SYMMETRY FIELD IDEA

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Abstract. In this paper [1] i will present model that can explain all Standard Model particles using symmetry and it can predict existence of new ones that are: anti-photon, anti-graviton, anti-gluon and graviton, first three are so called dark matter particles in this model. Workings of particle interaction here are very close to standard model, symmetry is exchanged (in SM its virtual force particle) that leads to change of energy state of particles interacting. Real force caring particles are created where there is change in field energy of particles so real force caring boson is created that takes energy. Where there is no real force caring bosons- symmetry exchange takes over virtual particle exchange in Standard Model. To quantize all interaction i use Planck units as natural units, it leads to normalization without any kind of infinities and predicts in natural way why speed of light is constant and unless you are moving with speed of light you always measure speed of light to be speed of light. So there is no need for Lorentz transformations. Spin is a rotation of field a physical rotation that is connected to energy of particle that is equal to symmetry exchange energy of particle, spin absolute value is equal to symmetry value. Symmetry field with spin is a tensor field without it just a scalar field that is defined in intervals not in any point of time. Any space-time that arises from this model is created by chasing photons path in field that means its interactions. Im not presenting solutions to those equations but gravity itself arises from Higgs field interaction with matter- in each point Higgs field has interaction with any particle in field that means gravity for given point is sum of all particle interactions at that point. Symmetry field is three space dimensions for each particle in field- so symmetry field for many particle system is function of all positions of particles. Higgs field is only field that has zero symmetry so it is in all space that's why in this model its responsible for gravity. If i have N particles at each point of Higgs field i have energy interaction between that point and all particles that creates gravity field- space has mass from Higgs field interaction with particles.

1. Basic units

In this whole paper i will be using basic Plancks units [2], of energy, time , space and momentum. It means i can write any unit as $U = \frac{U_B}{U_P}$, where U is the unit used in theory and U_B, U_P are base units and Planck units. There can't be less than one unit of distance and time, so it means that objects that move less than Planck length in one Planck time will move eventually by Planck length when enough of time passes. It means change in position Δx and corresponding change in time Δt cant have values less than one in Planck units. I can write it as:

$$\left|\frac{\Delta x}{\Delta t}\right| = \frac{nl_P}{mt_P} \tag{1.1}$$

$$n \leq m \tag{1.2}$$

Where n and m are natural numbers and l_P is Planck length and t_P is Planck time. In whole paper i will use notation $(\mathbf{x})$ that means space and time scalar components so for base coordinates its $(\mathbf{x}) = (x^0, x^1, x^2, x^3)$. Not only one unit of change in position in one unit of time is maximum, another part is energy limit. Energy for given Planck length can't be more than one. Any natural unit like second or meter can be converted to units used here by equation:

$$U_{nm} = \prod_n \prod_m \frac{U_{B_n} U_{P_m}}{U_{B_m} U_{P_n}} \tag{1.3}$$

Where n subscript means unit put into counter and m means unit put into denominator, B means base SI units and P means Planck's units. For many expressions with other units i need to add sum to it:

$$U_{n_g m_g} = \sum_g \prod_n \prod_m \frac{U_{B_{ng}} U_{P_{mg}}}{U_{B_{mg}} U_{P_{ng}}} \tag{1.4}$$

Where it means i can add units that are normally would be not compatible. And get a unit that is correct from point of view of this model. All units for given one point of space-time can't have more than one unit of this model unit, energy, charge all physical properties of system can't reach more than one. If i have any vector it length can be only natural number i can write it as:

$$N_x = \sqrt{\sum_a x^a x^a} \quad N_x = 0, 1, 2... \tag{1.5}$$

$$N_t = \sqrt{x^0 x^0} \quad N_t = 0, 1, 2... \tag{1.6}$$

2. Symmetries and spin

Base idea is that all elementary particles can be produced out of symmetries states. There are two symmetries i will use in this model, that can have positive value S_{+1}, S_{+2} or negative value S_{-1}, S_{-2}. Positive value means that symmetry is fulfilled , negative that its not. There are four possible combinations of spin values that can be represented as a matrix, where v_{nm} represents state and can be equal to one , zero or negative one:

$$\hat{S}(\mathbf{x}) = \begin{pmatrix} \frac{1}{2}v_{11}S_{+1}(\mathbf{x}) & \frac{1}{2}v_{12}S_{+2}(\mathbf{x}) \\ \frac{1}{2}v_{21}S_{-1}(\mathbf{x}) & \frac{1}{2}v_{22}S_{+2}(\mathbf{x}) \\ \frac{1}{2}v_{31}S_{+1}(\mathbf{x}) & \frac{1}{2}v_{32}S_{-2}(\mathbf{x}) \\ \frac{1}{2}v_{41}S_{-1}(\mathbf{x}) & \frac{1}{2}v_{42}S_{-2}(\mathbf{x}) \end{pmatrix} = \begin{pmatrix} \frac{1}{2}v_{11}S_{+1}(\mathbf{x}) & \frac{1}{2}v_{12}S_{+2}(\mathbf{x}) \\ -\frac{1}{2}v_{21}S_{+1}(\mathbf{x}) & \frac{1}{2}v_{22}S_{+2}(\mathbf{x}) \\ \frac{1}{2}v_{31}S_{+1}(\mathbf{x}) & -\frac{1}{2}v_{32}S_{+2}(\mathbf{x}) \\ -\frac{1}{2}v_{41}S_{+1}(\mathbf{x}) & -\frac{1}{2}v_{42}S_{+2}(\mathbf{x}) \end{pmatrix} \tag{2.1}$$

