Hypothesis of oscillation field of spacetime

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Abstract

In this hypothesis i will present possible mathematical model which describes gravity as consequence of tensor $K_{\alpha\beta}$ and symmetry associated with it. That tensor satisfies the equation:

$$\frac{\partial}{\partial\zeta_\alpha}\frac{\partial}{\partial\zeta_\beta}\Psi_a\Psi_b T^{ab}-\frac{\partial}{\partial\sigma_\alpha}\frac{\partial}{\partial\sigma_\beta}\Psi_a\Psi_b g^{ab}=K_{\alpha\beta}$$

Where Ψ_a is a vector in four dimensional spacetime, which has four variables (proper time) , $(\sigma^0,...,\sigma^3)$ while g^{ab} is the metric tensor,co-curvilinear coordinates are presented as ζ_α,ζ_β and T^{ab} is tensor that says how much energy there is in system.

This hypothesis allows moving at a speed greater than the speed of light, but only if the length of the smallest change in time can be less than the Planck time, the relation between the transformation of two different reference systems with different permissible length of the smallest time is determined by the equation:

$$K_{\alpha_n\beta_n}=\left(\left(K_{\alpha_m\beta_m}K^{\alpha_m\beta_m}_{\alpha_{m+1}\beta_{m+1}}\right)...K_{\alpha_{n-1}\beta_{n-1}}K^{\alpha_{n-1}\beta_{n-1}}_{\alpha_n\beta_n}\right)$$

Where subscripts (n,m) mean speed of light to the power of subscripts , for $m=1$ result is just normal spacetime with speed of light being the speed limit and smallest possible time is Planck time, for $n>1$ it means speed of light to the power n and power of smallest possible time.For each system speed of light limit is locally preserved which means that both system in their reference frame still measure speed of light and Planck time as smallest possible time and the highest possible speed.

This hypothesis connects spins of particle with symmetries which that system meets or breaks, first symmetry says that if system is massless -it has same movement in space and time(it travels at speed of light), that is, the part of the equation $\frac{\partial}{\partial\sigma_\alpha}\frac{\partial}{\partial\sigma_\beta}\Psi_a\Psi_b g^{ab}$ is equal to zero. Second symmetry says about how much contribution of energy from system is equal to it's gravity energy or greater, if that symmetry is not meet , it means that contribution of energy is less so $K_{\alpha\beta}$ is negative. When symmetry is meet tensor has positive value or zero.

In this hypothesis i will use Einstein summation convention and tensor product of two vectors, everywhere where there are two or more vector with same rank (covariant or contravariant) it means their tensor product, same with tensors if there is two or more tensors one after another with same rank it means their tensor product.

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1 Equation of field

I write wave function in covariant form by $\Psi_a(\sigma^0,...,\sigma^3)$ where it's variables $\sigma^0...\sigma^3$ means proper time, measured for curvilinear coordinates ζ_a and i write wave function in contravariant form by $\Psi^a(\sigma^0,...,\sigma^3)$, where proper time is measured for curvilinear coordinates ζ^a. In whole that paper i will just use notation Ψ_a or Ψ^a. Each coordinate has four proper times that imply four sigma variables. At zero energy getting to count only geometry of field , that wave function satisfy equation for indexes (a,b), where g_{ab} is metric tensor and this system is massless:

$$\frac{\partial}{\partial\sigma_\alpha}\frac{\partial}{\partial\sigma_\beta}\Psi_a\Psi_b g^{ab} = 0 \tag{1.1}$$

Where energy is not equal zero, it has to be taken into equation by energy in curvilinear co-ordinates that come from geometry of a fied $(\zeta^0,...,\zeta^3)$ and tensor of energy of a system, field satisfy this equation for massive and massless systems :

$$\frac{\partial}{\partial\zeta_\alpha}\frac{\partial}{\partial\zeta_\beta}\Psi_a\Psi_b T^{ab} - \frac{\partial}{\partial\sigma_\alpha}\frac{\partial}{\partial\sigma_\beta}\Psi_a\Psi_b g^{ab} = 0 \tag{1.2}$$

