Application of Prespacetime Model I

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ABSTRACT

Some applications of Prespacetime Model I are stated. The applications relate to presenting and modeling generation, sustenance and evolution of elementary particles through self-referential hierarchical spin structures of prespacetime. In particular, method and model for generating, sustaining and causing evolution of fermions, bosons and spinless particles are stated. Further, method and model for weak interaction, strong interaction, electromagnetic interaction, gravitational interaction, quantum entanglement and brain function are also stated.

Key Words: prespacetime, spin, self-reference, elementary particule, fermion, boson, unspinized particle, generation, sustenance, evolution.

I. Modeling Method Based on Prespacetime Model I

(1)   A method of modeling generation, sustenance and evolution of an elementary particle through hierarchical self-referential spin in prespacetime, as a teaching and/or modeling tool, comprising the steps of:

producing a first representation of said generation, sustenance and evolution of said elementary particle through said hierarchical self-referential spin in said prespacetime, said representation comprising:

$$1 = e^{i0} = 1e^{i0} = Le^{-iM+iM} = L_e L_i^{-1}\left(e^{-iM}\right)\left(e^{-iM}\right)^{-1} \rightarrow$$

$$\left(L_{M,e} \quad L_{M,i}\right)\begin{pmatrix} A_e e^{-iM} \\ A_i e^{-iM} \end{pmatrix} = L_M \begin{pmatrix} \psi_e \\ \psi_i \end{pmatrix} = 0$$

where e is natural exponential base, i is imaginary unit, L represents rule of one, M is a phase, $A_e e^{-iM} = \psi_e$ represents external object, $A_i e^{-iM} = \psi_i$ represents internal object, L_e represents external rule, L_i represents internal rule, $L_M = (L_{M,e} \ L_{M,i})$ represents matrix rule, $L_{M,e}$ represents external matrix rule and $L_{M,i}$ represents internal matrix rule; and

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presenting and/or modeling said first representation in a device for teaching and/or research.

(2)   A method as in (1) wherein said external object comprises of an external wave function; said internal object comprises of an internal wave function; said elementary particle comprises of a fermion, boson or unspinized particle; said matrix rule contains an energy operator $E \to i\partial_t$, momentum operator $\mathbf{p} \to -i\nabla$, spin operator $\boldsymbol{\sigma}$ where $\boldsymbol{\sigma} = (\sigma_1, \sigma_2, \sigma_3)$ are Pauli matrices, spin operator $\mathbf{S}$ where $\mathbf{S} = (s_1, s_2, s_3)$ are spin 1 matrices, and/or mass; said matrix rule further has a determinant containing E^2-$\mathbf{p}^2$-m^2=0, E^2-$\mathbf{p}^2$=0, E^2- m^2=0, or 0^2-$\mathbf{p}^2$-m^2=0; c=1 where c is speed of light; and $\hbar$=1 where $\hbar$ is reduced Planck constant.

(3)   A method as in (2) wherein formation of said matrix rule in said first representation comprises:

$$\to 1 = L = \frac{E^2 - m^2}{\mathbf{p}^2} = \left(\frac{E-m}{-|\mathbf{p}|}\right)\left(\frac{-|\mathbf{p}|}{E+m}\right)^{-1} \to \frac{E-m}{-|\mathbf{p}|} = \frac{-|\mathbf{p}|}{E+m} \to \frac{E-m}{-|\mathbf{p}|} - \frac{-|\mathbf{p}|}{E+m} = 0$$

$$\to \begin{pmatrix} E-m & -|\mathbf{p}| \\ -|\mathbf{p}| & E+m \end{pmatrix} \to \begin{pmatrix} E-m & -\boldsymbol{\sigma}\cdot\mathbf{p} \\ -\boldsymbol{\sigma}\cdot\mathbf{p} & E+m \end{pmatrix} \text{ or } \begin{pmatrix} E-m & -\mathbf{s}\cdot\mathbf{p} \\ -\mathbf{s}\cdot\mathbf{p} & E+m \end{pmatrix} \quad,$$

$$\to 1 = L = \frac{E^2 - \mathbf{p}^2}{m^2} = \left(\frac{E-|\mathbf{p}|}{-m}\right)\left(\frac{-m}{E+|\mathbf{p}|}\right)^{-1} \to \frac{E-|\mathbf{p}|}{-m} = \frac{-m}{E+|\mathbf{p}|} \to \frac{E-|\mathbf{p}|}{-m} - \frac{-m}{E+|\mathbf{p}|} = 0$$

$$\to \begin{pmatrix} E-|\mathbf{p}| & -m \\ -m & E+|\mathbf{p}| \end{pmatrix} \to \begin{pmatrix} E-\boldsymbol{\sigma}\cdot\mathbf{p} & -m \\ -m & E+\boldsymbol{\sigma}\cdot\mathbf{p} \end{pmatrix} \text{ or } \begin{pmatrix} E-\mathbf{s}\cdot\mathbf{p} & -m \\ -m & E+\mathbf{s}\cdot\mathbf{p} \end{pmatrix} \quad,$$

$$\to 1 = L = \frac{m^2 + \mathbf{p}^2}{E^2} = \left(\frac{E}{-m+i|\mathbf{p}|}\right)^{-1}\left(\frac{-m-i|\mathbf{p}|}{E}\right)$$

$$\to \frac{E}{-m+i|\mathbf{p}|} = \frac{-m-i|\mathbf{p}|}{E} \to \frac{E}{-m+i|\mathbf{p}|} - \frac{-m-i|\mathbf{p}|}{E} = 0$$

$$\to \begin{pmatrix} E & -m-i|\mathbf{p}| \\ -m+i|\mathbf{p}| & E \end{pmatrix} \to \begin{pmatrix} E & -m-i\boldsymbol{\sigma}\cdot\mathbf{p} \\ -m+i\boldsymbol{\sigma}\cdot\mathbf{p} & E \end{pmatrix} \text{ or } \begin{pmatrix} E & -m-i\mathbf{s}\cdot\mathbf{p} \\ -m+i\mathbf{s}\cdot\mathbf{p} & E \end{pmatrix}, \text{ or}$$

