac{\partial \vec{E}}{\partial t}$$

□

Proposition 26. *As shown in Figure 3 , A denotes the flash point of a photon at t_0 moment, B denotes the flash point of the same photon at t_1 moment, and $t_1 - t_0 = qt$. P denotes the reflection position, θ_1 denotes incident angle, θ_2 denotes reflection angle. Reflection law can be expressed as $\theta_1 = \theta_2$.*

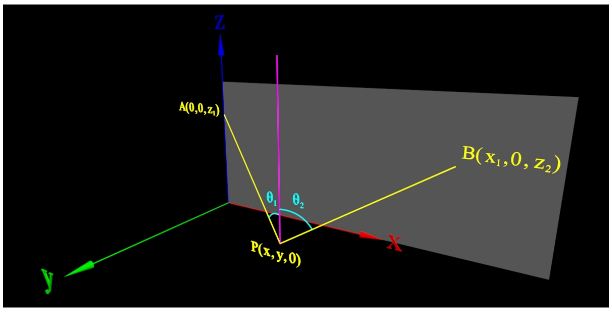

Figure 3: Law of reflection

Proof. Because the distance which a photon passing through in qt must be qs , so $|AP| + |PB| = qs$, where

$$|AP| = \sqrt{x^2 + y^2 + {z_1}^2}$$

$$|PB| = \sqrt{(x_1 - x)^2 + y^2 + {z_2}^2}$$

Partial derivative qs , we get

$$\frac{\partial qs}{\partial y} = \frac{y}{|AP|} + \frac{y}{|PB|} = 0 \tag{20}$$

$$\frac{\partial qs}{\partial x} = \frac{x}{|AP|} - \frac{x_1 - x}{|PB|} = \sin\theta_1 - \sin\theta_2 = 0 \tag{21}$$

By (20) we get $y = 0$, that means incident ray, normal and reflected ray coplanar. By (21) we get $\theta_1 = \theta_2$, that means the angle of incidence is equal to the angle of reflection.

□

Proposition 27. *As shown in Figure 4 , A denotes the flash point of a photon at t_0 moment, B denotes the flash point of the same photon at t_1 moment, and $t_1 - t_0 = qt$. P denotes the intersection point of light ray and medium interface, θ_1 denotes incident angle, θ_2 denotes refraction angle, v_1 denotes average speed of photon in medium 1 , v_2 denotes average speed of photon in medium 2 . Refraction law can be expressed as $v_2 \sin\theta_1 = v_1 \sin\theta_2$.*

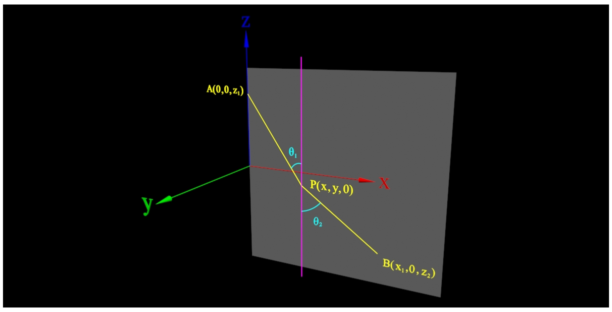

Figure 4: Law of refraction

Proof. Because the time interval between two adjacent flashes of a photon must be qt , then

$$\frac{|AP|}{v_1} + \frac{|PB|}{v_2} = qt$$

Partial derivative qt , we get

$$\frac{\partial qt}{\partial y} = \frac{y}{v_1|AP|} + \frac{y}{v_2|PB|} = 0 \tag{22}$$

$$\frac{\partial qt}{\partial x} = \frac{x}{v_1|AP|} - \frac{x_1 - x}{v_2|PB|} = \frac{\sin\theta_1}{v_1} - \frac{\sin\theta_2}{v_2} = 0 \tag{23}$$

By (22) we get $y = 0$, that means incident ray, normal and refracted ray coplanar. By (23) we get

$$v_2 \sin\theta_1 = v_1 \sin\theta_2$$

□

5 The base of natural logarithm

The base of natural logarithm e closely related to the logical rules of ϕ for constructing the illusion world. e or $1/e$ can be regarded as the systematic errors cumulative results of ϕ constructing the illusion world. One of the definition of e can be expressed as

$$\lim_{n\to\infty} (1 + \frac{1}{n})^n = e$$

By Pos 1 , the data processing capability of ϕ is limited. Assuming the maximum natural number which can be processed by ϕ is n , then the error size of unit 1 will be $1/n$, and the total cumulative number of the systematic error will be n times, when ϕ constructs the illusion world, the cumulative systematic error results about unit 1 can be expressed as

$$(1 + \frac{1}{n})^n$$

or

$$(1 - \frac{1}{n})^n$$

Because n is a very large natural number, we can even to think that $n \to \infty$, so when ϕ constructs the illusion world, the cumulative system errors results about unit 1 will be

$$\lim_{n\to\infty} (1+\frac{1}{n})^{n} = e$$

or

$$\lim_{n\to\infty} (1-\frac{1}{n})^{n} = \frac{1}{e}$$

6 Structure of hydrogen atom

Figure 5 represents a apart of the space structure of $\alpha\phi$. The radius of green ball is $\gamma_3 \between \alpha\phi$, the radius of red ball is $\gamma_2 \between \alpha\phi$, $\gamma_1 \between \alpha\phi$ logic interface is inside the red ball, blue round face represents the round surface of single degree freedom intrinsic rotation of $\alpha\phi$.

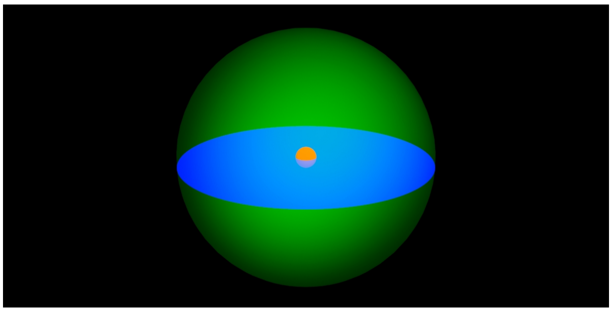

Figure 5: $\gamma_3 \between \alpha\phi$ and $\gamma_2 \between \alpha\phi$ logic interface

Because when ϕ being mapped to $\alpha\phi$, the angular frequency can not be changed, so any hydrogen atom structure can be determined by the three intrinsic rotation angular frequency parameters, continuously reciprocal transformation and accurate recognition rules of ϕ . $\forall i \in \{1,2,3\}$, taking $\alpha\phi$ by reciprocal transformation with fix points those at $\gamma_i \between \alpha\phi$ feature interfaces, that shows the precision structure of a hydrogen atom.