Equation (1.2) describes a symmetrical condition that comes from energy contribution to geometry of spacetime is equal to it's total energy, but if it's not fulfilled there is need for another object, tensor $K^{\alpha\beta}$ which it replaces zero to right side of equation it says what is difference between energy contribution and it's gravitational interaction, put that in equation:

$$\frac{\partial}{\partial\zeta^\alpha}\frac{\partial}{\partial\zeta^\beta}\Psi^a\Psi^b T_{ab} - \frac{\partial}{\partial\sigma^\alpha}\frac{\partial}{\partial\sigma^\beta}\Psi^a\Psi^b g_{ab} = K^{\alpha\beta} \tag{1.3}$$

Because more comfortable is to write this tensor in covariant form than contravariant, changing all indexes in equation (1.3) i get:

$$\frac{\partial}{\partial\zeta_\alpha}\frac{\partial}{\partial\zeta_\beta}\Psi_a\Psi_b T^{ab} - \frac{\partial}{\partial\sigma_\alpha}\frac{\partial}{\partial\sigma_\beta}\Psi_a\Psi_b g^{ab} = K_{\alpha\beta} \tag{1.4}$$

This equation is for one system , if tensor $K_{\alpha\beta}$ is equal to zero then it's only gravity system, if it meets equation (1.1) it has symmetry of space and time (massless), for two systems equation expands with two metric tensors and two energy tensors:

$$\frac{\partial}{\partial\zeta_\alpha}\frac{\partial}{\partial\zeta_\beta}\frac{\partial}{\partial\zeta_\gamma}\frac{\partial}{\partial\zeta_\delta}\Psi_a\Psi_b\Psi_c\Psi_d T^{ab}T^{cd} - \frac{\partial}{\partial\sigma_\alpha}\frac{\partial}{\partial\sigma_\beta}\frac{\partial}{\partial\sigma_\gamma}\frac{\partial}{\partial\sigma_\delta}\Psi_a\Psi_b\Psi_c\Psi_d g^{ab}g^{cd} = K_{\alpha\beta}K_{\gamma\delta} \tag{1.5}$$

For N this equation will have N metric tensors and N energy tensors , from that comes N tensors K, writing it all but this time using letters $a_1...a_{2N}$ for function Ψ and for metric and energy tensors but letters $\alpha_1...\alpha_{2N}$ for tensor K i get equation:

$$\frac{\partial}{\partial\zeta_{\alpha_1}}\frac{\partial}{\partial\zeta_{\alpha_2}}...\frac{\partial}{\partial\zeta_{\alpha_{2N-1}}}\frac{\partial}{\partial\zeta_{\alpha_{2N}}}\Psi_{a_1}\Psi_{a_2}...\Psi_{a_{2N-1}}\Psi_{a_{2N}}T^{a_1a_2}...T^{a_{2N-1}a_{2N}}$$
$$-\frac{\partial}{\partial\sigma_{\alpha_1}}\frac{\partial}{\partial\sigma_{\alpha_2}}....\frac{\partial}{\partial\sigma_{\alpha_{2N-1}}}\frac{\partial}{\partial\sigma_{\alpha_{2N}}}\Psi_{a_1}\Psi_{a_2}...\Psi_{a_{2N-1}}\Psi_{a_{2N}}g^{a_1a_2}...g^{a_{2N-1}a_{2N}} = K_{\alpha_1\alpha_2}...K_{\alpha_{2N-1}\alpha_{2N}}$$

2 Speed of light limit in field equation

For systems that satisfy symmetry of space and time which means equation (1.1) is valid , they have to move with speeed of light, it means that in fudamental unit of time (Planck time) there can't be more than one oscillation of field (frequency multiplied by Planck time can't be more than one) and change of oscillation can't be faster than change by an valuve in one unit of time.