$$\rightarrow 1 = L = \frac{E^2 - \mathbf{p}_i^2}{m^2} = \left(\frac{E - |\mathbf{p}_i|}{-m}\right)\left(\frac{-m}{E + |\mathbf{p}_i|}\right)^{-1} \rightarrow \frac{E - |\mathbf{p}_i|}{-m} = \frac{-m}{E + |\mathbf{p}_i|} \rightarrow \frac{E - |\mathbf{p}_i|}{-m} - \frac{-m}{E + |\mathbf{p}_i|} = 0$$

$$\rightarrow \begin{pmatrix} E - |\mathbf{p}_i| & -m \\ -m & E + |\mathbf{p}_i| \end{pmatrix} \rightarrow \begin{pmatrix} E - \boldsymbol{\sigma} \cdot \mathbf{p}_i & -m \\ -m & E + \boldsymbol{\sigma} \cdot \mathbf{p}_i \end{pmatrix} \text{ or } \begin{pmatrix} E - \mathbf{s} \cdot \mathbf{p}_i & -m \\ -m & E + \mathbf{s} \cdot \mathbf{p}_i \end{pmatrix},$$

where $\boldsymbol{\sigma} = (\sigma_1, \sigma_2, \sigma_3)$ are Pauli matrices, $|\mathbf{p}| = \sqrt{\mathbf{p}^2} = \sqrt{-Det(\boldsymbol{\sigma} \cdot \mathbf{p})} \rightarrow \boldsymbol{\sigma} \cdot \mathbf{p}$ represents fermionic spinization of $|\mathbf{p}|$, $\mathbf{s} = (s_1, s_2, s_3)$ are spin operators for spin 1 particle, $|\mathbf{p}| = \sqrt{\mathbf{p}^2} = \sqrt{-\left(Det(\mathbf{s} \cdot \mathbf{p} + I_3) - Det(I_3)\right)} \rightarrow \mathbf{s} \cdot \mathbf{p}$ represents bosonic spinization of $|\mathbf{p}|$, $\mathbf{p}_i$ represents imaginary momentum, $|\mathbf{p}_i| = \sqrt{\mathbf{p}_i^2} = \sqrt{-Det(\boldsymbol{\sigma} \cdot \mathbf{p}_i)} \rightarrow \boldsymbol{\sigma} \cdot \mathbf{p}_i$ represents fermionic spinization of $|\mathbf{p}_i|$, and $|\mathbf{p}_i| = \sqrt{\mathbf{p}_i^2} = \sqrt{-\left(Det(\mathbf{s} \cdot \mathbf{p}_i + I_3) - Det(I_3)\right)} \rightarrow \mathbf{s} \cdot \mathbf{p}_i$ represents bosonic spinization of $|\mathbf{p}_i|$.

(4)   A method as in (2) wherein said first representation of said generation, sustenance and evolution of said elementary particle comprises:

$$1 = e^{i0} = 1e^{i0} = Le^{+iM - iM} = \frac{E^2 - m^2}{\mathbf{p}^2} e^{+ip^\mu x_\mu - ip^\mu x_\mu} =$$

$$\left(\frac{E - m}{-|\mathbf{p}|}\right)\left(\frac{-|\mathbf{p}|}{E + m}\right)^{-1} \left(e^{-ip^\mu x_\mu}\right)\left(e^{-ip^\mu x_\mu}\right)^{-1} \rightarrow \frac{E - m}{-|\mathbf{p}|} e^{-ip^\mu x_\mu} = \frac{-|\mathbf{p}|}{E + m} e^{-ip^\mu x_\mu} \rightarrow$$

$$\frac{E - m}{-|\mathbf{p}|} e^{-ip^\mu x_\mu} - \frac{-|\mathbf{p}|}{E + m} e^{-ip^\mu x_\mu} = 0 \rightarrow \begin{pmatrix} E - m & -|\mathbf{p}| \\ -|\mathbf{p}| & E + m \end{pmatrix}\begin{pmatrix} a_{e,+} e^{-ip^\mu x_\mu} \\ a_{i,-} e^{-ip^\mu x_\mu} \end{pmatrix} = 0$$

$$\rightarrow \begin{pmatrix} E - m & -\boldsymbol{\sigma} \cdot \mathbf{p} \\ -\boldsymbol{\sigma} \cdot \mathbf{p} & E + m \end{pmatrix}\begin{pmatrix} A_{e,+} e^{-ip^\mu x_\mu} \\ A_{i,-} e^{-ip^\mu x_\mu} \end{pmatrix} = \begin{pmatrix} L_{M,e} & L_{M,i} \end{pmatrix}\begin{pmatrix} \psi_{e,+} \\ \psi_{i,-} \end{pmatrix} = 0 \text{ or }$$

$$\begin{pmatrix} E - m & -\mathbf{s} \cdot \mathbf{p} \\ -\mathbf{s} \cdot \mathbf{p} & E + m \end{pmatrix}\begin{pmatrix} A_{e,+} e^{-ip^\mu x_\mu} \\ A_{i,-} e^{-ip^\mu x_\mu} \end{pmatrix} = \begin{pmatrix} L_{M,e} & L_{M,i} \end{pmatrix}\begin{pmatrix} \psi_{e,+} \\ \psi_{i,-} \end{pmatrix} = 0$$

where $\begin{pmatrix} E-m & -|\mathbf{p}| \\ -|\mathbf{p}| & E+m \end{pmatrix}\begin{pmatrix} a_{e,+}e^{-ip^{\mu}x_{\mu}} \\ a_{i,-}e^{-ip^{\mu}x_{\mu}} \end{pmatrix}=0$ is a first equation for said unspinized