Assuming the three intrinsic angular frequency parameters of ϕ can be expressed as $\omega_1 > \omega_2 > \omega_3 > 0$, when the radius of ϕ is greater than γ_2 , the linear velocities those corresponding to ω_1 and ω_2 will leave the causality chain which ϕ constructing the world illusion because of super velocity of light, then the space area between γ_3 and γ_2 logic interface (the blue round face in Figure 5) can only has a single degree of freedom intrinsic rotation, that means the recognition logic of ϕ at that area must be two dimensional round face.

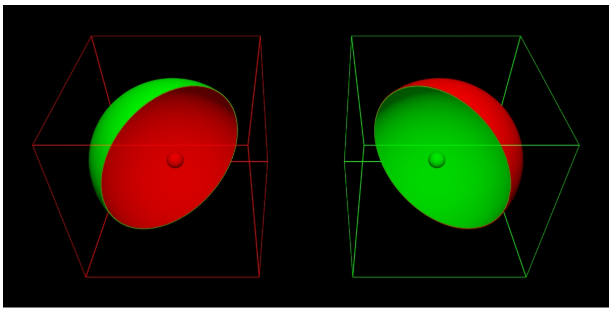

Figure 6: Three dimensional Taiji

As shown in Figure 6 , the red frame denotes $E\alpha\phi$, the green frame denotes $\sigma E\alpha\phi$, $\forall i \in \{1,2,3\}$, the i-th layer of Taiji can be expressed as

1. The outer surface of red ball $\alpha\gamma_i \frown \alpha\phi$ in $E\alpha\phi$ is the i-th layer Yang eye of $\alpha\phi$.
2. The inner surface of red ball $\alpha\gamma_i \smile \alpha\phi$ in $E\alpha\phi$ is the i-th layer Yin eye of $\alpha\phi$.
3. The outer surface of spherical shell $\gamma_i/\alpha \frown \alpha\phi$ in $E\alpha\phi$ is the i-th layer Yin fish of $\alpha\phi$.
4. The inner surface of spherical shell $\gamma_i/\alpha \smile \alpha\phi$ in $E\alpha\phi$ is the i-th layer Yang fish of $\alpha\phi$.
5. The outer surface of green ball $\alpha\gamma_i \frown \sigma\alpha\phi$ in $\sigma E\alpha\phi$ is the i-th layer Yin eye of $\sigma\alpha\phi$.
6. The inner surface of green ball $\alpha\gamma_i \smile \sigma\alpha\phi$ in $\sigma E\alpha\phi$ is the i-th layer Yang eye of $\sigma\alpha\phi$.
7. The outer surface of spherical shell $\gamma_i/\alpha \frown \sigma\alpha\phi$ in $\sigma E\alpha\phi$ is the i-th layer Yang fish of $\sigma\alpha\phi$.
8. The inner surface of spherical shell $\gamma_i/\alpha \smile \sigma\alpha\phi$ in $\sigma E\alpha\phi$ is the i-th layer Yin fish of $\sigma\alpha\phi$.

If we regard $\alpha\phi^3$ as the hydrogen atom, then the electron is the third layer Yin fish of $\alpha\phi^3$, the positron is the third layer Yang eye of $\alpha\phi^3$, the proton is the second layer Yang eye of $\alpha\phi^3$, the negative proton is the second layer Yin fish of $\alpha\phi^3$.

In essence, positron is related to $\gamma_3 \between \phi$ feature interface, because from $\gamma_3 \frown \phi$ to infinite, the recognition logic of ϕ will not being limited by intrinsic rotation line speed and then restore the three-dimensional state, so under normal circumstances, the logic relation of positron is three-dimensional, symmetrically, electron and electron's image are also three-dimensional. The feature radius of electron is equal to γ_3 , m_e denotes the rest mass of electron, by Def 52 and Pro 7 , the theoretical value of γ_3 can be expressed as

$$\gamma_3 = \frac{\hbar}{m_e c} = 3.8615926750 \times 10^{-13}\, m$$

The classical electron radius of theoretical value is

$$\alpha\gamma_3 = 2.8179403217 \times 10^{-15}\, m$$

The classical electron radius of CODATA 2014 recommended value is

$$r_e = 2.8179403227(19) \times 10^{-15}\, m$$

The electron orbit radius of theoretical value is

$$\gamma_3/\alpha = 5.2917721048 \times 10^{-11}\, m$$

The electron orbit radius of CODATA 2014 recommended value (Bohr radius) is

$$a_0 = 5.2917721067(12) \times 10^{-11}\, m$$

When ϕ identifies a proton, the recognition logic will focus on $\gamma_2 \frown \alpha\phi$, because from $\gamma_2 \frown \alpha\phi$ interface to $\gamma_3 \smile \alpha\phi$ interface, the recognition logic of ϕ must be two dimensional, so in the view of ϕ , a proton must be identified as a two dimensional round face, the action relations of proton applies to Pro 8 . Known the charge radius of proton is equal to γ_2 , by Def 52 and Pro 8 , the theoretical value of proton feature radius γ_2 will be

$$\gamma_2 = \frac{4\hbar}{m_p c} = 0.84123564019 \times 10^{-15}\, m$$

7 Special interfaces

Because in the view of ϕ , information wave ψ is the simulation of data wave δ , and ϕ itself has never-ending reciprocal transformation, so inner image $\alpha\phi$ must associate with the projections of special logic interfaces of ϕ , those special projections will be identified as particles similar to elementary particles, they also have wave-particle duality, even have some unique properties. In order to facilitate the description, these particles are also classified as the category of elementary particles.