This limit can be bypassed if there is speed greater than speed of light that means unit time smaller than Planck time. But locally in reference frame speed of light is always greatest, but it's possible to write transformations that describe greater than speed of light and time smaller than Planck time. If proper time coordinate σ_{α_1} means that greatest speed is speed of light and σ_{α_2} that that speed is c^2 i will write transformation of wave function as:

$$\Psi_{\alpha_2} = \Psi^{\alpha_1}_{\alpha_2} \frac{\partial \Psi_{\alpha_1}}{\partial \sigma_{\alpha_2}} \tag{2.1}$$

When that transformation goes from number m to number n, where $n > m$ i can write it as:

$$\Psi_{\alpha_n} = \left(\Psi^{\alpha_{n-1}}_{\alpha_n} \frac{\partial}{\partial \sigma_{\alpha_n}} \dots \left(\Psi^{\alpha_{m+1}}_{\alpha_{m+2}} \frac{\partial}{\partial \sigma_{\alpha_{m+2}}} \left(\Psi^{\alpha_m}_{\alpha_{m+1}} \frac{\partial \Psi_{\alpha_m}}{\partial \sigma_{\alpha_{m+1}}} \right)\right)\right) \tag{2.2}$$

For two wave functions $\Psi_{\alpha_n}\Psi_{\beta_n}$ that come in field equation, this transformation takes form:

$$\Psi_{\alpha_n}\Psi_{\beta_n} = \left(\Psi^{\alpha_{n-1}}_{\alpha_n} \Psi^{\beta_{n-1}}_{\beta_n} \frac{\partial}{\partial \sigma_{\alpha_n}} \frac{\partial}{\partial \sigma_{\beta_n}} \dots \left(\Psi^{\alpha_m}_{\alpha_{m+1}} \Psi^{\beta_m}_{\beta_{m+1}} \frac{\partial}{\partial \sigma_{\alpha_{m+1}}} \frac{\partial}{\partial \sigma_{\beta_{m+1}}} \Psi_{\alpha_m}\Psi_{\beta_m} \right)\right) \tag{2.3}$$

In field equation key role plays tensor $K_{\alpha\beta}$, transformations of that tensor can be understand as q transfrmations where $q = n - m$, so there is necessary tensor that has $2q$ indexes or equivalently q tensors that transform tensor $K_{\alpha\beta}$. Writing then tensor $K_{\alpha_n\beta_n}$ relative to transformation of tensor $K_{\alpha_m\beta_m}$ where $n > m$:

$$K_{\alpha_n\beta_n} = \left(\left(K_{\alpha_m\beta_m} K^{\alpha_m\beta_m}_{\alpha_{m+1}\beta_{m+1}} \right) \dots K_{\alpha_{n-1}\beta_{n-1}} K^{\alpha_{n-1}\beta_{n-1}}_{\alpha_n\beta_n} \right) \tag{2.4}$$

For many systems that tensor has total $2N$ indexes, where N is number of systems, equations takes form:

$$K_{\alpha_n\beta_n} \dots K_{N_nM_n} =$$
$$\left(\left(K_{\alpha_m\beta_m} K^{\alpha_m\beta_m}_{\alpha_{m+1}\beta_{m+1}} \dots K_{N_mM_m} K^{N_mM_m}_{N_{m+1}M_{m+1}} \right) \dots K_{\alpha_{n-1}\beta_{n-1}} K^{\alpha_{n-1}\beta_{n-1}}_{\alpha_n\beta_n} \dots K_{N_{n-1}M_{n-1}} K^{N_{n-1}M_{n-1}}_{N_nM_n} \right)$$

If tensor $K_{\alpha\beta}$ is equal to zero, it is equal to zero in every transformation, if it satisfy equation (1.1) and it's equal zero, it does do it in every transformation, writing it all as one:

$$K_{\alpha_m\beta_m} = 0$$
$$K_{\alpha_n\beta_n} = \left(\left(K_{\alpha_m\beta_m} K^{\alpha_m\beta_m}_{\alpha_{m+1}\beta_{m+1}} \right) \dots K_{\alpha_{n-1}\beta_{n-1}} K^{\alpha_{n-1}\beta_{n-1}}_{\alpha_n\beta_n} \right) = 0$$
$$\frac{\partial}{\partial \sigma_{\alpha_m}} \frac{\partial}{\partial \sigma_{\beta_m}} \Psi_{a_m}\Psi_{b_m} g^{a_m b_m} = 0$$
$$\frac{\partial}{\partial \sigma_{\alpha_n}} \frac{\partial}{\partial \sigma_{\beta_n}} \Psi_{a_n}\Psi_{b_n} g^{a_n b_n} = 0$$

3 Symmetries: gravitons, photons and massive particles

Tensor $K_{\alpha\beta}$ can satisfy the basic symmetry that says energy contribution of system is greater or equal to it's gravitational interaction, then tensor has valuve equal to zero or greater than zero, but if it breaks this symmetery it has less than zero. Second symmetry is equation (1.1) that says system is symemetric in space and time from that follows it's massless, those two symmetries are basic idea in that hypothesis.