Symmetry number for a given system is equal to sum of this matrix elements $S(\mathbf{x}) = \sum_{n,m} S_{nm}(\mathbf{x})$, if first symmetry is fulfilled it means that system is massless $ds^2 = 0$ second symmetry is fulfilled when energy states change so for given system there is not one energy state E but many E_n and they are not equal $(E_0 \neq E_1... \neq E_n)$, when first symmetry is not fulfilled then system has mass $ds^2 \neq 0$ and when second is not fulfilled all energy states are equal $(E_0 = E_1... = E_n)$. Spin number [3] for a given system is equal to its absolute value of symmetry $|S(\mathbf{x})|$ and from it i can create symmetry-spin vector S^{ϕ_N} that has n states, for each state it has positive value only with n entry of vector and zero everywhere else. For bosons i can have states of spin number that is equal to $N = 2|S(\mathbf{x})| + 1$ where they go from positive spin $|S(\mathbf{x})|$ then positive spin $|S(\mathbf{x})| - 1$ and so on till they get to zero $(|S(\mathbf{x})| - n = 0)$, then they go from negative $-|S(\mathbf{x})| + n \neq 0$ till $-|S(\mathbf{x})| + 0$ and for fermions they go from $|S(\mathbf{x})|$ to $|S(\mathbf{x})| - 1/2n \neq 0$ and then from $-|S(\mathbf{x})| + 1/2n$ to $-|S(\mathbf{x})| + 0$. So now i can write symmetry-spin vector with all states as for fermions and boson:

$$S_F^{\phi} = \begin{pmatrix} \rho_{|S(\mathbf{x})|} \\ 0 \\ ... \\ 0 \end{pmatrix}_1, \begin{pmatrix} 0 \\ \rho_{|S(\mathbf{x})|-1/2} \\ ... \\ 0 \end{pmatrix}_2 ... \begin{pmatrix} 0 \\ ... \\ \rho_{-|S(\mathbf{x})|+1/2} \\ 0 \end{pmatrix}_{N-1}, \begin{pmatrix} 0 \\ ... \\ 0 \\ \rho_{-|S(\mathbf{x})|} \end{pmatrix}_N \tag{2.2}$$

$$S_B^{\phi} = \begin{pmatrix} \rho_{|S(\mathbf{x})|} \\ 0 \\ ... \\ 0 \end{pmatrix}_1, \begin{pmatrix} 0 \\ \rho_{|S(\mathbf{x})|-1} \\ ... \\ 0 \end{pmatrix}_2 ... \begin{pmatrix} 0 \\ ... \\ \rho_0 \\ ... \end{pmatrix}_{N/2+1} \begin{pmatrix} 0 \\ ... \\ \rho_{-|S(\mathbf{x})|+1} \\ 0 \end{pmatrix}_N, \begin{pmatrix} 0 \\ ... \\ 0 \\ \rho_{-|S(\mathbf{x})|} \end{pmatrix}_{N+1} \tag{2.3}$$

Subscript in one means what spin state it represents and ρ is probability of spin state number. Where for bosons $|S(\mathbf{x})| = 0, 1, 2...$ for fermions $|S(\mathbf{x})| = 1/2, 3/2...$,each state has one where column number is equal to N state. So its not one vector but N vectors for spin 1/2 particles its $N = 2$ where they get positive and negative spin states. Generally N is number of all states, for bosons its easy to calculate its just $N = 2|S(\mathbf{x})| + 1 = 2p + 1$ where $|S(\mathbf{x})|$ is symmetry number, for fermions its more complex for each spin state there is one number so if i have N states where $N/2$ are positive states and $N/2 + 1...N$ are negative states this number N is number of all possible negative and positive states. It connects to spin number by $|S(\mathbf{x})| - 1/2n \geq 0$ so i get $N = 2p$ where $n = 1, 3..., 2p - 1$. So from spin number i can get possible spin state number by (subscript F means fermions, B bosons):

$$Y_{F_p} = \begin{cases} 1/2(2p-1) \wedge p > 0 \\ 1/2(2p+1) \wedge p < 0 \end{cases}_{-|S(\mathbf{x})| \leq Y_{F_p} \leq |S(\mathbf{x})|} \tag{2.4}$$

$$Y_{B_p} = p \wedge p \in \mathbb{Z}|_{-|S(\mathbf{x})| \leq Y_{B_p} \leq |S(\mathbf{x})|} \tag{2.5}$$

3. Energy from symmetry exchange

Energy by rotation of tensor field is generated by rate of change in symmetries. For given system symmetry number stays constant but it allows for changing in symmetry state, rule is that only positive symmetry state can exchange to positive, negative state exchange to negative they do not change state of symmetry but have energy, when negative symmetry changes to positive or positive to negative they change state of system and carry energy. First symmetry is scalar field of space and time, so it can be threat as scalar function of space and time, for each given point it has value, if i take symmetry in state $S(x^0+\delta x^0,\mathbf{x^a})$ i want to get state of symmetry so just $S(\mathbf{x})$, that time where symmetry changes by unit of symmetry is exchange time and it generates energy :

$$S(\mathbf{x}) = S(x^0+\delta x^0,\mathbf{x^a}) \tag{3.1}$$

$$E(\mathbf{x})\Big|_{x^0}^{x^0+\delta x^0_{nmij}} = 2\sum_{n,m}\sum_{i,j\neq n,m}\frac{S_{nmij}(x^0+\delta x^0_{nmij},\mathbf{x^a})}{\delta x^0_{nmij}} \tag{3.2}$$

$$J(\mathbf{x})\Big|_{x^0}^{x^0+\delta x^0_{nmij}} = 2\frac{Y_p}{|Y_p|}\left|\sum_{n,m}\sum_{i,j\neq n,m}\frac{S_{nmij}(x^0+\delta x^0_{nmij},\mathbf{x^a})}{\delta x^0_{nmij}}\right| \tag{3.3}$$

Where final angle is equal to $\gamma = Y_p\theta$ where θ is physical rotation angle it means for example for spin one half particles rotation by 2π has effect as rotation by π first represents θ angle and second γ angle:

$$J(\mathbf{x})\Big|_{x^0}^{x^0+\delta x^0_{nmij}} = Y_p\frac{\dot{\theta}(\mathbf{x})}{2\pi}\Bigg|_{x^0}^{x^0+\delta x^0_{nmij}} =$$

$$\frac{\dot{\gamma}(\mathbf{x})}{2\pi}\Bigg|_{x^0}^{x^0+\delta x^0_{nmij}} = 2\frac{Y_p}{|Y_p|}\left|\sum_{n,m}\sum_{i,j\neq n,m}\frac{S_{nmij}(x^0+\delta x^0_{nmij},\mathbf{x^a})}{\delta x^0_{nmij}}\right| \tag{3.4}$$