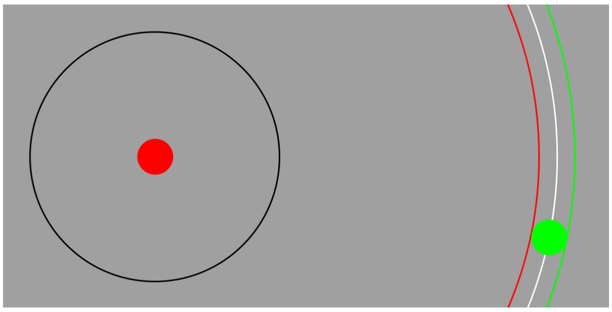

Figure 7: Special interfaces

As shown in Figure 7 , $\forall i \in \{1,2,3\}$, the red circle denotes the logic interface $\alpha^2\gamma_i \between \alpha\phi$, the black annular denotes the action interface $\alpha\gamma_i \between \alpha\phi$, the white annular denotes feature interface $\gamma_i \between \alpha\phi$, the green circle denotes the logic image random occurrence at $\alpha^2\gamma_i \between \alpha\phi$ which radius is equal to $\alpha^2\gamma_i$, the red annular denotes $(1-\alpha^2)\gamma_i \between \alpha\phi$, the green annular denotes $(1+\alpha^2)\gamma_i \between \alpha\phi$.

By Pos 8 , the logic mirror image which green circle represented has the same fundamental properties with $\alpha^2\gamma_i \frown \sigma\alpha\phi$. $\alpha^2\gamma_i \frown \alpha\phi$ which red circle represented can be named Zhen, denoted by b_i . $\alpha^2\gamma_i \frown \sigma\alpha\phi$ which green circle represented can be named Xun, denoted by w_i . Because the center of w_i at feature interface $\gamma_i \between \alpha\phi$, and the radius of w_i is equal to $\alpha^2\gamma_i$, so the edge of w_i can creat $(1+\alpha^2)\gamma_i \between \alpha\phi$ logic interface at the positions in $\alpha\phi$ where radius is $r = (1+\alpha^2)\gamma_i$, the logic interface can be named Gen, denoted by g_i . If b_i appears at feature interface $\gamma_i \between \alpha\phi$ of other inner image $\alpha\phi$, forming a logic interface $(1-\alpha^2)\gamma_i \between \alpha\phi$, then name $(1-\alpha^2)\gamma_i \between \alpha\phi$ as Dui, denoted by d_i .

Because Zhen hand Xun do not belong to Taiji, so under normal circumstances, Zhen hand Xun have not any charge. Because ϕ can process charge blessing to Zhen hand Xun, so under some special circumstance, Zhen hand Xun may exist temporary charge properties.

By Def 51 , the three dimensional electron mass m_e can be expressed as

$$m_e = \frac{\varphi}{4\pi{\gamma_3}^2}$$

Because Xun w_i reflects the essential properties of $\alpha^2\gamma_i \frown \sigma\alpha\phi$, so the information sphere radius of Gen g_i must be $r = \gamma_i/(1+\alpha^2)$. Because g_3 reflects the internal state of $\gamma_3 \between \sigma\alpha\phi$, so the mass of g_3 must be two dimensional mass. Because the information of g_i belongs to the reciprocal symmetry world, so the background information of g_i will be $\alpha\varphi/(1+\alpha^2)$. By Def 51 , under the circumstance that the background information is equal to $\alpha\varphi/(1+\alpha^2)$, the two dimensional mass of $\gamma_3/(1+\alpha^2) \frown \sigma\alpha\phi$ can be expressed as

$$\frac{\alpha\varphi(1+\alpha^2)^2}{(1+\alpha^2)\pi{\gamma_3}^2} = 4\alpha m_e(1+\alpha^2)$$

Because g_i is created by ϕ according to the data that w_i moving at its orbit interface, so ϕ needs to consider the system error of ϕ . Known the system error of ϕ is equal to the base of natural logarithm e , $\widetilde{m}_{g_3}$ denotes the two dimensional mass of g_3 , then $\widetilde{m}_{g_3}$ can be expressed as

$$\widetilde{m}_{g_3} = \frac{4\alpha m_e(1+\alpha^2)}{e}$$

Because Gen g_i and Xun w_i have the same intrinsic causality, so g_i and w_i have same inner speed, they are all equal to αc . m_{g_3} denotes the two dimensional mass of g_3 , by Pro 4 we get

$$m_{g_3} = \frac{\widetilde{m}_{g_3}}{\sqrt{1-\dfrac{v^2}{c^2}}} = \frac{\widetilde{m}_{g_3}}{\sqrt{1-\alpha^2}}$$

then m_{g_3} can be expressed as

$$m_{g_3} = \frac{4\alpha m_e(1+\alpha^2)}{e\sqrt{1-\alpha^2}} \tag{24}$$

Because Zhen b_i does not relate to the reciprocal symmetry inner image directly, so the information sphere radius of Dui d_3 will be $r = (1-\alpha^2)\gamma_i$. Because d_3 reflects the status those inside $\gamma_3 \between \alpha\phi$, so the mass of d_3 is two dimensional mass.

By Def 51 , if the background information is equal to $\alpha(1-\alpha^2)\varphi$, then the two dimensional mass of the logic interface $(1-\alpha^2)\gamma_3 \frown \alpha\phi$ can be expressed as

$$\frac{\alpha(1-\alpha^2)\varphi}{\pi(1-\alpha^2)^2{\gamma_3}^2} = \frac{4\alpha m_e}{1-\alpha^2}$$

Because d_i is created by ϕ according to the data that b_i moving at its orbit interface, so ϕ needs to consider the system error e . $\widetilde{m}_{d_3}$ denotes the two dimensional mass of d_3 , then $\widetilde{m}_{d_3}$ will be

$$\widetilde{m}_{d_3} = \frac{4\alpha m_e}{e(1-\alpha^2)}$$

Because Dui d_i and Zhen b_i have the same intrinsic causality, so d_i and b_i have same inner speed, they are all equal to αc . m_{d_3} denotes the two dimensional mass of d_3 , by Pro 4 we get

$$m_{d_3} = \frac{\widetilde{m}_{d_3}}{\sqrt{1-\alpha^2}}$$

then m_{d_3} can be expressed as

$$m_{d_3} = \frac{4\alpha m_e}{e(1-\alpha^2)\sqrt{1-\alpha^2}} \tag{25}$$

For the information wave ψ of inner image $\alpha\phi$, because Gen and Xun absorb the information wave, so the mass of Gen and Xun inside $\alpha\phi$ show negative mass, because Dui and Zhen emit the information wave, so the mass of Gen and Xun inside $\alpha\phi$ show positive mass.