particle, $\begin{pmatrix} E-m & -\boldsymbol{\sigma}\cdot\mathbf{p} \\ -\boldsymbol{\sigma}\cdot\mathbf{p} & E+m \end{pmatrix}\begin{pmatrix} A_{e,+}e^{-ip^{\mu}x_{\mu}} \\ A_{i,-}e^{-ip^{\mu}x_{\mu}} \end{pmatrix}=0$ is Dirac equation in Dirac form for said

fermion, and $\begin{pmatrix} E-m & -\mathbf{s}\cdot\mathbf{p} \\ -\mathbf{s}\cdot\mathbf{p} & E+m \end{pmatrix}\begin{pmatrix} \mathbf{A}_{e,+}e^{-ip^{\mu}x_{\mu}} \\ \mathbf{A}_{i,-}e^{-ip^{\mu}x_{\mu}} \end{pmatrix}=0$ is a first equation for said boson;

$$1=e^{i0}=1e^{i0}=L_1 e^{+iM-iM}=\frac{E^2-\mathbf{p}^2}{m^2}e^{+ip^{\mu}x_{\mu}-ip^{\mu}x_{\mu}}=$$

$$\left(\frac{E-|\mathbf{p}|}{-m}\right)\left(\frac{-m}{E+|\mathbf{p}|}\right)^{-1}\left(e^{-ip^{\mu}x_{\mu}}\right)\left(e^{-ip^{\mu}x_{\mu}}\right)^{-1}\rightarrow\frac{E-|\mathbf{p}|}{-m}e^{-ip^{\mu}x_{\mu}}=\frac{-m}{E+|\mathbf{p}|}e^{-ip^{\mu}x_{\mu}}\rightarrow$$

$$\frac{E-|\mathbf{p}|}{-m}e^{-ip^{\mu}x_{\mu}}-\frac{-m}{E+|\mathbf{p}|}e^{-ip^{\mu}x_{\mu}}=0\rightarrow\begin{pmatrix} E-|\mathbf{p}| & -m \\ -m & E+|\mathbf{p}| \end{pmatrix}\begin{pmatrix} a_{e,l}e^{-ip^{\mu}x_{\mu}} \\ a_{i,r}e^{-ip^{\mu}x_{\mu}} \end{pmatrix}=0$$

$$\rightarrow\begin{pmatrix} E-\boldsymbol{\sigma}\cdot\mathbf{p} & -m \\ -m & E+\boldsymbol{\sigma}\cdot\mathbf{p} \end{pmatrix}\begin{pmatrix} A_{e,l}e^{-ip^{\mu}x_{\mu}} \\ A_{i,r}e^{-ip^{\mu}x_{\mu}} \end{pmatrix}=\begin{pmatrix} L_{M,e} & L_{M,i} \end{pmatrix}\begin{pmatrix} \psi_{e,l} \\ \psi_{i,r} \end{pmatrix}=0 \quad \text{or}$$

$$\begin{pmatrix} E-\mathbf{s}\cdot\mathbf{p} & -m \\ -m & E+\mathbf{s}\cdot\mathbf{p} \end{pmatrix}\begin{pmatrix} \mathbf{A}_{e,l}e^{-ip^{\mu}x_{\mu}} \\ \mathbf{A}_{i,r}e^{-ip^{\mu}x_{\mu}} \end{pmatrix}=\begin{pmatrix} L_{M,e} & L_{M,i} \end{pmatrix}\begin{pmatrix} \psi_{e,l} \\ \psi_{i,r} \end{pmatrix}=0$$

where $\begin{pmatrix} E-|\mathbf{p}| & -m \\ -m & E+|\mathbf{p}| \end{pmatrix}\begin{pmatrix} a_{e,l}e^{-ip^{\mu}x_{\mu}} \\ a_{i,r}e^{-ip^{\mu}x_{\mu}} \end{pmatrix}=0$ is a second equation for said unspinized

particle, $\begin{pmatrix} E-\boldsymbol{\sigma}\cdot\mathbf{p} & -m \\ -m & E+\boldsymbol{\sigma}\cdot\mathbf{p} \end{pmatrix}\begin{pmatrix} A_{e,l}e^{-ip^{\mu}x_{\mu}} \\ A_{i,r}e^{-ip^{\mu}x_{\mu}} \end{pmatrix}=0$ is Dirac equation in Weyl form for

said fermion, and $\begin{pmatrix} E-\mathbf{s}\cdot\mathbf{p} & -m \\ -m & E+\mathbf{s}\cdot\mathbf{p} \end{pmatrix}\begin{pmatrix} \mathbf{A}_{e,l}e^{-ip^{\mu}x_{\mu}} \\ \mathbf{A}_{i,r}e^{-ip^{\mu}x_{\mu}} \end{pmatrix}=0$ is a second equation for said

boson;

$$1 = e^{i0} = 1e^{i0} = Le^{+iM-iM} = \frac{E^2}{m^2 + \mathbf{p}^2} e^{+ip^\mu x_\mu - ip^\mu x_\mu} =$$

$$\left(\frac{E}{-m+i|\mathbf{p}|}\right)\left(\frac{-m-i|\mathbf{p}|}{E}\right)^{-1}\left(e^{-ip^\mu x_\mu}\right)\left(e^{-ip^\mu x_\mu}\right)^{-1} \rightarrow$$

$$\frac{E}{-m+i|\mathbf{p}|}e^{-ip^\mu x_\mu} = \frac{-m-i|\mathbf{p}|}{E}e^{-ip^\mu x_\mu} \rightarrow \frac{E}{-m+i|\mathbf{p}|}e^{-ip^\mu x_\mu} - \frac{-m-i|\mathbf{p}|}{E}e^{-ip^\mu x_\mu} = 0$$

$$\rightarrow \begin{pmatrix} E & -m-i|\mathbf{p}| \\ -m+i|\mathbf{p}| & E \end{pmatrix}\begin{pmatrix} a_e e^{-ip^\mu x_\mu} \\ a_i e^{-ip^\mu x_\mu} \end{pmatrix} = 0$$