Where angle θ is defined as for spin state ϕ for fermions:

$$\theta_{k(\phi)F}(\mathbf{x})\Big|_{x^0}^{x^0+\delta x^0_{nmij}} = \begin{cases}\theta_{k(\phi)}(\mathbf{x}) = +\theta(\mathbf{x}) \to \phi = 1,...,N/2 \to (Y_{F_m} > 0)\\ \theta_{k(\phi)}(\mathbf{x}) = -\theta(\mathbf{x}) \to \phi = N/2+1,...,N \to (Y_{F_m} < 0)\end{cases} \tag{3.5}$$

For bosons its same but i need to add zero energy state that is equal to:

$$\theta_{k(\phi)B}(\mathbf{x})\Big|_{x^0}^{x^0+\delta x^0_{nmij}} = \begin{cases}\theta_{k(\phi)}(\mathbf{x}) = +\theta(\mathbf{x}) \to \phi = 1,...,N/2 \to (Y_{B_m} > 0)\\ \theta_{k(\phi)}(\mathbf{x}) = 0 \to \phi = N/2+1 \to (Y_{B_m} = 0)\\ \theta_{k(\phi)}(\mathbf{x}) = -\theta(\mathbf{x}) \to \phi = N/2+2,...,N+1 \to (Y_{B_m} < 0)\end{cases} \tag{3.6}$$

Positive angle represents positive spin $Y_p > 0$ state and negative angle represents negative spin $Y_p < 0$ state. So i can write full angle as:

$$\dot{\gamma}\Big|_{x^0}^{x^0+\delta x^0_{nmij}} = Y_p\dot{\theta}(\mathbf{x})\Big|_{x^0}^{x^0+\delta x^0_{nmij}} =$$

$$= \frac{Y_p\theta(x^0+\delta x^0, \mathbf{x^a}) - Y_p\theta(\mathbf{x})}{\delta x^0}\Bigg|_{x^0}^{x^0+\delta x^0_{nmij}} = \frac{\gamma(x^0+\delta x^0, \mathbf{x^a}) - \gamma(\mathbf{x})}{\delta x^0}\Bigg|_{x^0}^{x^0+\delta x^0_{nmij}} \tag{3.7}$$

Where time that state is changed is equal to T_+ and time when state is not change is equal to T_-:

$$T_- = x^0\left(1 - \sum_{n,m}\sum_{i,j\neq n,m}\frac{1}{\delta x^0_{nmij}}\right) \wedge x^0 \geq \sum_{n,m}\sum_{i,j\neq n,m}\delta x^0_{nmij} \tag{3.8}$$

$$T_+ = x^0\left(\sum_{n,m}\sum_{i,j\neq n,m}\frac{1}{\delta x^0_{nmij}}\right) \wedge x^0 \geq \sum_{n,m}\sum_{i,j\neq n,m}\delta x^0_{nmij} \tag{3.9}$$

Where angular speed is defined :

$$\omega r\Big|_{x^0}^{x^0+\delta x^0_{nmij}} = \frac{|Y_p|\dot{\theta}(\mathbf{x})}{2\pi}\Bigg|_{x^0}^{x^0+\delta x^0_{nmij}} = \frac{\dot{\gamma}(\mathbf{x})}{2\pi}\Bigg|_{x^0}^{x^0+\delta x^0_{nmij}} \tag{3.10}$$

I can write E and J for many bodies as:

$$E(\mathbf{x^0}, \mathbf{x^a_k}, \mathbf{x^a_l})\Big|_{x^0}^{x^0+x^0_{nmijkl}R_{kl}}$$

$$= 2\sum_{k,l}V(k,l)\left|\sum_{n,m}\sum_{i,j\neq n,m}\frac{S_{nmijkl}(x^0+\delta x^0_{nmijkl}R_{kl}, \mathbf{x^a_k}, \mathbf{x^a_l})}{\delta x^0_{nmijkl}R_{kl}}\right| \tag{3.11}$$

$$J(\mathbf{x^0}, \mathbf{x^a_k}, \mathbf{x^a_l})\Big|_{x^0}^{x^0+x^0_{nmijkl}R_{kl}}$$

$$= 2\sum_{k,l}f(k,l)\left|\sum_{n,m}\sum_{i,j\neq n,m}\frac{S_{nmijkl}(x^0+\delta x^0_{nmijkl}R_{kl}, \mathbf{x^a_k}, \mathbf{x^a_l})}{\delta x^0_{nmijkl}R_{kl}}\right| \tag{3.12}$$

Where angular speed is for many systems :

$$\omega(\mathbf{x^0}, \mathbf{x^a_k}, \mathbf{x^a_l})r(\mathbf{x^0}, \mathbf{x^a_k}, \mathbf{x^a_l})\Big|_{x^0}^{x^0+x^0_{nmijkl}R_{kl}}$$

$$= \frac{|Y_p(\mathbf{x^0}, \mathbf{x^a_k}, \mathbf{x^a_l})|\dot{\theta}(\mathbf{x^0}, \mathbf{x^a_k}, \mathbf{x^a_l})}{2\pi}\Bigg|_{x^0}^{x^0+x^0_{nmijkl}R_{kl}}$$

$$= \frac{\dot{\gamma}(\mathbf{x^0}, \mathbf{x^a_k}, \mathbf{x^a_l})}{2\pi}\Bigg|_{x^0}^{x^0 + x^0_{nmijkl}R_{kl}}$$

$$= 2\sum_{k,l} f(k,l)\left|\sum_{n,m}\sum_{i,j\neq n,m} \frac{S_{nmijkl}(x^0 + \delta x^0_{nmijkl}R_{kl}, \mathbf{x^a_k}, \mathbf{x^a_l})}{\delta x^0_{nmijkl}R_{kl}}\right| \quad (3.13)$$

Now only thing left is to calculate interaction time and time where there is no interaction, it depends on how all objects exchange energy, most simple way is just sum of all individual interaction times, more complex picture is sum of all interaction for given system k with interaction l:

$$T_{-k} = x^0\left(1 - \sum_{l}\sum_{n,m}\sum_{i,j\neq n,} \frac{1}{\delta x^0_{nmijkl}R_{kl}}\right)$$
$$\wedge x^0 \geq \sum_{l}\sum_{n,m}\sum_{i,j\neq n,m} \delta x^0_{nmij}R_{kl} \quad (3.14)$$

$$T_{+k} = x^0\left(\sum_{l}\sum_{n,m}\sum_{i,j\neq n,m} \frac{1}{\delta x^0_{nmijkl}R_{kl}}\right)$$
$$\wedge x^0 \geq \sum_{l}\sum_{n,m}\sum_{i,j\neq n,m} \delta x^0_{nmijkl}R_{kl} \quad (3.15)$$