Because the inner surface of Gen corresponds to the inner surface of Xun, the inner surface of Dui corresponds to the outer surface of Zhen, and Zhen and Xun are reversed the inside and outside, so Gen and Dui will all show negative magnetic moment inside $\alpha\phi$.

8 Mass of hydrogen

Because of the existence of the reciprocal symmetry world, there must exist the reciprocal symmetry information wave $\sigma\psi$. Because $\sigma\psi$ can only be distinguished at the logical interface where the reciprocal symmetrical fixed points located, so information wave ψ can be superimposed with $\alpha\sigma\psi$ only at the feature interface of $\alpha\phi$, that is the nature of Pos 9 .

As shown in Figure 8 , $\forall i \in \{1,2,3\}$, the left circle denotes the feature interface $\gamma_i \between \alpha\phi$, the right circle denotes the feature interface $\gamma_i \between \sigma\alpha\phi$, the red arrow denotes the propagation direction of ψ , the green arrow denotes the propagation direction of $\sigma\psi$, φ denotes the information amount corresponding to ψ or $\sigma\psi$.

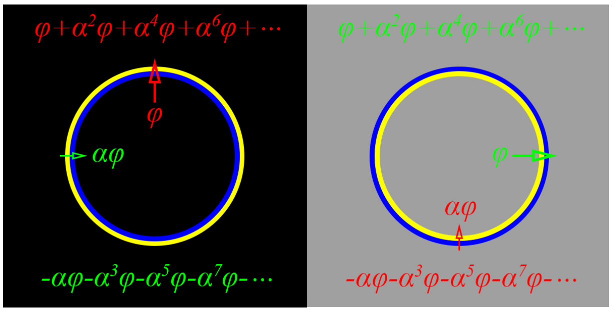

Figure 8: Accumulation of information at logical interfaces

Consider the information wave ψ passing through the feature interface $\gamma_i \between \alpha\phi$ from inside to outside. By Pos 9 and Pos 10 , when ψ reaches $\gamma_i \frown \alpha\phi$, it will trigger the mapping operation, so that when ψ passing through $\gamma_i \frown \alpha\phi$, it will being mapped to $\sigma\alpha\phi$ world to be $\sigma\alpha\psi$, by the same reason, the reciprocal symmetry $\sigma\alpha\psi$ will trigger the mapping operation at $\gamma_i \frown \sigma\alpha\phi$, so that when $\sigma\alpha\psi$ passing through $\gamma_i \frown \sigma\alpha\phi$, it will being mapped to $\alpha\phi$ world to be $\alpha^2\psi$. The continuous mapping process will form a sequence, cause the total information amount of $\gamma_i \between \alpha\phi$ to be $\varphi + \alpha^2\varphi + \alpha^4\varphi + \alpha^6\varphi + \cdots$, symmetrically, the reciprocal symmetry $\sigma\alpha\psi$ will also form another sequence, cause the total information amount of $\gamma_i \between \alpha\phi$ has the change of $-\alpha\varphi - \alpha^3\varphi - \alpha^5\varphi - \alpha^7\varphi - \cdots$, then the total information amount of $\gamma_i \between \alpha\phi$ can be expressed as

$$\alpha^0\varphi - \alpha^1\varphi + \alpha^2\varphi - \alpha^3\varphi + \alpha^4\varphi - \alpha^5\varphi + \cdots$$

φ_p denotes the background information amount those corresponding to ψ passing through $\gamma_2 \between \alpha\phi$ feature interface, φ_x denotes the cumulated information amount those φ_p being mapped among $\alpha\phi$ and $\sigma\alpha\phi$ repeatedly, then the relationship of φ_x and φ_p can be expressed as

$$\varphi_x = \varphi_p \sum_{n=0}^{\infty} (-\alpha)^n = \frac{\varphi_p}{1+\alpha} \tag{26}$$

m_x denotes the comprehensive proton mass inside the hydrogen atom, m_p denotes the rest mass of proton, m_v denotes the microscopic dynamic mass of proton. Known the inner speed of proton can be expressed as $v = \alpha c$, by Pro 4 we get

$$m_v = \frac{m_p}{\sqrt{1 - \dfrac{\alpha^2 c^2}{c^2}}} = \frac{m_p}{\sqrt{1-\alpha^2}}$$

By Def 51 , the nature of mass is surface density of φ . r_p denotes the radius of proton's information distribution surface, by (26) , the relationship of m_x and m_v can be expressed as

$$\frac{\varphi_x}{\varphi_p} = \frac{1}{1+\alpha} = \frac{\pi {r_p}^2 m_x}{\pi {r_p}^2 m_v} = \frac{m_x}{m_v}$$

then the relationship between m_x and m_p will be

$$m_x = \frac{m_p}{(1+\alpha)\sqrt{1-\alpha^2}}$$

By Pos 5 , only in very special circumstances, ϕ can distinguish the mass inside the $\gamma_1 \between \alpha\phi$. If the recognition logic of ϕ continue inwards from $\gamma_2 \frown \alpha\phi$, it will change the recognition logic from two dimensional to three dimensional, this kind of adding dimension operation will cause ϕ can not establish the exact logical relationship within $\gamma_2 \frown \alpha\phi$. For example, three dimensional sphere being mapped into a two dimensional plane can form two dimensional circle, but the two dimensional circle mapping back to the three dimensional space, it will not being restored into the three dimensional sphere because of the lack of necessary parameters, adding dimension operation is usually more complicated than reducing dimension operation, that is the nature of Pos 5 .