$$\rightarrow \begin{pmatrix} E & -m-i\boldsymbol{\sigma}\cdot\mathbf{p} \\ -m+i\boldsymbol{\sigma}\cdot\mathbf{p} & E \end{pmatrix}\begin{pmatrix} A_e e^{-ip^\mu x_\mu} \\ A_i e^{-ip^\mu x_\mu} \end{pmatrix} = \begin{pmatrix} L_{M,e} & L_{M,i} \end{pmatrix}\begin{pmatrix} \psi_e \\ \psi_i \end{pmatrix} = 0 \text{ or}$$

$$\begin{pmatrix} E & -m-i\mathbf{s}\cdot\mathbf{p} \\ -m+i\mathbf{s}\cdot\mathbf{p} & E \end{pmatrix}\begin{pmatrix} \mathbf{A}_e e^{-ip^\mu x_\mu} \\ \mathbf{A}_i e^{-ip^\mu x_\mu} \end{pmatrix} = \begin{pmatrix} L_{M,e} & L_{M,i} \end{pmatrix}\begin{pmatrix} \psi_e \\ \psi_i \end{pmatrix} = 0$$

where $\begin{pmatrix} E & -m-i|\mathbf{p}| \\ -m+i|\mathbf{p}| & E \end{pmatrix}\begin{pmatrix} a_e e^{-ip^\mu x_\mu} \\ a_i e^{-ip^\mu x_\mu} \end{pmatrix} = 0$ is a third equation for said unspinized

particle, $\begin{pmatrix} E & -m-i\boldsymbol{\sigma}\cdot\mathbf{p} \\ -m+i\boldsymbol{\sigma}\cdot\mathbf{p} & E \end{pmatrix}\begin{pmatrix} A_e e^{-ip^\mu x_\mu} \\ A_i e^{-ip^\mu x_\mu} \end{pmatrix} = 0$ is Dirac equation in a third form

for said fermion, and $\begin{pmatrix} E & -m-i\mathbf{s}\cdot\mathbf{p} \\ -m+i\mathbf{s}\cdot\mathbf{p} & E \end{pmatrix}\begin{pmatrix} \mathbf{A}_e e^{-ip^\mu x_\mu} \\ \mathbf{A}_i e^{-ip^\mu x_\mu} \end{pmatrix} = 0$ is a third equation

for said boson; or

$$1 = e^{i0} = 1e^{i0} = Le^{+iM-iM} = \frac{E^2 - m^2}{\mathbf{p}_i^2} e^{+ip^\mu x_\mu - ip^\mu x_\mu} =$$

$$\left(\frac{E-m}{-|\mathbf{p}_i|}\right)\left(\frac{-|\mathbf{p}_i|}{E+m}\right)^{-1}\left(e^{-ip^\mu x_\mu}\right)\left(e^{-ip^\mu x_\mu}\right)^{-1} \rightarrow \frac{E-m}{-|\mathbf{p}_i|}e^{-ip^\mu x_\mu} = \frac{-|\mathbf{p}_i|}{E+m}e^{-ip^\mu x_\mu} \rightarrow$$

$$\frac{E-m}{-\mathbf{p}_i}e^{-ip^\mu x_\mu} - \frac{-|\mathbf{p}_i|}{E+m}e^{-ip^\mu x_\mu} = 0 \rightarrow \begin{pmatrix} E-m & -|\mathbf{p}_i| \\ -|\mathbf{p}_i| & E+m \end{pmatrix}\begin{pmatrix} s_{e,+} e^{-iEt} \\ s_{i,-} e^{-iEt} \end{pmatrix} = 0$$

$$\rightarrow \begin{pmatrix} E-m & -\boldsymbol{\sigma}\cdot\mathbf{p}_i \\ -\boldsymbol{\sigma}\cdot\mathbf{p}_i & E+m \end{pmatrix}\begin{pmatrix} S_{e,+} e^{-iEt} \\ S_{i,-} e^{-iEt} \end{pmatrix} = \begin{pmatrix} L_{M,e} & L_{M,i} \end{pmatrix}\begin{pmatrix} \psi_{e,+} \\ \psi_{i,-} \end{pmatrix} = 0 \text{ or}$$

$$\begin{pmatrix} E-m & -\mathbf{s}\cdot\mathbf{p}_i \\ -\mathbf{s}\cdot\mathbf{p}_i & E+m \end{pmatrix}\begin{pmatrix} \mathbf{S}_{e,+}e^{-iEt} \\ \mathbf{S}_{i,-}e^{-iEt} \end{pmatrix} = \begin{pmatrix} L_{M,e} & L_{M,i} \end{pmatrix}\begin{pmatrix} \psi_{e,+} \\ \psi_{i,-} \end{pmatrix} = 0$$

where $\begin{pmatrix} E-m & -|\mathbf{p}_i| \\ -|\mathbf{p}_i| & E+m \end{pmatrix}\begin{pmatrix} s_{e,+}e^{-iEt} \\ s_{i,-}e^{-iEt} \end{pmatrix} = 0$ is a first equation for said unspinized particle

with said imaginary momentum $\mathbf{p}_i$, $\begin{pmatrix} E-m & -\boldsymbol{\sigma}\cdot\mathbf{p}_i \\ -\boldsymbol{\sigma}\cdot\mathbf{p}_i & E+m \end{pmatrix}\begin{pmatrix} S_{e,+}e^{-iEt} \\ S_{i,-}e^{-iEt} \end{pmatrix} = 0$ is Dirac equation

in Dirac form for said fermion with said imaginary momentum $\mathbf{p}_i$, and

$\begin{pmatrix} E-m & -\mathbf{s}\cdot\mathbf{p}_i \\ -\mathbf{s}\cdot\mathbf{p}_i & E+m \end{pmatrix}\begin{pmatrix} \mathbf{S}_{e,+}e^{-iEt} \\ \mathbf{S}_{i,-}e^{-iEt} \end{pmatrix} = 0$ is a first equation for said boson with said imaginary

momentum $\mathbf{p}_i$.