Where function $f(k,l)$ and $V(n,m)$ is equal to (sgn is signum function):

$$f(k,l) := \begin{cases} 1 \Rightarrow k = l \wedge Y_{k_p} = Y_{l_p} > 0 \\ -1 \Rightarrow k = l \wedge Y_{k_p} = Y_{l_p} < 0 \\ -1 \Rightarrow k \neq l \wedge Y_{l_p} < 0 \wedge f(l,k) \\ -1 \Rightarrow k \neq l \wedge Y_{k_p} < 0 \wedge f(k,l) \\ 1 \Rightarrow k \neq l \wedge Y_{k_p} < 0 \wedge f(k,l) \\ 1 \Rightarrow k \neq l \wedge Y_{l_p} < 0 \wedge f(l,k) \\ 0 \Rightarrow Y_{l_p} = 0 \vee Y_{k_p} = 0 \vee Y_{l_p} = Y_{k_p} = 0 \end{cases} \quad (3.16)$$

$$V(k,l) := \begin{cases} \operatorname{sgn}(S_{nmijkk}) \wedge V(k,k) \\ \operatorname{sgn}(S_{nmijll}) \wedge V(l,l) \\ \operatorname{sgn}(S_{nmijkl}) \rightarrow S_{nmijkl} = S_{nmijlk} \wedge V(k,l) \\ \operatorname{sgn}(S_{nmijlk}) \rightarrow S_{nmijkl} = S_{nmijlk} \wedge V(l,k) \\ -1 \rightarrow S_{nmijkl} \neq S_{nmijlk} \wedge V(k,l) \\ -1 \rightarrow S_{nmijkl} \neq S_{nmijlk} \wedge V(l,k) \\ 0 \rightarrow S_{nmijkl} = S_{nmijlk} = 0 \vee S_{nmijlk} = 0 \vee S_{nmijkl} = 0 \end{cases} \quad (3.17)$$

From symmetry model i can map all particles of Standard Model [4] to symmetry states. I will use a table with matter (symmetrical state) and anti-matter (anti-symmetrical), where i use matrix S_{nm} elements with v_{nm} states as a sign :

Elementary Particles		
Particle	Matter State (symmetrical)	Anti-Matter State (anti-symmetrical)
Photon	$+S_{11}, +S_{12}$	$-S_{11}, -S_{12}$
Electron/Muon/Tau	$-S_{11}, +S_{21}, +S_{22}$	$+S_{11}, -S_{21}, -S_{22}$
Quarks (up, charm, top)	$-S_{11}, -S_{12}, -S_{21}, +S_{31}, -S_{32}$	$+S_{11}, +S_{12}, +S_{21}, -S_{31}, +S_{32}$
Quarks (down, strange, bottom)	$+S_{11}, +S_{12}, +S_{21}, -S_{31}, +S_{32}$	$-S_{11}, -S_{12}, -S_{21}, +S_{31}, -S_{32}$
Graviton	$+S_{11}, +S_{12}, -S_{41}, -S_{42}$	$-S_{11}, -S_{12}, +S_{41}, +S_{42}$
Higgs Boson	$+S_{11}, -S_{12}$	$-S_{11}, +S_{12}$
$W^{\pm}$ Boson	$-S_{11}, +S_{12}, -S_{21}, +S_{22}$	$+S_{11}, -S_{12}, +S_{21}, -S_{22}$
Z Boson	$+S_{41}, +S_{42}$	$+S_{41}, +S_{42}$
Neutrino	$+S_{12}, +S_{41}, -S_{42}$	$-S_{12}, -S_{41}, +S_{42}$
Gluon	$+S_{11}, +S_{12}, -S_{41}, +S_{42}$	$-S_{11}, -S_{12}, +S_{41}, -S_{42}$

From it there is electric charge calculation:

$$Q(\mathbf{x})\Big|_{x^0}^{x^0+x^0_{n1ij}}\Bigg|_{x^0}^{x^0+x^0_{n2ij}} = 2\frac{S(\mathbf{x})}{|S(\mathbf{x})|}\left(\sum_{n=2,3}\sum_{i=2,3,j\neq n=1,2}\left|\frac{S_{n1ij}(x^0+\delta x^0_{n1ij},\mathbf{x^a})}{\delta x^0_{n1ij}}\right|\right)$$
$$+2\frac{S(\mathbf{x})}{|S(\mathbf{x})|}\left(\sum_{n=2,3}\sum_{i=2,3,j\neq n=1,2}\left|\frac{S_{n2ij}(x^0+\delta x^0_{n2ij},\mathbf{x^a})}{\delta x^0_{n2ij}}\right|\right) \tag{3.18}$$

Electric field created by charges energy is equal to (where α is fine structure constant [5]):

$$\Phi(\mathbf{x^0},\mathbf{x^a_k},\mathbf{x^a_l})\Big|_{x^0}^{x^0+x^0_{n1ijkl}}\Bigg|_{x^0}^{x^0+x^0_{n2ijkl}} = \sum_{k,l}\alpha q(k,l)Q^2(\mathbf{x^0},\mathbf{x^a_k},\mathbf{x^a_l}) \tag{3.19}$$

$$q(k,l) = \begin{cases} + \to \operatorname{sgn}(Q(\mathbf{x^0},\mathbf{x^a_k},\mathbf{x^a_k})) = \operatorname{sgn}(Q(\mathbf{x^0},\mathbf{x^a_l},\mathbf{x^a_l})) \\ - \to \operatorname{sgn}(Q(\mathbf{x^0},\mathbf{x^a_k},\mathbf{x^a_k})) \neq \operatorname{sgn}(Q(\mathbf{x^0},\mathbf{x^a_l},\mathbf{x^a_l})) \end{cases} \tag{3.20}$$