Because both the electron image and the positron image are all corresponding to $\gamma_3 \between \alpha\phi$ feature interface, when the information wave ψ passing through $\gamma_3 \between \alpha\phi$, no matter how the information φ mapping and accumulation, the mass of $\gamma_3 \smile \alpha\phi$ and $\gamma_3 \frown \alpha\phi$ are all inverse to each other, so the mass of electron image and the mass of positron will be cancelled out each other. By Pos 5 , ϕ can not construct the three dimensional logic relationship inside $\gamma_2 \smile \alpha\phi$, because of the existence of reciprocal symmetric relations, causes Gen u_2 can not being generated outside of $\gamma_2 \between \alpha\phi$, so the mass of $\gamma_2 \frown \alpha\phi$ which corresponding to proton mass m_p will be the most important contributor to the mass of hydrogen atom. Because Zhen and Xun have attributes with internal and external inversion, so the mass of Zhen and Xun can be cancelled out each other. Because the mass of Gen g_3 can net being cancelled out inside the hydrogen atom, so the mass of Gen g_3 is another key factor to the mass of hydrogen atom.

By (24) , the two dimensional moving mass of g_3 can be expressed as

$$m_{g_3} = \frac{4\alpha m_e(1+\alpha^2)}{e\sqrt{1-\alpha^2}}$$

m_h denotes the theoretical mass of hydrogen atom, because the outer surface of g_3 absorbs the information waves, so m_{g_3} is negative mass compare to m_h . Because ϕ can not construct the mass those inside $\gamma_2 \between \alpha\phi$, so m_h can be expressed as

$$m_h = m_x - m_{g_3} = 1.6605390406 \times 10^{-27}\, kg$$

By means of the Avogado constant N_A we can verify the correctness of the m_h . The definition of Molar mass constant is $M_u = 0.001\, kg/mol$, the ratio of M_u and m_h is theoretical value of Avogado constant N_A , that is

$$N_A = \frac{M_u}{m_h} = 6.0221408564 \times 10^{23}\, mol^{-1}$$

Known the CODATA 2014 Recommended value of N_A is $6.022140857(74) \times 10^{23}\, mol^{-1}$, that shows the theoretical value of N_A is in complete agreement with the experimental observation, we may believe the theoretical model of this paper is a kind of credible model describing the internal structure of hydrogen atom..

9 Mass of neutron

Assuming neutron is a kind of mixture particle by a proton and an external electron, m_p denotes the mass of proton, m_e denotes the mass of electron. Because the mass of electron image is equivalent to the filed mass of the feature interface $\gamma_3 \between \alpha\phi$, so the external electron inside the neutron should nearby $\gamma_3 \between \alpha\phi$. Because the feature vector $\vec{\gamma}_3 \between \alpha\phi$ only representative of $\gamma_3 \between \alpha\phi$, so we should assume the logic interface of the external electron inside the neutron is $(\gamma_3 - qs) \between \alpha\phi$, that means the external electron must release a photon first, after producing an energy level transition, then it can become a part of the neutron system. Because qs is almost negligible compared to γ_3 , so we can regard $\gamma_3 - qs \approx \gamma_3$. Because the photon which the external electron released is outside the neutron system, so we do not need to calculate the photon mass.

Because $(\gamma_3 - qs) \between \alpha\phi$ interface is inside $\gamma_3 \between \alpha\phi$, so the recognition logic of ϕ at $(\gamma_3 - qs) \between \alpha\phi$ must be two dimensional, that means the external electron inside the neutron shows two dimensional mass. Assuming exist the systematic error while ϕ constructs the two dimensional electron, known the systematic error of ϕ can be expressed as the base of natural logarithm e , the outer surface of electron absorbs the information wave, it will reduce the total mass, so the mass of the external electron will be the negative mass, then the two dimensional mass of the external electron will be $-4em_e$.

Assuming at the same time the neutron is formed, it will absorb a Xun w_3 . $\widetilde{m}_{w_3}$ denotes the three dimensional field mass of Xun w_3 , Because the information sphere radius of w_3 is equal to γ_3 , and the external Xun w_3 shows three dimensional mass, by the mapping relationship between ϕ and $\alpha\phi$ we get that the background information amount is equal to $\alpha\varphi$, so $\widetilde{m}_{w_3}$ can be expressed as

$$\widetilde{m}_{w_3} = \frac{\alpha\varphi}{4\pi{\gamma_3}^2} = \alpha m_e$$

m_{w_3} denotes the three dimensional moving mass of w_3 inside the neutron, considering the relativistic effect caused by the inner speed αc , the systematic error e and the recurrent mapping of information, then m_{w_3} can be expressed as

$$m_{w_3} = \frac{\alpha m_e}{e(1+\alpha)\sqrt{1-\alpha^2}} \tag{27}$$

Known that Xun w_3 can generate a Gen g_3 at $(1+\alpha^2)\gamma_3 \between \alpha\phi$ interface, m_{g_3} denotes the two dimensional mass of g_3 , by (24) we get

$$m_{g_3} = \frac{4\alpha m_e(1+\alpha^2)}{e\sqrt{1-\alpha^2}}$$

The background mass of neutron can be denoted by

$$m_x = m_p - 4em_e - m_{w_3} - m_{g_3}$$

Assuming ϕ can repeatedly process m_x continuous n times projection, where n is the largest natural number that ϕ assigned to neutron, we can approximately consider that $n \to \infty$. If ϕ identifies the whole of these projections as a neutron, then the theoretical value of neutron mass can be expressed as

$$m_n = m_x \sum_{n=0}^{\infty} \alpha^n = 1.6749274752 \times 10^{-27} kg$$

This is a very accurate theoretical value of neutron mass, compared to CODATA 2014 recommended neutron mass $1.674927471(21) \times 10^{-27} kg$, the theoretical value of neutron mass is in agreement with the experimental observations.

Because neutron is not the full $\alpha\phi^3$, but a kind of mixture particle, ϕ should believe that the proton is the center of neutron, known that the external electron is at $(\gamma_3 - qs) \between \alpha\phi$ logic interface, so we can assume the external electron and the proton of neutron have the accordance intrinsic causality, even think their movement are synchronous, then we do not need to consider the relativistic effect of the external electron caused by the inner speed αc . Because Xun w_3 corresponds to $\gamma_3 \between \alpha\phi$, its intrinsic angular frequency is equal to ω_3 , Known Gen and Xun have the same inner speed, so Gen and Xun will not synchronous move with the proton, we must consider the relativistic effect of Gen and Xun.