Any system can satisfy those symetry ,break them or it's not applicable, this symmetry is strongly related with spin. If i write that first symmetry as S_1 and second symmetry as S_2 when first symmetry is satisfied value that system takes is $+S_1 = \frac{1}{2}$ or $+S_2 = \frac{1}{2}$. Similarly when symmetry is broken it takes vaule $-S_1 = -\frac{1}{2}$ or $-S_2 = -\frac{1}{2}$, but because those symmetries have to go with pairs it means four combinations:

$$\{(+S_1, +S_2), (-S_1, +S_2), (+S_1, -S_2), (-S_1, -S_2)\}$$

To each combinations it comes number Q that can have valuve equal to, 0 (not applicable) or $+1$ (symmetry is active) and (-1 it can have that symmetry but it is in a state without it) combining it all in matrix i can write it as:

$$Q_{ij} = \begin{bmatrix} +S_1 Q_{11} & +S_2 Q_{12} \\ -S_1 Q_{21} & +S_2 Q_{22} \\ +S_1 Q_{31} & -S_2 Q_{32} \\ -S_1 Q_{41} & -S_2 Q_{32} \end{bmatrix}$$

For every spin of system i can get it's value by summing elements that have same column but for each sum there is the absolute value of their sum, spin can be negative. Writing that when i writie spin as ϕ:

$$\phi = \sum_{i,j \in S} \frac{1}{2} \left| Q_{i1} + Q_{j2} \right| \tag{3.1}$$

Rule is that system can't satisfy same symmetry pair two times , for example photon has spin equal to one because only matrix elements Q_{11} and Q_{12} are satisfy and number is equal to $Q = 1$ always, in contrast electron has matrix element Q_{11} in first line and elements Q_{21} and Q_{22}, electron is not applicable by symmetry $-S_2$, electron moving with speed of light had to have spin third-two. Graviton has spin two that means it satisfy matrix elements and symmetry related with them Q_{11} and Q_{12} , Q_{41} and Q_{42} , it exist in two states both of them have spin two, one of them is masless and its energy contribution of the system is equal to its gravitational interaction, second state has energy contribution less than its gravitational interaction . Formally i write symmetry S_1 when equation (1.1) is equal to zero or when it's not equal to zero when it's broken:

$$S \in +S_1 \Leftrightarrow \frac{\partial}{\partial \sigma_\alpha} \frac{\partial}{\partial \sigma_\beta} \Psi_a \Psi_b g^{ab} = 0 \tag{3.2}$$

$$S \in -S_1 \Leftrightarrow \frac{\partial}{\partial \sigma_\alpha} \frac{\partial}{\partial \sigma_\beta} \Psi_a \Psi_b g^{ab} \neq 0 \tag{3.3}$$

For symmetry $\pm S_2$ condition for tensor $K_{\alpha\beta}$ is when it's equal or greater than zero it satisfy or when it's less than zero it breaks that symmetry:

$$S \in +S_2 \Leftrightarrow \sum_{\alpha,\beta} K_{\alpha\beta} \geq 0 \tag{3.4}$$

$$S \in -S_2 \Leftrightarrow \sum_{\alpha,\beta} K_{\alpha\beta} < 0 \tag{3.5}$$

4 Geometry and measurement in field equation

In General Theory of Relativity, metric for solving field equation is understand as scalar quantity (ds^2) it's differential of space-time interval. In my field equation is not possible derive exactly this quantity, because field equation requires ten solutions like it (sixteen but only ten independent), so metric quantity is define as tensor in covariant form:

$$U_{\alpha\beta} = \int_{\alpha,\beta} \sum_{a,b} d\Psi_a d\Psi_b g^{ab} d\sigma_\alpha d\sigma_\beta \tag{4.1}$$