$$Q(\mathbf{x^0},\mathbf{x^a_k},\mathbf{x^a_l})\Big|_{x^0}^{x^0+x^0_{n1ijkl}}\Bigg|_{x^0}^{x^0+x^0_{n2ijkl}} =$$
$$\sum_{k,l}2\frac{S_{kl}(\mathbf{x})}{|S_{kl}(\mathbf{x})|}\left(\sum_{n=2,3}\sum_{i=2,3,j\neq n=1,2}\left|\frac{S_{n1ijkl}(x^0+\delta x^0_{n1ijkl}R_{kl},\mathbf{x^a_k},\mathbf{x^a_l})}{\delta x^0_{n1ijkl}R_{kl}}\right|\right)$$
$$+\sum_{k,l}2\frac{S_{kl}(\mathbf{x})}{|S_{kl}(\mathbf{x})|}\left(\sum_{n=2,3}\sum_{i=2,3,j\neq n=1,2}\left|\frac{S_{n2ijkl}(x^0+\delta x^0_{n2ijkl}R_{kl},\mathbf{x^a_k},\mathbf{x^a_l})}{\delta x^0_{n2ijkl}R_{kl}}\right|\right) \tag{3.21}$$

4. Symmetry field

There is base energy level for each symmetry interaction that can't be lower than it E_0, next energy level is increased by change in interaction time that change can be zero or can be done in any steps but with limit of maximum Planck Energy, each step is multiplication of Planck time and can be any natural number (of Planck Times) if system obeys second symmetry if not there is always same state of energy so it means system can exchange only one energy level. Now i need to add probability and i can write Symmetry field as, where $\rho(\mathbf{r}, \varphi, \theta)$ is probability function depending on radius of position :

$$K(\mathbf{x^0}, \mathbf{x^a_k}, \mathbf{x^a_l})\Big|_{x^0}^{x^0+x^0_{nmijkl}R_{kl}}\Bigg|_{(c_{pqs},\varphi_{pqs},\theta_{pqs},t_0)_{kl}}^{(r_{pqs},\varphi_{pqs},\theta_{pqs},t_M)_{kl}} =$$

$$\sum_p\sum_q\sum_s\sum_{\eta=1}^{N}\sum_{k,l}\sum_{n,m}\sum_{i,j\neq n,m}$$

$$\int\left(1+\frac{1}{N_{A_{nmijklE}}}\left(\frac{i\rho_{pqs}(\mathbf{r}_k,\varphi_k,\theta_k,\mathbf{r}_l,\varphi_l,\theta_l)}{1+|E_{nmijkl\eta}-E_0|}\right)\right)$$

$$\big(E(\mathbf{x^0},(\mathbf{r}_k,\varphi_k,\theta_k)_{pqs},(\mathbf{r}_l,\varphi_l,\theta_l)_{pqs}) + J(\mathbf{x^0},(\mathbf{r}_k,\varphi_k,\theta_k)_{pqs},(\mathbf{r}_l,\varphi_l,\theta_l)_{pqs})$$

$$+\Phi(\mathbf{x^0},(\mathbf{r}_k,\varphi_k,\theta_k)_{pqs},(\mathbf{r}_l,\varphi_l,\theta_l)_{pqs})\big)\ d\varphi_k d\theta_k d\varphi_l d\theta_l\Big|_{p,q,s\in N}\Bigg|_{(c_{pqs},\varphi_{pqs},\theta_{pqs},t_0)_{kl}}^{(r_{pqs},\varphi_{pqs},\theta_{pqs},t_M)_{kl}} \tag{4.1}$$

$$\mathbf{r}_{pqs} = \sqrt{(x^1-p)^2+(x^2-q)^2+(x^3-s)^2}\Bigg|_{p,q,r\in N} = 1+\dot{\mathbf{r}}t \qquad \dot{\mathbf{r}}t\in N \tag{4.2}$$

Probability of field being in all energy state E_η and all position probability is equal to:

$$\int -i\sum_p\sum_q\sum_s\sum_{\eta=1}^{N}\frac{1}{N_{A_{nmijklE}}}$$
$$\times\frac{i\rho_{pqs}(\mathbf{r}_k,\varphi_k,\theta_k,\mathbf{r}_l,\varphi_l,\theta_l)}{1+|E_{nmijkl\eta}-E_0|}d\varphi_k d\theta_k d\varphi_l d\theta_l = 1 \tag{4.3}$$

For given symmetry field- symmetry must be always conserved, it means that sum of all symmetry number after and before interaction has to be equal:

$$\sum_{k,l}\sum_{n,m}\sum_{i,j\neq n,m} S_{nmijkl}(x^0+\delta x^0_{nmijkl}R_{kl},\mathbf{x^a_k},\mathbf{x^a_l})\Big|_{x^0}^{x^0+x^0_{nmijkl}R_{kl}}$$
$$=\sum_{k,l}\sum_{n,m}\sum_{i,j\neq n,m} S_{nmijkl}(x^0,\mathbf{x^a_k},\mathbf{x^a_l})\Big|_{x^0}^{x^0+x^0_{nmijkl}R_{kl}} \tag{4.4}$$

And so for all space they have to be equal before and after interaction:

$$\int\sum_{k,l}\sum_{n,m}\sum_{i,j\neq n,m} S_{nmijkl}(x^0+\delta x^0_{nmijkl}R_{kl},\mathbf{x^a_k},\mathbf{x^a_l})dx^3\Big|_{x^0}^{x^0+x^0_{nmijkl}R_{kl}} =$$
$$=\int\sum_{k,l}\sum_{n,m}\sum_{i,j\neq n,m} S_{nmijkl}(x^0,\mathbf{x^a_k},\mathbf{x^a_l})dx^3\Big|_{x^0}^{x^0+x^0_{nmijkl}R_{kl}} \tag{4.5}$$