The inverse operation of neutron absorbing the external electron and Xun w_3 will be the decay process of neutron. Known if a neutron decays, it will produce a proton, an electron, and a neutrino, the process is called β decay, because Xun w_3 has no charge, so if we assume Xun w_3 is neutrino, then we can give a good explanation about neutron β decay.

10 Electron magnetic moment

Known the definition of magnetic moment is $\mu = I \cdot S$, where μ denotes magnetic moment, I denotes electric current, S denotes area. If we write magnetic moment as $\mu = qvr$, where q denotes electric charge, v denotes speed rate, r denotes length, then magnetic moment can be vividly understood as electric charge q moving with speed rate v on the orbit which radius is equal to r . In order to facilitate the following description, we should name r corresponding to μ as standard action radius of μ .

If we substitute Bohr radius a_0 into r , inner speed αc into v , elementary charge e into q , and dividing the product of the three parameters by 2 , then the result $e\alpha c a_0/2$ will be exactly equal to Bohr magneton μ_B . Because ϕ can not distinguish the reciprocal symmetry world or imaginary world, but electricity and magnetism are clearly related to the reciprocal symmetry world or imaginary world, so we need to divide $e\alpha c a_0$ by 2 . Bohr magneton μ_B can be expressed as

$$\mu_B = \frac{e\hbar}{2m_e} = \frac{ec}{2}\gamma_3 = \frac{e\alpha c}{2}a_0$$

Because the repeatedly mapping of information wave ψ between $\alpha\phi$ and $\sigma\alpha\phi$ will change the total information amount of $\gamma_3 \between \alpha\phi$, and the change of information amount at $\gamma_3 \between \alpha\phi$ feature interface will affect the total amount of electrical information, this is the main reason for the deviation between magnetic moment of electron μ_e and Bohr magneton μ_B .

By Pos 3 , the action of elementary particle must be h , by Pos 4 , the total material amount of charged elementary particle must be $e\hbar$. Because $h = 2\pi\hbar$, so for elementary charge e , the projection coefficient that the electrical information wave $e\psi$ repeatedly mapping between ϕ and $\sigma\phi$ must be $\alpha/2\pi$. Because of $e\psi$ repeatedly mapping between ϕ and $\sigma\phi$, the cumulative result of the projection coefficient can be expressed as

$$(\frac{\alpha}{2\pi})^1 - (\frac{\alpha}{2\pi})^2 + (\frac{\alpha}{2\pi})^3 - \cdots = -\sum_{n=1}^{\infty}(-\frac{\alpha}{2\pi})^n$$

so $e\psi$ repeatedly mapping between $\alpha\phi$ and $\sigma\alpha\phi$ will deviate from Bohr magneton μ_B , its coefficient is

$$k_1 = -\sum_{n=1}^{\infty}(-\frac{\alpha}{2\pi})^n$$

Because the measuring sample of electron magnetic moment is free electron, and the free electron has completely detached from the orbit interface of $\alpha\phi$, that means the free electron has not any content those inside the feature interface $\gamma_2 \between \alpha\phi$, so the standard action radius of Bohr magneton μ_B need to be subtracted a short length about the feature radius γ_2 . By Pro 8 , γ_2 can be expressed as

$$\gamma_2 = \frac{4\hbar}{m_p c}$$

so the ratio of feature radius γ_2 and Bohr radius a_0 wil be

$$\frac{\gamma_2}{a_0} = \frac{4\alpha m_e}{m_p}$$

Because $\gamma_2 \between \alpha\phi$ has also the repeatedly mapping of $e\psi$ between ϕ and $\sigma\phi$, and the mapping coefficient corresponding to $\gamma_2 \between \alpha\phi$ is also $\alpha/2\pi$, the internal content absence of $\gamma_2 \between \alpha\phi$ will affect the total amount of electrical information, and then affects the magnetic moment, the coefficient will be

$$k_2 = -\frac{4\alpha m_e}{m_p}\sum_{n=1}^{\infty}(-\frac{\alpha}{2\pi})^n$$

Although free electrons do not contain Xun w_3 , but we can assume Gen g_3 still exist in $\alpha\phi$, it will keep the logical association with the free electron by the quantum entanglement way. Because the existence of g_3 will cause $\sigma\alpha\psi$ being absorbed by $\gamma_3/(1+\alpha^2) \between \sigma\alpha\phi$ before it arrives $\gamma_3 \between \sigma\alpha\phi$, so the standard action radius of μ_B will be decreased $\alpha^2\gamma_3 = \alpha^3 a_0$.

When we treat the change of μ_B standard action radius, it will inevitably involve the electrical information wave $e\psi$ repeatedly mapping between ϕ and $\sigma\phi$. Because the repeatedly mapping of $\alpha^3 a_0$ only relates the geometry structure of $\alpha\phi$, but not involves the electrical substances, so the projection ratio will be fine structure constant α , and it will show the pure cumulative relationship. Therefore, the repeatedly mapping of $\alpha^3 a_0$ will cause the standard action radius of μ_B decrease

$$\triangle r = \alpha^3 a_0 \sum_{n=0}^{\infty} \alpha^n = a_0 \sum_{n=3}^{\infty} \alpha^n$$

then the ratio of $\triangle r$ and Bohr radius a_0 can be expressed as

$$k_3 = \sum_{n=3}^{\infty} \alpha^n$$

Because electron is independent, it does not involve a combination of other elementary particles, so we need not to calculate the system error. Because compares to μ_B , the magnetic moment of electron is negative, so the theoretical value of μ_e can be expressed as

$$\mu_e = -\mu_B(1 + k_1 - k_2 - k_3)$$

Ultimately we get

$$\mu_e = \frac{e\hbar}{2m_e}((1 - \frac{4\alpha m_e}{m_p}) \sum_{n=1}^{\infty}(-\frac{\alpha}{2\pi})^n + \sum_{n=3}^{\infty} \alpha^n - 1\,) = -9.2847646200 \times 10^{-24} JT^{-1}$$

Known the CODATA 2014 recommended value of μ_e is $\mu_e = -9.284764620(57) \times 10^{-24} JT^{-1}$, that shows the theoretical value of electron magnetic moment μ_e is perfectly matched the experimental value.