(5)   A method as in (4) wherein said elementary particle comprises of:

an electron, equation of said electron being modeled as:

$$\begin{pmatrix} E-m & -\boldsymbol{\sigma}\cdot\mathbf{p} \\ -\boldsymbol{\sigma}\cdot\mathbf{p} & E+m \end{pmatrix}\begin{pmatrix} A_{e,+}e^{-ip^{\mu}x_{\mu}} \\ A_{i,-}e^{-ip^{\mu}x_{\mu}} \end{pmatrix} = 0, \quad \begin{pmatrix} E-\boldsymbol{\sigma}\cdot\mathbf{p} & -m \\ -m & E+\boldsymbol{\sigma}\cdot\mathbf{p} \end{pmatrix}\begin{pmatrix} A_{e,l}e^{-ip^{\mu}x_{\mu}} \\ A_{i,r}e^{-ip^{\mu}x_{\mu}} \end{pmatrix} = 0 \text{ or }$$

$$\begin{pmatrix} E & -m-i\boldsymbol{\sigma}\cdot\mathbf{p} \\ -m+i\boldsymbol{\sigma}\cdot\mathbf{p} & E \end{pmatrix}\begin{pmatrix} A_{e}e^{-ip^{\mu}x_{\mu}} \\ A_{i}e^{-ip^{\mu}x_{\mu}} \end{pmatrix} = 0;$$

a positron, equation of said positron being modeled as:

$$\begin{pmatrix} E-m & -\boldsymbol{\sigma}\cdot\mathbf{p} \\ -\boldsymbol{\sigma}\cdot\mathbf{p} & E+m \end{pmatrix}\begin{pmatrix} A_{e,-}e^{+ip^{\mu}x_{\mu}} \\ A_{i,+}e^{+ip^{\mu}x_{\mu}} \end{pmatrix} = 0, \quad \begin{pmatrix} E-\boldsymbol{\sigma}\cdot\mathbf{p} & -m \\ -m & E+\boldsymbol{\sigma}\cdot\mathbf{p} \end{pmatrix}\begin{pmatrix} A_{e,r}e^{+ip^{\mu}x_{\mu}} \\ A_{i,l}e^{+ip^{\mu}x_{\mu}} \end{pmatrix} = 0 \text{ or }$$

$$\begin{pmatrix} E & -m-i\boldsymbol{\sigma}\cdot\mathbf{p} \\ -m+i\boldsymbol{\sigma}\cdot\mathbf{p} & E \end{pmatrix}\begin{pmatrix} A_{e}e^{+ip^{\mu}x_{\mu}} \\ A_{i}e^{+ip^{\mu}x_{\mu}} \end{pmatrix} = 0;$$

a massless neutrino, equation of said neutrino being modeled as:

$$\begin{pmatrix} E & -\boldsymbol{\sigma}\cdot\mathbf{p} \\ -\boldsymbol{\sigma}\cdot\mathbf{p} & E \end{pmatrix}\begin{pmatrix} A_{e,+}e^{-ip^{\mu}x_{\mu}} \\ A_{i,-}e^{-ip^{\mu}x_{\mu}} \end{pmatrix} = 0, \quad \begin{pmatrix} E-\boldsymbol{\sigma}\cdot\mathbf{p} & \\ & E+\boldsymbol{\sigma}\cdot\mathbf{p} \end{pmatrix}\begin{pmatrix} A_{e,l}e^{-ip^{\mu}x_{\mu}} \\ A_{i,r}e^{-ip^{\mu}x_{\mu}} \end{pmatrix} = 0 \text{ or }$$

$$\begin{pmatrix} E & -i\boldsymbol{\sigma}\cdot\mathbf{p} \\ +i\boldsymbol{\sigma}\cdot\mathbf{p} & E \end{pmatrix} \begin{pmatrix} A_e e^{-ip^\mu x_\mu} \\ A_i e^{-ip^\mu x_\mu} \end{pmatrix} = 0 \,;$$

A massless antineutrino, equation of said antineutrino being modeled as:

$$\begin{pmatrix} E & -\boldsymbol{\sigma}\cdot\mathbf{p} \\ -\boldsymbol{\sigma}\cdot\mathbf{p} & E \end{pmatrix} \begin{pmatrix} A_{e,-} e^{+ip^\mu x_\mu} \\ A_{i,+} e^{+ip^\mu x_\mu} \end{pmatrix} = 0 \,, \quad \begin{pmatrix} E-\boldsymbol{\sigma}\cdot\mathbf{p} & \\ & E+\boldsymbol{\sigma}\cdot\mathbf{p} \end{pmatrix} \begin{pmatrix} A_{e,r} e^{+ip^\mu x_\mu} \\ A_{i,l} e^{+ip^\mu x_\mu} \end{pmatrix} = 0 \text{ or}$$

$$\begin{pmatrix} E & -i\boldsymbol{\sigma}\cdot\mathbf{p} \\ +i\boldsymbol{\sigma}\cdot\mathbf{p} & E \end{pmatrix} \begin{pmatrix} A_e e^{+ip^\mu x_\mu} \\ A_i e^{+ip^\mu x_\mu} \end{pmatrix} = 0 \,;$$

a massive spin 1 boson, equation of said massive spin 1 boson being modeled as:

$$\begin{pmatrix} E-m & -\mathbf{s}\cdot\mathbf{p} \\ -\mathbf{s}\cdot\mathbf{p} & E+m \end{pmatrix} \begin{pmatrix} \mathbf{A}_{e,+} e^{-ip^\mu x_\mu} \\ \mathbf{A}_{i,-} e^{-ip^\mu x_\mu} \end{pmatrix} = 0 \,, \quad \begin{pmatrix} E-\mathbf{s}\cdot\mathbf{p} & -m \\ -m & E+\mathbf{s}\cdot\mathbf{p} \end{pmatrix} \begin{pmatrix} \mathbf{A}_{e,l} e^{-ip^\mu x_\mu} \\ \mathbf{A}_{i,r} e^{-ip^\mu x_\mu} \end{pmatrix} = 0 \text{ or}$$