From speed i can calculate energy - or from change in energy from base energy i can calculate sum of all speed vector components for massive and massless particles where E_0 is lowest energy interaction, where N is number of particles in a system and S_N is symmetry for given particle :

$$\left(\sum_{\mu}\dot{x}^{\mu}\dot{x}^{\mu}\right)^{1/2} = 1+\sqrt{1-\frac{E_0^2}{\frac{1}{4S_N^2N^2}\left(\sum_{k,l}\sum_{n,m}\sum_{i,j\neq n,m}\frac{1}{\delta x^0_{nmijkl}}\right)^2}}$$
$$+\frac{1}{2S_NN}\left(\sum_{k,l}\sum_{n,m}\sum_{i,j\neq n,m}\frac{1}{\delta x^0_{nmijkl}}\right)$$
$$\times\left(1-\sqrt{1-\frac{E_0^2}{\frac{1}{4S_N^2N^2}\left(\frac{1}{\sum_{k,l}\sum_{n,m}\sum_{i,j\neq n,m}\delta x^0_{nmijkl}}\right)^2}}\right) \tag{4.6}$$

Probability of field being in one of energy state is E_η is equal to:

$$\int -i\sum_{p}\sum_{q}\sum_{s}\frac{1}{N_{A_{nmijklE}}}\frac{i\rho_{pqs}(\mathbf{r}_k,\varphi_k,\theta_k,\mathbf{r}_l,\varphi_l,\theta_l)}{1+|E_{nmijkl\eta}-E_0|}d\varphi_k d\theta_k d\varphi_l d\theta_l \tag{4.7}$$

Probability of field being in one of energy state is E_η and radius (p,q,s) is equal to:

$$\int -i\frac{1}{N_{A_{nmijklE}}}\frac{i\rho_{pqs}(\mathbf{r}_k,\varphi_k,\theta_k,\mathbf{r}_l,\varphi_l,\theta_l)}{1+|E_{nmijkl\eta}-E_0|}d\varphi_k d\theta_k d\varphi_l d\theta_l \tag{4.8}$$

Now i need to add rotation and spin to symmetry field and turn it from scalar to tensor field, i will use tensor product of spin states and rotation operators on coordinates that depend on angle and measured spin axis that i write as $(\hat{a}_k,\hat{a}_l,\alpha_k,\alpha_l)$, where unit vectors are just normal vectors in flat space so they give one for equal to k or l and zero everywhere else. Measured spin axis is $\hat{a}_k,\hat{a}_l$, both rotation operator and spin depends on it that will be crucial in next section about probability. So symmetry field is equal to:

$$K^{\phi_k\phi_l}(\mathbf{x^0},\mathbf{x^a_k},\mathbf{x^a_l})\Big|_{x^0}^{x^0+x^0_{nmijkl}R_{kl}}\Bigg|_{(c_{pqs},\varphi_{pqs},\theta_{pqs},t_0)_{kl}}^{(r_{pqs},\varphi_{pqs},\theta_{pqs},t_M)_{kl}}$$

$$=\sum_p\sum_q\sum_s\sum_{\eta=1}^{N}\sum_{k,l}\sum_{n,m}\sum_{i,j\neq n,m}$$

$$\int\left(1+\frac{1}{N_{A_{nmijklE}}}\left(\frac{i\rho_{pqs}(\mathbf{r}_k,\varphi_k,\theta_k,\mathbf{r}_l,\varphi_l,\theta_l)}{1+|E_{nmijkl\eta}-E_0|}\right)\right)$$

$$\times\Big(E(\mathbf{x^0},(\mathbf{r}_k,\hat{R}_{\varphi_k}(\hat{a}_k,\alpha_k)\varphi_k,\hat{R}_{\theta_k}(\hat{a}_k,\alpha_k)\theta_k)_{pqs}\ ,$$

$$(\mathbf{r}_l,\hat{R}_{\varphi_l}(\hat{a}_l,\alpha_l)\varphi_l,\hat{R}_{\theta_l}(\hat{a}_l,\alpha_l)\theta_l)_{pqs})$$

$$+J(\mathbf{x^0},(\mathbf{r}_k,\mathbf{r}_k,\hat{R}_{\varphi_k}(\hat{a}_k,\alpha_k)\varphi_k,\hat{R}_{\theta_k}(\hat{a}_k,\alpha_k)\theta_k$$

$$\mathbf{r}_l,\hat{R}_{\varphi_l}(\hat{a}_l,\alpha_l)\varphi_l,\hat{R}_{\theta_l}(\hat{a}_l,\alpha_l)\theta_l)$$

$$+\Phi(\mathbf{x^0},(\mathbf{r}_k,\mathbf{r}_k,\hat{R}_{\varphi_k}(\hat{a}_k,\alpha_k)\varphi_k,\hat{R}_{\theta_k}(\hat{a}_k,\alpha_k)\theta_k$$

$$\mathbf{r}_l,\hat{R}_{\varphi_l}(\hat{a}_l,\alpha_l)\varphi_l,\hat{R}_{\theta_l}(\hat{a}_l,\alpha_l)\theta_l)\Big)$$

$$\times S^{\phi_k\phi_l}(\hat{a}_k,\hat{a}_l,\alpha_k,\alpha_l)\,\hat{u}_k\otimes\hat{u}_l$$

$$d\varphi_k d\theta_k d\varphi_l d\theta_l\Big|_{x^0}^{x^0+x^0_{nmijkl}R_{kl}}\Bigg|_{(c_{pqs},\varphi_{pqs},\theta_{pqs},t_0)_{kl}}^{(r_{pqs},\varphi_{pqs},\theta_{pqs},t_M)_{kl}}$$

5. Probability

Before measurement there is all possible paths traced after only one path i can use geodesic equation for both situations as [6]:

$$\sum_l \sum_p \sum_q \sum_s \int \int_{(q_{pqs},\varphi_{pqs},\theta_{pqs},t_0)_{kl}}^{(r_{pqs},\varphi_{pqs},\theta_{pqs},t_M)_{kl}} \delta ds d\varphi_{pqs} d\theta_{pqs} = 0 \tag{5.1}$$

$$\sum_l \int_{(q_{pqs},\varphi_{pqs},\theta_{pqs},t_0)_{kl}}^{(r_{pqs},\varphi_{pqs},\theta_{pqs},t_M)_{kl}} \delta ds = 0 \tag{5.2}$$