Because the derivation of μ_e involves $\gamma_2 \between \alpha\phi$, and the specific data of $\gamma_2 \between \alpha\phi$ can be calculated by the relationship of proton mass and γ_2 , so we can accurately get the theoretical value of μ_e . Similar to electron, the calculation of proton magnetic moment must be involved $\gamma_1 \between \alpha\phi$, due to the lack of related data of $\gamma_1 \between \alpha\phi$, so we can not get the theoretical value of the proton magnetic moment temporarily.

11 Neutron magnetic moment

The model of neutron has been obtained by deducing the neutron mass, although we do not know the value of feature radius γ_1 , but because the value of γ_1 has been included in the proton magnetic moment μ_p , so we can deduce the theoretical value of neutron magnetic moment μ_n by proton magnetic moment μ_p directly.

The theoretical value of neutron magnetic moment μ_n can be expressed as

$$\mu_n = -\frac{e(1+\alpha)}{4}\mu_p - \frac{\alpha\sqrt{1-\alpha^2}}{2\pi}\mu_N - \frac{e\alpha\sqrt{1-\alpha^2}}{2k((1+\alpha^2)\dfrac{m_p}{\alpha m_e} - 1)}\mu_p = -9.6623650438 \times 10^{-27} JT^{-1}$$

where μ_p denotes the proton magnetic moment, μ_N denotes the nuclear magneton, m_p denotes the proton mass, m_e dentoes the electron mass, e denotes the base of natural logarithm, k denotes the cumulative results of projection that the electrical information repeatedly mapping between $\alpha\phi$ world and $\sigma\alpha\phi$ world.

$$k = (\frac{\alpha}{2\pi})^1 - (\frac{\alpha}{2\pi})^2 + (\frac{\alpha}{2\pi})^3 - \cdots = -\sum_{n=1}^{\infty}(-\frac{\alpha}{2\pi})^n$$

The CODATA 2014 recommended value of μ_n is

$$\mu_n = -9.6623650(23) \times 10^{-27} JT^{-1}$$

By Pos 7 , at the orbit interface $\gamma_2/\alpha \between \alpha\phi$ inside the neutron, it will appear a logic image which radius is equal to $\alpha\gamma_2$, the basic properties are the same as negative proton, because the magnetic moment of proton and the magnetic moment of negative proton image can offset each other, so the magnetic moment of the external electron will be the main part of neutron magnetic moment, that is the fundamental reason why the magnetic moment of neutron is negative.

By Pos 8 , at the feature interface $\gamma_2 \between \alpha\phi$ inside the neutron, it will appear a Xun w_2 which radius is equal to $\alpha^2\gamma_2$, the basic properties are the same as $\alpha^2\gamma_2 \between \sigma\alpha\phi$, after the charge blessing, Xun w_2 will affect the magnetic moment of the neutron.

Known at the time of the neutron formation, the neutron will absorb an external Xun w_3 , by Def 44 , because of the charge blessing of ϕ , Xun w_3 will affect the magnetic moment of the neutron, in addition, Gen g_3 which being generated by Xun w_3 will also affect the magnetic moment of the neutron. Known nuclear magneton μ_N can be expressed as

$$\mu_N = \frac{e\hbar}{2m_p} = \frac{ec}{8}\gamma_2$$

and Bohr magneton μ_B can be expressed as

$$\mu_B = \frac{e\hbar}{2m_e} = \frac{ec}{2}\gamma_3$$

where e denotes elementary charge. Very obviously, nuclear magneton μ_N is the two dimensional magnetic moment corresponding to the two dimensional proton mass. Because proton mass m_p is two dimensional, so proton magnetic moment is also two dimensional magnetic moment, then neutron magnetic moment μ_n is two dimensional magnetic moment correspondingly.

First to consider the external electron. Known that the electron and the proton have equal amount but opposite charge, and the movement of the external electrons is synchronized with the motion of the proton, assuming in neutron level, the standard action radius of μ_n is equal to the orbit radius γ_2/α , then the magnetic moment of the external electron can be shown by the magnetic moment of negative proton $-\mu_p$. Because Xun w_3 equivalents to the external electron projection, so we can treat Xun w_3 at the same way with the external electron. Because proton magnetic moment μ_p is two dimensional, so we need to change the mass of Xun w_3 and the mass of external electron into two dimensional, it will use the coefficient 4 to do the dimension reduction processing. Consider ϕ calculates the external particles will have the system error e , then the common magnetic moment of external electron and Xun w_3 can be expressed as

$$\mu_1 = -\frac{e(1+\alpha)}{4}\mu_p$$

Next to consider the neutron magnetic moment effect of Xun w_2 being charge blessed by ϕ . Assuming Xun w_2 of feature interface $\gamma_2 \between \alpha\phi$ corresponds to nuclear magneton μ_N . Because Xun w_2 reflects the fundamental properties of $\alpha^2\gamma_2 \between \sigma\alpha\phi$ logic interface, by Pos 3 and Pos 4 , after being charge blessed by ϕ , Xun w_2 will reflects the fundamental properties of $\alpha^2\gamma_2/2\pi \between \sigma\alpha\phi$, that means w_2 equivalents to the projection of $\alpha\gamma_2 \between \sigma\alpha\phi$, and the projection ratio is $\alpha/2\pi$. Because the inner speed of Xun w_2 is equal to αc , by Pro 2, the standard action radius of μ_N will have $\sqrt{1-\alpha^2}$ length contraction, so after being charge blessed by ϕ , the neutron magnetic moment effect of Xun w_2 can be expressed as

$$\mu_2 = -\frac{\alpha\sqrt{1-\alpha^2}}{2\pi}\mu_N$$

Finally to consider the interface $\gamma_3(1+\alpha^2) \between \alpha\phi$ which corresponding to Gen g_3 . By the relationship between ϕ and $\alpha\phi$, the background information amount of Gen g_3 will be $\alpha\varphi(1+\alpha^2)$. $\widetilde{m}_{g_3}$ denotes the three dimensional mass of g_3 , then

$$\widetilde{m}_{g_3} = \frac{\alpha\varphi(1+\alpha^2)}{4\pi{\gamma_3}^2(1+\alpha^2)^2} = \frac{\alpha m_e}{1+\alpha^2}$$