It can be written in contravariant form by changing the indexes in equation, where every part of equation is solution to field equation (1.3 and 1.4):

$$U^{\alpha\beta} = \int_{\alpha,\beta} \sum_{a,b} d\Psi^a d\Psi^b g_{ab} d\sigma^\alpha d\sigma^\beta \tag{4.2}$$

From both of this tensors i can approximate differential of space-time interval (ds^2), by summing indexes (α, β) so i get:

$$ds^2 \approx \sum_{\alpha,\beta} U_{\alpha\beta} \approx \sum_{\alpha,\beta} U^{\alpha\beta} \tag{4.3}$$

In quantum physics measurement play key role, in my model there is need for a special tensor quantity that is approximation of classical probability of system being in some state. I will write this tensor quantity as $P_{\alpha\beta}$ in covariant form:

$$n(\alpha,\beta)\left(\left|\int_{\alpha,\beta} \sum_{a,b} \Psi_a \Psi_b T^{ab} d\zeta_\alpha d\zeta_\beta\right| + \left|\int_{\alpha,\beta} \sum_{a,b} \Psi_a \Psi_b g^{ab} d\sigma_\alpha d\sigma_\beta\right|\right) = P_{\alpha\beta} \tag{4.4}$$

Where function $n(\alpha, \beta)$ is a normalization function that fulfills need that whole function is equal to one. For some part of function that goes from part of spacetime X_a to another part X_b this equation will be just range in equation (4.4):

$$n(\alpha,\beta)\left(\left|\int_{\alpha,\beta} \sum_{a,b} \Psi_a \Psi_b T^{ab} d\zeta_\alpha d\zeta_\beta\right| + \left|\int_{\alpha,\beta} \sum_{a,b} \Psi_a \Psi_b g^{ab} d\sigma_\alpha d\sigma_\beta\right|\right)\Bigg|_{X_a}^{X_b} = P_{\alpha\beta}\Big|_{X_a}^{X_b}$$

Normalization condition means that for whole spacetime where wave function is spread, tensor $P_{\alpha\beta}$ is equal to one. Writing it where X means whole spacetime i get:

$$n(\alpha,\beta)\left(\left|\int_{\alpha,\beta} \sum_{a,b} \Psi_a \Psi_b T^{ab} d\zeta_\alpha d\zeta_\beta\right| + \left|\int_{\alpha,\beta} \sum_{a,b} \Psi_a \Psi_b g^{ab} d\sigma_\alpha d\sigma_\beta\right|\right)\Bigg|_X = P_{\alpha\beta}\Big|_X = 1 \tag{4.5}$$

That condition just means for whole spacetime probability of finding system for specific coordinate is equal to one, which need comes from simple probability theory. Writing same tensor but this time in contravariant form i get:

$$n(\alpha,\beta)\left(\left|\int_{\alpha,\beta} \sum_{a,b} \Psi^a \Psi^b T_{ab} d\zeta^\alpha d\zeta^\beta\right| + \left|\int_{\alpha,\beta} \sum_{a,b} \Psi^a \Psi^b g_{ab} d\sigma^\alpha d\sigma^\beta\right|\right) = P^{\alpha\beta} \tag{4.6}$$

Proper time can be written as integral over path P, where c is speed of light and ζ are curvilinear co-ordinates:

$$\sigma_a = \frac{1}{c} \int_P \frac{\partial \zeta_a}{\partial \zeta_0} d\zeta_a \tag{4.7}$$

$$\sigma^a = \frac{1}{c} \int_P \frac{\partial \zeta_a}{\partial \zeta_0} d\zeta^a \tag{4.8}$$