Field equation changes from all possible states to one state, Then it evolves again but from that space-time point it was measured. First i write state when measured, where c is center radius equal to:

$$c_{pqs} = \sqrt{(x^1-p)^2 + (x^2-q)^2 + (x^3-s)^2}\Big|_{p,q,r\in N} = 1 \tag{5.3}$$

$$\begin{aligned} &K^{\phi_k\phi_l}(\mathbf{x^0}, \mathbf{x^a_k}, \mathbf{x^a_l})\Big|_{x^0}^{x^0+x^0_{nmijkl}R_{kl}}\Big|_{(c_{pqs},\varphi_{pqs},\theta_{pqs},t_0)_{kl}}^{(r_{pqs},\varphi_{pqs},\theta_{pqs},t_M)_{kl}} \\ &= \sum_{k,l}\sum_{n,m}\sum_{i,j\neq n,m}\left(\frac{\rho_{pqs}(\mathbf{r}_k,\varphi_k,\theta_k,\mathbf{r}_l,\varphi_l,\theta_l)}{1+|E_{nmijkl\eta}-E_0|}\right) \\ &\times\Big(E(\mathbf{x^0},(\mathbf{r}_k,\hat{R}_{\varphi_k}(\hat{a}_k,\alpha_k)\varphi_k,\hat{R}_{\theta_k}(\hat{a}_k,\alpha_k)\theta_k)_{pqs}, \\ &(\mathbf{r}_l,\hat{R}_{\varphi_l}(\hat{a}_l,\alpha_l)\varphi_l,\hat{R}_{\theta_l}(\hat{a}_l,\alpha_l)\theta_l)_{pqs}) \\ &+ J(\mathbf{x^0},(\mathbf{r}_k,\mathbf{r}_k,\hat{R}_{\varphi_k}(\hat{a}_k,\alpha_k)\varphi_k,\hat{R}_{\theta_k}(\hat{a}_k,\alpha_k)\theta_k \\ &\mathbf{r}_l,\hat{R}_{\varphi_l}(\hat{a}_l,\alpha_l)\varphi_l,\hat{R}_{\theta_l}(\hat{a}_l,\alpha_l)\theta_l) \\ &+ \Phi(\mathbf{x^0},(\mathbf{r}_k,\mathbf{r}_k,\hat{R}_{\varphi_k}(\hat{a}_k,\alpha_k)\varphi_k,\hat{R}_{\theta_k}(\hat{a}_k,\alpha_k)\theta_k \\ &\mathbf{r}_l,\hat{R}_{\varphi_l}(\hat{a}_l,\alpha_l)\varphi_l,\hat{R}_{\theta_l}(\hat{a}_l,\alpha_l)\theta_l)\Big) \\ &\times S^{\phi_k\phi_l}(\hat{a}_k,\hat{a}_l,\alpha_k,\alpha_l)\,\hat{u}_k\otimes\hat{u}_l\ \Big|_{x^0}^{x^0+x^0_{nmijkl}R_{kl}}\Big|_{(c_{pqs},\varphi_{pqs},\theta_{pqs},t_0)_{kl}}^{(r_{pqs},\varphi_{pqs},\theta_{pqs},t_M)_{kl}} \end{aligned} \tag{5.4}$$

This does not account spin measurement. But before i get into spin will write, equation after. It just starts to evolve again. It starts from point where it was measured, for each point center shifts by that trajectory body has moved. It means that each center after measurement is $c'_{pqs} = \sqrt{(x^1-p-p')^2+(x^2-q-q')^2+(x^3-s-s')^2} = 1$ where (p',q',s') is point where particle was found by measurement. And primed measured time and radius are new ones that are create after this measurement. So i can finally write equation that is equal to after measurement:

$$K^{\phi_k \phi_l}(\mathbf{x^0}, \mathbf{x^a_k}, \mathbf{x^a_l})\Big|_{x^0}^{x^0+x^0_{nmijkl}R_{kl}}\Big|_{(c'_{pqs},\varphi_{pqs},\theta_{pqs},t_M)_{kl}}^{(r'_{pqs},\varphi'_{pqs},\theta'_{pqs},t'_M)_{kl}}$$
$$= \sum_p \sum_q \sum_s \sum_{\eta=1}^{N} \sum_{k,l} \sum_{n,m} \sum_{i,j\neq n,m}$$
$$\int \left(1 + \frac{1}{N_{A_{nmijklE}}}\left(\frac{i\rho_{pqs}(\mathbf{r}_k, \varphi_k, \theta_k, \mathbf{r}_l, \varphi_l, \theta_l)}{1+|E_{nmijkl\eta} - E_0|}\right)\right)$$
$$\times \Big(E(\mathbf{x^0}, (\mathbf{r}_k, \hat{R}_{\varphi_k}(\hat{a}_k, \alpha_k)\,\varphi_k, \hat{R}_{\theta_k}(\hat{a}_k, \alpha_k)\,\theta_k)_{pqs}\ ,$$
$$(\mathbf{r}_l, \hat{R}_{\varphi_l}(\hat{a}_l, \alpha_l)\,\varphi_l, \hat{R}_{\theta_l}(\hat{a}_l, \alpha_l)\,\theta_l)_{pqs})$$
$$+ J(\mathbf{x^0}, (\mathbf{r}_k, \mathbf{r}_k, \hat{R}_{\varphi_k}(\hat{a}_k, \alpha_k)\,\varphi_k, \hat{R}_{\theta_k}(\hat{a}_k, \alpha_k)\,\theta_k$$
$$\mathbf{r}_l, \hat{R}_{\varphi_l}(\hat{a}_l, \alpha_l)\,\varphi_l, \hat{R}_{\theta_l}(\hat{a}_l, \alpha_l)\,\theta_l)$$
$$+ \Phi(\mathbf{x^0}, (\mathbf{r}_k, \mathbf{r}_k, \hat{R}_{\varphi_k}(\hat{a}_k, \alpha_k)\,\varphi_k, \hat{R}_{\theta_k}(\hat{a}_k, \alpha_k)\,\theta_k$$
$$\mathbf{r}_l, \hat{R}_{\varphi_l}(\hat{a}_l, \alpha_l)\,\varphi_l, \hat{R}_{\theta_l}(\hat{a}_l, \alpha_l)\,\theta_l)\Big)$$
$$\times S^{\phi_k \phi_l}(\hat{a}_k, \hat{a}_l, \alpha_k, \alpha_l)\,\hat{u}_k \otimes \hat{u}_l$$
$$d\varphi_k d\theta_k d\varphi_l d\theta_l\Big|_{x^0}^{x^0+x^0_{nmijkl}R_{kl}}\Big|_{(c'_{pqs},\varphi_{pqs},\theta_{pqs},t_M)_{kl}}^{(r'_{pqs},\varphi'_{pqs},\theta'_{pqs},t'_M)_{kl}} \tag{5.5}$$