$$\begin{pmatrix} E & -m-i\mathbf{s}\cdot\mathbf{p} \\ -m+i\mathbf{s}\cdot\mathbf{p} & E \end{pmatrix} \begin{pmatrix} \mathbf{A}_e e^{-ip^\mu x_\mu} \\ \mathbf{A}_i e^{-ip^\mu x_\mu} \end{pmatrix} = 0 \,;$$

a massive spin 1 antiboson, equation of said massive spin 1 antiboson being modeled as:

$$\begin{pmatrix} E-m & -\mathbf{s}\cdot\mathbf{p} \\ -\mathbf{s}\cdot\mathbf{p} & E+m \end{pmatrix} \begin{pmatrix} \mathbf{A}_{e,-} e^{+ip^\mu x_\mu} \\ \mathbf{A}_{i,+} e^{+ip^\mu x_\mu} \end{pmatrix} = 0 \,, \quad \begin{pmatrix} E-\mathbf{s}\cdot\mathbf{p} & -m \\ -m & E+\mathbf{s}\cdot\mathbf{p} \end{pmatrix} \begin{pmatrix} \mathbf{A}_{e,r} e^{+ip^\mu x_\mu} \\ \mathbf{A}_{i,l} e^{+ip^\mu x_\mu} \end{pmatrix} = 0 \text{ or}$$

$$\begin{pmatrix} E & -m-i\mathbf{s}\cdot\mathbf{p} \\ -m+i\mathbf{s}\cdot\mathbf{p} & E \end{pmatrix} \begin{pmatrix} \mathbf{A}_e e^{+ip^\mu x_\mu} \\ \mathbf{A}_i e^{+ip^\mu x_\mu} \end{pmatrix} = 0 \,;$$

a massless spin 1 boson, equation of said massless spin 1 boson being modeled as:

$$\begin{pmatrix} E & -\mathbf{s}\cdot\mathbf{p} \\ -\mathbf{s}\cdot\mathbf{p} & E \end{pmatrix} \begin{pmatrix} \mathbf{A}_{e,+} e^{-ip^\mu x_\mu} \\ \mathbf{A}_{i,-} e^{-ip^\mu x_\mu} \end{pmatrix} = \begin{pmatrix} E & -\mathbf{s}\cdot\mathbf{p} \\ -\mathbf{s}\cdot\mathbf{p} & E \end{pmatrix} \begin{pmatrix} \mathbf{E} \\ i\mathbf{B} \end{pmatrix} = 0 \,,$$

$$\begin{pmatrix} E-\mathbf{s}\cdot\mathbf{p} & \\ & E+\mathbf{s}\cdot\mathbf{p} \end{pmatrix} \begin{pmatrix} \mathbf{A}_{e,l} e^{-ip^\mu x_\mu} \\ \mathbf{A}_{i,r} e^{-ip^\mu x_\mu} \end{pmatrix} = 0 \text{ or} \begin{pmatrix} E & -i\mathbf{s}\cdot\mathbf{p} \\ +i\mathbf{s}\cdot\mathbf{p} & E \end{pmatrix} \begin{pmatrix} \mathbf{A}_e e^{-ip^\mu x_\mu} \\ \mathbf{A}_i e^{-ip^\mu x_\mu} \end{pmatrix} = 0$$

where $\begin{pmatrix} E & -\mathbf{s}\cdot\mathbf{p} \\ -\mathbf{s}\cdot\mathbf{p} & E \end{pmatrix} \begin{pmatrix} \mathbf{E} \\ i\mathbf{B} \end{pmatrix} = 0$ is equivalent to Maxwell equation $\begin{pmatrix} \partial_t\mathbf{E} = \nabla\times\mathbf{B} \\ \partial_t\mathbf{B} = -\nabla\times\mathbf{E} \end{pmatrix}$;

a massless spin 1 antiboson, equation of said massless spin 1 antiboson being modeled as:

$$\begin{pmatrix} E & -\mathbf{s}\cdot\mathbf{p} \\ -\mathbf{s}\cdot\mathbf{p} & E \end{pmatrix}\begin{pmatrix} A_{e,-}e^{+ip^{\mu}x_{\mu}} \\ A_{i,+}e^{+ip^{\mu}x_{\mu}} \end{pmatrix}=0 \,, \begin{pmatrix} E-\mathbf{s}\cdot\mathbf{p} & \\ & E+\mathbf{s}\cdot\mathbf{p} \end{pmatrix}\begin{pmatrix} A_{e,r}e^{+ip^{\mu}x_{\mu}} \\ A_{i,l}e^{+ip^{\mu}x_{\mu}} \end{pmatrix}=0 \text{ or}$$

$$\begin{pmatrix} E & -i\mathbf{s}\cdot\mathbf{p} \\ -m+i\mathbf{s}\cdot\mathbf{p} & E \end{pmatrix}\begin{pmatrix} A_{e}e^{+ip^{\mu}x_{\mu}} \\ A_{i}e^{+ip^{\mu}x_{\mu}} \end{pmatrix}=0 \,;$$

an antiproton, equation of said antiproton being modeled as:

$$\begin{pmatrix} E-m & -\boldsymbol{\sigma}\cdot\mathbf{p}_i \\ -\boldsymbol{\sigma}\cdot\mathbf{p}_i & E+m \end{pmatrix}\begin{pmatrix} S_{e,+}e^{-iEt} \\ S_{i,-}e^{-iEt} \end{pmatrix}=0 \,, \begin{pmatrix} E-\boldsymbol{\sigma}\cdot\mathbf{p}_i & -m \\ -m & E+\boldsymbol{\sigma}\cdot\mathbf{p}_i \end{pmatrix}\begin{pmatrix} S_{e,l}e^{-iEt} \\ S_{i,r}e^{-iEt} \end{pmatrix}=0 \text{ or}$$