5 Summary and the physical consequences of the field equation

In this hypothesis, I presented the key ideas for quantizing gravity as a continuous field that satisfies the differential equation (1.4), this equation describes how for a given wave function and hence a given quantum state the proper time measurement and space-time geometry are preserved. This description consists mainly of symmetries that can be in two states and the third where the part of field equation does not exist. The first two can break symmetries or fulfill it, third meaning that the tensor $K_{\alpha\beta}$ has only one of the two elements of the equation. Writing this when the tensor does not apply to the symmetry the second one has the form:

$$K_{\alpha\beta} = \frac{\partial}{\partial\zeta_\alpha}\frac{\partial}{\partial\zeta_\beta}\Psi_a\Psi_b T^{ab}$$

whereas if it only fulfills the second symmetry and not the first one, it analogically has the form without the first part and there is only the second one:

$$K_{\alpha\beta} = -\frac{\partial}{\partial\sigma_\alpha}\frac{\partial}{\partial\sigma_\beta}\Psi_a\Psi_b g^{ab}$$

These symmetries are the basis of this model, they result from the same time-space model and are not something imposed from above. These symmetries are able to reproduce all the particles and forces of the standard model as I presented in the first appendix to this hypothesis. However, the main idea that this hypothesis describes is gravity. Gravity is understood as a tensor field that satisfies the field equation. Transformations of this field allow for the existence of speeds greater than the speed of light but locally meeting its limit. Thus, the hypothesis is not in contradiction with the theory of relativity. On the other hand, these transformations given in the second chapter describe the dynamics of space-time without any size or time constraints. This means that according to this hypothesis there is no real minimum time that can be measured, there is only a local limit and as to the time and the speed of light which is always the limit speed for a given observer.

This hypothesis, although it uses differential geometry and objects such as the metric tensor that are deeply rooted in it, requires a more complex approach, because the space-time interval is no longer a scalar value but a tensor value. Nevertheless, it does not require any other mathematical laws than those used in differential geometry. This simply requires counting more components in this case, the space-time interval as four values, not one. In the second appendix to this hypothesis, I presented simple solutions of the equations of this hypothesis for gravity and considering only one proper time measured for a given metric component, not four as required by the field equation itself. These types of simplifications are crucial for the calculations resulting from this hypothesis and for testing it as a mathematical model describing gravity, and thus as an effective theory of quantum gravity.

This hypothesis describes that every event related to gravity has a certain probability of occurrence, hence the entire surface on which the wave function is spread (created by its proper time) is the entire gravitational contribution of a given system. Each surface in this hypothesis for an ever-larger spatial or temporal scale will eventually start to be a closed surface, which results in a looping not only of space but also of time. Therefore, in theory, the natural limit of measurement is the Plancks time and Plancks length that are equivalent to each other. In the fundamental time and the fundamental length, the field frequency can not be greater than one, which means that the smallest time loop has the Planck length or, in other words, the Planck time duration. These loops are dynamically changing surfaces in their proper time.

6 Appendix A: Particles and forces of standard model

In this appendix i will write which elements of symmetry each force of standard model fulfills and states (symmetrical,anti-symmetrical) of that forces. I will start by writing how to calculate electric charge , electric charge contribution comes only from elements of symmetry matrix (Q_{ij}) that are: $Q_{21}, Q_{22}, Q_{31}, Q_{32}$. To calculate value of electric charge i sum absolute valuve of those matrix elements -each valuve can have minus sign or plus sign charge, i will write it by:

$$e^{\pm} = \sum_{i=2\vee 3} \frac{1}{2}|Q_{i1}| + \frac{1}{2}|Q_{i2}| \tag{6.1}$$

Relation between matrix Q_{ij} and as it follows from it which symmetry field equation (1.3) fulfills i will write in table , in which beyond states i will present condition that is needed to make field emit particle of that field. I will write states as element of matrix where S value will be written as plus or minus signs. This table describes fields (forces) and it's corresponding emited particle, but does not describe particles of standard model, it has form:

Symmetry and standard model			
Force	Symmetrical state	Anti-symmetrical state	Emission
Strong	$+Q_{11}, Q_{31}, Q_{12}; -Q_{32}, Q_{21}$	$+Q_{32}, Q_{21}; -Q_{11}, Q_{31}, Q_{12}$	Both states
Electromagnetic	$\pm Q_{21}, \pm Q_{22}, \pm Q_{31}, \pm Q_{32}$	$\pm Q_{21}, \pm Q_{22}, \pm Q_{31}, \pm Q_{32}$	$-Q_{k\wedge l,1} \to Q_{k\wedge l,1}\big\rvert_{k\neq l}$
Weak	$+Q_{11}, Q_{12}, Q_{22}; -Q_{21}$	$-Q_{11}, Q_{12}, Q_{22}; +Q_{21}$	$Q_{1\vee 2,1} \to -Q_{1\vee 2,1}$ $Q_{1\wedge 2,1} \to -Q_{1\wedge 2,1}$
Gravity	$+Q_{11}, Q_{12}; -Q_{41}, Q_{42}$	$-Q_{11}, Q_{12}; +Q_{41}, Q_{42}$	Always/Breaking symmetry state
Higgs Field	$+Q_{11}; -Q_{12}$	$+Q_{12}; -Q_{11}$	Both states

Each fundamental particle or composite particle fulfills one of those written in table forces. Gravitons are only field that in symmetrical state is always present and does not depend on other fields (forces). Change from one symmetry to another one in some system always creates emission of particle that balances that change and keeps system in original symmetry state or changes it by interaction. For example electron that emits photon for a short moment changes state of matrix element Q_{11} from sign minus to plus sign and same with matrix element Q_{21} , from that change photon is created that is emited and electron goes to orginal state but it gains additional energy, this pattern works for any other field (force). I will write table that describes all fundamental particles and symmetrical state or anti-symmetrical state of them:

Fundamental particles		
Particle	Symmetrical state	Anti-symmetrical state
Neutrino	$+Q_{12}, Q_{42}; -Q_{41}$	$+Q_{12}, Q_{42}, Q_{41}$
Electron/Moun/Tau	$+Q_{21}, Q_{22}; -Q_{11}$	$+Q_{21}, Q_{22}, Q_{11}$
Quarks/Gluon	$+Q_{11}, Q_{31}, Q_{12}; -Q_{32}, Q_{21}$	$+Q_{32}, Q_{21}; -Q_{11}, Q_{31}, Q_{12}$
Graviton	$+Q_{11}, Q_{12}; -Q_{41}, Q_{42}$	$-Q_{11}, Q_{12}; +Q_{41}, Q_{42}$
Higgs Boson	$+Q_{11}; -Q_{12}$	$+Q_{12}; -Q_{11}$
Photon	$+Q_{11}, +Q_{12}$	$+Q_{11}, +Q_{12}$
Boson$W^{\pm}$	$+Q_{11}, Q_{12}, Q_{22}; -Q_{21}$	$+Q_{21}; -Q_{11}, Q_{12}, Q_{22}$
Boson Z	$+Q_{11}, Q_{12}$	$-Q_{11}, Q_{12}$

7 Appendix B: Spherical solutions of field equations for gravity

In this appendix I will present a solution of field equations for a perfectly spherical one arrangement assuming that the closed area is a hyper-four-dimensional sphere and that the three spatial coordinates have a minus sign. This means that time has the opposite sign to space (which is standard for space-time). I will start by writing a metric tensor for this hyper surface, it is a tensor which has the coordinates r that is the radius and angular coordinates $(\phi_1, ..., \phi_a)$. By writing the metric tensor I will get:

$$g_{ab} = \begin{bmatrix} r^2 & 0 & 0 & 0 \\ 0 & -r^2\phi_{00} & 0 & 0 \\ 0 & 0 & -r^2\phi_{00}\phi_{11} & 0 \\ 0 & 0 & 0 & -r^2\phi_{00}\phi_{11}\phi_{22} \end{bmatrix} \tag{7.1}$$