Because the proton mass corresponds to the feature radius γ_2 , if using the proton magnetic moment μ_p as the standard to measure the effect of Gen g_3 on the neutron magnetic moment, we need the deviation between the standard action radius of Gen g_3 magnetic moment and the feature radius γ_2 . By Pro 8 , the feature radius γ_2 can be expressed as

$$\gamma_2 = \frac{4\hbar}{m_p c}$$

$\triangle r_1$ denotes the basic deviation between the standard action radius of Gen g_3 magnetic moment and the feature radius γ_2 . By Pro 8 we get

$$\gamma_2 + \triangle r_1 = \frac{4\hbar}{(m_p - \frac{\alpha m_e}{1+\alpha^2})c}$$

so we get

$$\triangle r_1 = \frac{\alpha m_e \gamma_2}{m_p(1+\alpha^2) - \alpha m_e}$$

Known the electrical information repeatedly mapping between $\alpha\phi$ and $\sigma\alpha\phi$, the cumulative results of projection can be expressed as

$$k = (\frac{\alpha}{2\pi})^1 - (\frac{\alpha}{2\pi})^2 + (\frac{\alpha}{2\pi})^3 - \cdots = -\sum_{n=1}^{\infty}(-\frac{\alpha}{2\pi})^n$$

Since the electrical information repeatedly mapping between $\alpha\phi$ and $\sigma\alpha\phi$, $\triangle r_1$ need to be revised as

$$\triangle r_2 = \frac{\alpha m_e \gamma_2}{k(m_p(1+\alpha^2) - \alpha m_e)}$$

Because ϕ can not distinguish reciprocal symmetric worlds and imaginary worlds, so Gen g_3 need to be divided by 2 like μ_B or μ_N . If we consider the relativistic effect caused by the inner speed αc and the system error e , then $\triangle r_2$ finally to be revised as

$$\triangle r = \frac{e\sqrt{1-\alpha^2}}{2k(\frac{m_p}{\alpha m_e}(1+\alpha^2) - 1)}\gamma_2$$

Assuming the ratio of $\triangle r$ and γ_2/α is equal to the ratio of the neutron magnetic moment change caused by Gen g_3 and proton magnetic moment μ_p , compares to nuclear magneton μ_N , the magnetic moment of Gen g_3 is negative, then we get

$$\mu_3 = \frac{e\alpha\mu_p\sqrt{1-\alpha^2}}{2k(1 - \frac{m_p}{\alpha m_e}(1+\alpha^2))}$$

Finally, the theoretical value of neutron magnetic moment μ_n is

$$\mu_n = \mu_1 + \mu_2 + \mu_3 = -9.6623650438 \times 10^{-27} JT^{-1}$$

After clear the structure of hydrogen atom and neutron, we may try to explain some of the more complex microscopic particles.

12 Mass of deuteron

On the basis of understanding the structure of hydrogen atom and neutron, we can derive the theoretical deuteron mass according to some reasonable assumptions.

Because deuteron is the two $\alpha\phi^3$ composite particle, so the mass of deuteron is equal to the sum of the elementary particles' masses. Assuming a same electron revolves around two different $\alpha\phi^3$, then ϕ will believe that the electron mass each contribute to the two different particle quantum $\alpha\phi^3$, that means the electron can not only absorb the information wave of $\alpha{\phi_a}^3$, but also can absorb the information of $\alpha{\phi_b}^3$, the electron negative mass being contributed to the system twofold.

Because the electron moves back and forth between $\alpha{\phi_a}^3$ and $\alpha{\phi_b}^3$, so that it can not inside any of $\gamma_3 \between \alpha\phi$ feature interfaces, so the mass of electron must be the three dimensional mass, its double negative mass can be denoted by $2m_e$ directly, we don't need to consider the dimension changes and system error e .

Assuming the formation of deuteron need to absorb two external Zhen b_3 , respectively enters to the two feature interfaces $\gamma_3 \between \alpha\phi$ and generate 2 Dui d_3 at each $\gamma_3 \between \alpha\phi$. Because b_3 corresponds to $\alpha\gamma_3 \frown \phi$, so in deuteron, the mass of b_3 will be two dimensional.

By the mapping relations between ϕ and $\alpha\phi$, the background information amount of external Zhen b_3 will be $\alpha\varphi$. Because in deuteron, the external Zhen b_3 will appear at $\gamma_3 \between \alpha\phi$ feature interfaces, so the information sphere radius is equal to γ_3 . m_{b_3} denotes the moving mass of b_3 , consider the relativistic effects caused by the inner speed αc of b_3 , m_{b_3} can be expressed as

$$m_{b_3} = \frac{\alpha\varphi}{\pi{\gamma_3}^2\sqrt{1-\alpha^2}} = \frac{4\alpha m_e}{\sqrt{1-\alpha^2}}$$

m_{d_3} denotes the moving mass of Dui d_3 , by (25) we get

$$m_{d_3} = \frac{4\alpha m_e}{e(1-\alpha^2)\sqrt{1-\alpha^2}}$$

Assuming the two particle quantum $\alpha{\phi_a}^3$ and $\alpha{\phi_b}^3$ around the common center of revolution, and the revolution rate is equal to the inner speed αc . Because the relativistic effects caused by the revolution of $\alpha\phi^3$ and the relativistic effects caused by the inner speed of Zhen or Dui belong to different levels, so we need to calculate the relativistic effects separately. Known the mass of m_{b_3} and the mass of m_{d_3} are all positive mass, by Pro 4 , the theoretical mass of deuteron can be expressed as

$$m_d = \frac{2(m_p - m_e + \frac{4\alpha m_e}{\sqrt{1-\alpha^2}}(1 + \frac{1}{e(1-\alpha^2)}))}{\sqrt{1-\alpha^2}} = 3.3435836918 \times 10^{-27} kg$$

The CODATA 2014 recommended value of deuteron mass is $m_d = 3.343583719(41) \times 10^{-27} kg$, that shows the theoretical value of deuteron mass m_d is perfectly matched the experimental value.