$$\begin{pmatrix} E & -m-i\boldsymbol{\sigma}\cdot\mathbf{p}_i \\ -m+i\boldsymbol{\sigma}\cdot\mathbf{p}_i & E \end{pmatrix}\begin{pmatrix} S_{e}e^{-iEt} \\ S_{i}e^{-iEt} \end{pmatrix}=0 \,; \text{ or}$$

a proton, equation of said proton being modeled as:

$$\begin{pmatrix} E-m & -\boldsymbol{\sigma}\cdot\mathbf{p}_i \\ -\boldsymbol{\sigma}\cdot\mathbf{p}_i & E+m \end{pmatrix}\begin{pmatrix} S_{e,-}e^{+iEt} \\ S_{i,+}e^{+iEt} \end{pmatrix}=0 \,, \begin{pmatrix} E-\boldsymbol{\sigma}\cdot\mathbf{p}_i & -m \\ -m & E+\boldsymbol{\sigma}\cdot\mathbf{p}_i \end{pmatrix}\begin{pmatrix} S_{e,r}e^{+iEt} \\ S_{i,l}e^{+iEt} \end{pmatrix}=0 \text{ or}$$

$$\begin{pmatrix} E & -m-i\boldsymbol{\sigma}\cdot\mathbf{p}_i \\ -m+i\boldsymbol{\sigma}\cdot\mathbf{p}_i & E \end{pmatrix}\begin{pmatrix} S_{e}e^{+iEt} \\ S_{i}e^{+iEt} \end{pmatrix}=0 \,.$$

(6)   A method as in (4) wherein said elementary particle comprises an electron and said first representation is modified to include a proton, said proton being modeled as a second elementary particle, and interaction fields of said electron and said proton, said modified first representation comprising:

$$1=e^{i0}=1e^{i0}1e^{i0}=\left(Le^{+iM-iM}\right)_{p}\left(Le^{+iM-iM}\right)_{e}$$

$$=\left(\frac{E^2-m^2}{\mathbf{p}_i^2}e^{+ip^{\mu}x_{\mu}-ip^{\mu}x_{\mu}}\right)_{p}\left(\frac{E^2-m^2}{\mathbf{p}^2}e^{-ip^{\mu}x_{\mu}+ip^{\mu}x_{\mu}}\right)_{e}=$$

$$\left(\left(\frac{E-m}{-\mathbf{p}_i}\right)\left(\frac{-|\mathbf{p}_i|}{E+m}\right)^{-1}\left(e^{+ip^{\mu}x_{\mu}}\right)\left(e^{+ip^{\mu}x_{\mu}}\right)^{-1}\right)_{p}\left(\left(\frac{E-m}{-|\mathbf{p}|}\right)\left(\frac{-|\mathbf{p}|}{E+m}\right)^{-1}\left(e^{-ip^{\mu}x_{\mu}}\right)\left(e^{-ip^{\mu}x_{\mu}}\right)^{-1}\right)_{e}$$

$$\rightarrow \left(\begin{pmatrix} E-m & -|\mathbf{p}_i| \\ -|\mathbf{p}_i| & E+m \end{pmatrix} \begin{pmatrix} s_{e,-}e^{+iEt} \\ s_{i,+}e^{+iEt} \end{pmatrix} = 0 \right)_p \left(\begin{pmatrix} E-m & -|\mathbf{p}| \\ -|\mathbf{p}| & E+m \end{pmatrix} \begin{pmatrix} s_{e,+}e^{-iEt} \\ s_{i,-}e^{-iEt} \end{pmatrix} = 0 \right)_e$$

$$\rightarrow \begin{vmatrix} \left(\begin{pmatrix} E-e\phi-m & -\boldsymbol{\sigma}\cdot(\mathbf{p}_i-e\mathrm{A}) \\ -\boldsymbol{\sigma}\cdot(\mathbf{p}_i-e\mathrm{A}) & E-e\phi+m \end{pmatrix} \begin{pmatrix} S_{e,-}e^{+iEt} \\ S_{i,+}e^{+iEt} \end{pmatrix} = 0 \right)_p \\ \left(\begin{pmatrix} E+e\phi-m & -\boldsymbol{\sigma}\cdot(\mathbf{p}+e\mathbf{A}) \\ -\boldsymbol{\sigma}\cdot(\mathbf{p}+e\mathbf{A}) & E+e\phi+m \end{pmatrix} \begin{pmatrix} S_{e,+}e^{-iEt} \\ S_{i,-}e^{-iEt} \end{pmatrix} = 0 \right)_e \end{vmatrix}$$

where ( )$_e$ denotes electron, ( )$_p$ denotes proton and (( )$_e$ ( )$_p$) denotes an electron-proton system.

(7)   A method as in (4) wherein said elementary particle comprises of an electron and said first representation is modified to include an unspinized proton, said unspinized proton being modeled as a second elementary particle, and interaction fields of said electron and said unspinized proton, said modified first representation comprising:

$$1 = e^{i0} = 1e^{i0}1e^{i0} = \left(Le^{+iM-iM} \right)_p \left(Le^{+iM-iM} \right)_e$$

$$= \left(\frac{E^2-m^2}{\mathbf{p}_i^2} e^{+ip^\mu x_\mu - ip^\mu x_\mu} \right)_p \left(\frac{E^2-m^2}{\mathbf{p}^2} e^{-ip^\mu x_\mu + ip^\mu x_\mu} \right)_e =$$

$$\left(\left(\frac{E-m}{-|\mathbf{p}_i|} \right) \left(\frac{-|\mathbf{p}_i|}{E+m} \right)^{-1} \left(e^{+ip^\mu x_\mu} \right) \left(e^{+ip^\mu x_\mu} \right)^{-1} \right)_p \left(\left(\frac{E-m}{-|\mathbf{p}|} \right) \left(\frac{-|\mathbf{p}|}{E+m} \right)^{-1} \left(e^{-ip^\mu x_\mu} \right) \left(e^{-ip^\mu x_\mu} \right)^{-1} \right)_e$$