Now only thing left is spin states. When spin state for given axis is measured it changes rotation operator to that axis its angle rate of change in time to spin value. For example if i take graviton and its measured spin value is one it means θ angle is multiplied by one, same with spin two measured, now its θ angle is multiplied by two it means it has twice as energy compared to spin one measured. If i measure spin state again but with another axis I again get probability for each spin state, i can write whole process as:

$$S^{\phi_k \phi_l}(\hat{a}_k, \hat{a}_l, \alpha_k, \alpha_l)\,\hat{u}_k \otimes \hat{u}_l \overset{M(\hat{m}_k,\hat{m}_l)}{\rightarrow} s^{\phi_k \phi_l}(\hat{m}_k, \hat{m}_l, \beta_k, \beta_l)\,\hat{u}_k \otimes \hat{u}_l \tag{5.6}$$

Where small s represents one spin state and m represents measured axis. It means that small s has zero for all ϕ states except one state that was measured. If i do measurement again by with different spin axis i will another state:

$$S^{\phi'_k\phi'_l}\left(\hat{m}'_k,\hat{m}'_l,\beta_k,\beta_l\right)\hat{u}_k\otimes\hat{u}_l \overset{M(\hat{m}'_k,\hat{m}'_l)}{\to} s^{\phi'_k\phi'_l}\left(\hat{m}'_k,\hat{m}'_l,\beta'_k,\beta'_l\right)\hat{u}_k\otimes\hat{u}_l \tag{5.7}$$

And so on if i chagne measured axis. Probability for all spin states is always equal to one:

$$\sum_{\phi} S^{\phi_k\phi_l}\left(\hat{m}_k,\hat{m}_l,\beta_k,\beta_l\right)\hat{u}_k\otimes\hat{u}_l = 1 \tag{5.8}$$

$$\sum_{\phi} s^{\phi_k\phi_l}\left(\hat{a}_k,\hat{a}_l,\alpha_k,\alpha_l\right)\hat{u}_k\otimes\hat{u}_l = 1 \tag{5.9}$$

$$\sum_{\phi} S^{\phi'_k\phi'_l}\left(\hat{m}'_k,\hat{m}'_l,\beta'_k,\beta'_l\right)\hat{u}_k\otimes\hat{u}_l = 1 \tag{5.10}$$

$$\sum_{\phi} s^{\phi'_k\phi'_l}\left(\hat{m}'_k,\hat{m}'_l,\beta'_k,\beta'_l\right)\hat{u}_k\otimes\hat{u}_l = 1 \tag{5.11}$$

So field equation changes from axis $(\hat{a}_k,\hat{a}_l)$ to $(\hat{m}_k,\hat{m}_l)$ angle changes from (α_k,α_l) to (β_k,β_l) so i can write evolving equation after spin measurement as:

$$\begin{gathered}
K^{\phi_k\phi_l}(\mathbf{x^0},\mathbf{x^a_k},\mathbf{x^a_l})\Big|_{x^0}^{x^0+x^0_{nmijkl}R_{kl}}\Big|_{(c'_{pqs},\varphi_{pqs},\theta_{pqs},t_M)_{kl}}^{(r'_{pqs},\varphi'_{pqs},\theta'_{pqs},t'_M)_{kl}} \\
=\sum_p\sum_q\sum_s\sum_{\eta=1}^{N}\sum_{k,l}\sum_{n,m}\sum_{i,j\neq n,m} \\
\int\left(1+\frac{1}{N_{A_{nmijklE}}}\left(\frac{i\rho_{pqs}(\mathbf{r}_k,\varphi_k,\theta_k,\mathbf{r}_l,\varphi_l,\theta_l)}{1+|E_{nmijkl\eta}-E_0|}\right)\right) \\
\times\Big(E(\mathbf{x^0},(\mathbf{r}_k,\hat{R}_{\varphi_k}\left(\hat{m}_k,\beta_k\right)\varphi_k,\hat{R}_{\theta_k}\left(\hat{m}_k,\beta_k\right)\theta_k)_{pqs}\;, \\
(\mathbf{r}_l,\hat{R}_{\varphi_l}\left(\hat{m}_l,\beta_l\right)\varphi_l,\hat{R}_{\theta_l}\left(\hat{m}_l,\beta_l\right)\theta_l)_{pqs}) \\
+\;J(\mathbf{x^0},(\mathbf{r}_k,\mathbf{r}_k,\hat{R}_{\varphi_k}\left(\hat{m}_k,\beta_k\right)\varphi_k,\hat{R}_{\theta_k}\left(\hat{m}_k,\beta_k\right)\theta_k \\
\mathbf{r}_l,\hat{R}_{\varphi_l}\left(\hat{m}_l,\beta_l\right)\varphi_l,R_{\theta_l}\left(\hat{m}_l,\beta_l\right)\theta_l) \\
+\;\Phi(\mathbf{x^0},(\mathbf{r}_k,\mathbf{r}_k,\hat{R}_{\varphi_k}\left(\hat{m}_k,\beta_k\right)\varphi_k,\hat{R}_{\theta_k}\left(\hat{m}_k,\beta_k\right)\theta_k \\
\mathbf{r}_l,\hat{R}_{\varphi_l}\left(\hat{m}_l,\beta_l\right)\varphi_l,\hat{R}_{\theta_l}\left(\hat{m}_l,\beta_l\right)\theta_l)\Big) \\
\times S^{\phi_k\phi_l}\left(\hat{m}_k,\hat{m}_l,\beta_k,\beta_l\right)\hat{u}_k\otimes\hat{u}_l \\
d\varphi_k d\theta_k d\varphi_l d\theta_l\Big|_{x^0}^{x^0+x^0_{nmijkl}R_{kl}}\Big|_{(c'_{pqs},\varphi_{pqs},\theta_{pqs},t_M)_{kl}}^{(r'_{pqs},\varphi'_{pqs},\theta'_{pqs},t'_M)_{kl}}
\end{gathered} \tag{5.12}$$

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