The rotation angle function ϕ_{ab} is a function dependent on the time proper measured. The energy tensor in this case has a trivial form that I will write write as derivative of the angle after proper time, writing the whole equation I will get:

$$T_{a+1b+1} = \frac{\partial\phi_a}{\partial\sigma_a}\frac{\partial\phi_b}{\partial\sigma_b} = \omega_{a+1}\omega_{b+1}\cos(\omega_{a+1}\sigma_{a+1})\cos(\omega_{b+1}\sigma_{b+1})\hat{\sigma}^{b+1}\otimes\hat{\sigma}^{b+1}\Big|_{a,b=0,1,2} ; T_{00} = 1 \tag{7.2}$$

$$T^{a+1b+1} = \frac{\partial\sigma_a}{\partial\phi_a}\frac{\partial\sigma_b}{\partial\phi_b} = \frac{1}{\omega_{a+1}\omega_{b+1}\cos(\omega_{a+1}\sigma_{a+1})\cos(\omega_{b+1}\sigma_{b+1})}\hat{\sigma}_{b+1}\otimes\hat{\sigma}_{b+1}\Big|_{a,b=0,1,2} ; T^{00} = 1 \tag{7.3}$$

The function ϕ_{ab} is understood as a tensor, which depending on the point selection in the entire space of the wave function, can change its value. The basis vectors $\hat{\sigma}_a = \frac{1}{c}\frac{\partial\zeta_a}{\partial\zeta_0}$ are base vectors for a given measured proper time.

$$\phi_a = \sin(\omega_{a+1}\sigma_{a+1})\hat{\sigma}^{a+1}\big|_{a=0,1,2} \tag{7.4}$$

$$\phi_{ab} = \sin(\omega_{a+1}\sigma_{a+1})\ \sin(\omega_{b+1}\sigma_{b+1})\hat{\sigma}^{b+1}\otimes\hat{\sigma}^{b+1}\Big|_{a,b=0,1,2} \tag{7.5}$$

All that remains is to solve the field equation, the wave function depends only on the radius and the rotation angle, so in the case where only four elements of the function are counted $(\Psi_{00}, ..., \Psi_{33})$, these are four solutions to differential equations because the metric tensor and energy tensor are known only wave function is unknown. The energy tensor has a trivial form that counts only the frequency of oscillation for a given point of the hyper surface, in fact the rotation of the angle with respect to its own time. By writing the field equation for the wave function I will get:

$$K_{\alpha\beta} = \frac{\partial^2}{\partial r^2}\Psi_{ab}T^{ab} - \left(\frac{\partial^2}{\partial\phi_{00}^2}\Psi_{ab} + \frac{\partial^2}{\partial\phi_{11}^2}\Psi_{ab} + \frac{\partial^2}{\partial\phi_{22}^2}\Psi_{ab}\right)g^{ab}\Bigg|_{(\alpha=a)=(\beta=b),(\alpha=a)\neq(\beta=b)\ \to K_{\alpha\beta}=0} \tag{7.6}$$

Equation (7.5) can be treated as an ordinary wave equation, omitting known metric tensor and energy tensor in contravarial forms. The solution to this equation will be four wave functions that preserve the transformation properties of the tensor which is the wave function. The spatial components $k_a(\phi_a)$ that occur in the solution of the wave equation are here the scalar product of vectors $(k_a(\phi_a), k_b(\phi_b))$ with base curvilinear coordinates ζ. The radius is treated as a time coordinate, it should be remembered that the angular coordinates ϕ depend on their own time just as the radius. In this solution, the (a, b) indexes are equal to the (α, β) indexes. So, writing the solution for the wave function as for the ordinary wave equation, remembering about the scalar product of two vectors, I will get:

$$\Psi_{ab} = \int dk_a A_a(r)e^{i(k_a(\phi_0)\cdot\zeta_1 + k_a(\phi_1)\cdot\zeta_2 + k_a(\phi_2)\cdot\zeta_3 - \omega_a r)} \otimes dk_b A_b(r)e^{i(k_b(\phi_0)\cdot\zeta_1 + k_b(\phi_1)\cdot\zeta_2 + k_b(\phi_2)\cdot\zeta_3 - \omega_b r)}$$
$$+ \int dk_a B_a(r)e^{-i(k_a(\phi_0)\cdot\zeta_1 + k_a(\phi_1)\cdot\zeta_2 + k_a(\phi_2)\cdot\zeta_3 - \omega_a r)} \otimes dk_b B_b(r)e^{-i(k_b(\phi_0)\cdot\zeta_1 + k_b(\phi_1)\cdot\zeta_2 + k_b(\phi_2)\cdot\zeta_3 - \omega_b r)}$$