$$\rightarrow \left(\begin{pmatrix} E-m & -|\mathbf{p}_i| \\ -|\mathbf{p}_i| & E+m \end{pmatrix} \begin{pmatrix} s_{e,-}e^{+iEt} \\ s_{i,+}e^{+iEt} \end{pmatrix} = 0 \right)_p \left(\begin{pmatrix} E-m & -|\mathbf{p}| \\ -|\mathbf{p}| & E+m \end{pmatrix} \begin{pmatrix} s_{e,+}e^{-iEt} \\ s_{i,-}e^{-iEt} \end{pmatrix} = 0 \right)_e$$

$$\rightarrow \begin{vmatrix} \left(\begin{pmatrix} E-e\phi-m & -|\mathbf{p}_i-e\mathrm{A}| \\ -|\mathbf{p}_i-e\mathrm{A}| & E-e\phi+m \end{pmatrix} \begin{pmatrix} s_{e,-}e^{+iEt} \\ s_{i,+}e^{+iEt} \end{pmatrix} = 0 \right)_p \\ \left(\begin{pmatrix} E+e\phi-V-m & -\boldsymbol{\sigma}\cdot(\mathbf{p}+e\mathbf{A}) \\ -\boldsymbol{\sigma}\cdot(\mathbf{p}+e\mathbf{A}) & E+e\phi-V+m \end{pmatrix} \begin{pmatrix} S_{e,+}e^{-iEt} \\ S_{i,-}e^{-iEt} \end{pmatrix} = 0 \right)_e \end{vmatrix}$$

where ( )$_e$ denotes electron, ( )$_p$ denotes unspinized proton and (( )$_e$ ( )$_p$) denotes an electron-unspinized proton system.

(8)   A method as (1), (2), (3), (4) or (5) wherein said external object interacting with said internal object through said matrix rule is modeled as self-gravity or self-quantum-entanglement.

(9)   A method as in (3) or (4) wherein fermionic spinization $|\mathbf{p}|=\sqrt{\mathbf{p^2}}=\sqrt{-Det(\boldsymbol{\sigma}\cdot\mathbf{p})}\rightarrow\boldsymbol{\sigma}\cdot\mathbf{p}$ and/or reversal of said fermionic spinization $\boldsymbol{\sigma}\cdot\mathbf{p}\rightarrow\sqrt{-Det(\boldsymbol{\sigma}\cdot\mathbf{p})}=\sqrt{\mathbf{p^2}}=|\mathbf{p}|$ is modeled as a first form of weak interation; bosonic spinization $|\mathbf{p}|=\sqrt{\mathbf{p^2}}=\sqrt{-\left(Det(\mathbf{s}\cdot\mathbf{p}+I_3)-Det(I_3)\right)}\rightarrow\mathbf{s}\cdot\mathbf{p}$ of said elementary particle with rest mass and/or decay of said massive boson is modeled as a second form of weak interaction; and said bosonic spinization of said elementary particle with no rest mass and/or reversal of said bosonic spinization $\mathbf{s}\cdot\mathbf{p}\rightarrow\sqrt{-(Det(\mathbf{s}\cdot\mathbf{p}+I_3)-Det(I_3))}=\sqrt{\mathbf{p^2}}=|\mathbf{p}|$ of said massless boson is modeled as a form of electromagnetic interaction.

(10)   A method as in (3) or (4) wherein a form of interaction or process involving imaginary momentum p_i is modeled as strong interaction.

(11)   A method as (1), (2), (3), (4) or (5) wherein said first representation is modified to include a second elementary particle comprising a second external object and a second internal object; and interaction between said external object and said second internal object and/or between said second external object and said internal object is modeled as gravity or quantum entanglement.

(12)   A method of modeling an interaction inside brain through hierarchical self-referential spin in prespacetime, as a teaching and/or modeling tool, comprising the steps of:

generating a first representation of said interaction through said hierarchical self-referential spin in said prespacetime, said representation comprising:

$$\left[\begin{pmatrix} E-e\phi-m & -\boldsymbol{\sigma}\cdot(\mathbf{p}_i-e\mathbf{A}) \\ -\boldsymbol{\sigma}\cdot(\mathbf{p}_i-e\mathbf{A}) & E-e\phi+m \end{pmatrix}\begin{pmatrix} \psi_{e,-} \\ \psi_{i,+} \end{pmatrix}=0\right]_p \begin{pmatrix} E & -\boldsymbol{\sigma}\cdot\mathbf{p} \\ -\boldsymbol{\sigma}\cdot\mathbf{p} & E \end{pmatrix}\begin{pmatrix} \boldsymbol{\sigma}\cdot\mathbf{E} \\ i\boldsymbol{\sigma}\cdot\mathbf{B} \end{pmatrix}=\begin{pmatrix} -i\boldsymbol{\sigma}\cdot(\psi^{\dagger}\beta\boldsymbol{\alpha}\psi) \\ -i(\psi^{\dagger}\beta\beta\psi) \end{pmatrix}_p ,$$

and/or

$$\left[\begin{pmatrix} E+e\phi-m & -\boldsymbol{\sigma}\cdot(\mathbf{p}+e\mathbf{A}) \\ -\boldsymbol{\sigma}\cdot(\mathbf{p}+e\mathbf{A}) & E+e\phi+m \end{pmatrix}\begin{pmatrix} \psi_{e,+} \\ \psi_{i,-} \end{pmatrix}=0\right]_e \begin{pmatrix} E & -\boldsymbol{\sigma}\cdot\mathbf{p} \\ -\boldsymbol{\sigma}\cdot\mathbf{p} & E \end{pmatrix}\begin{pmatrix} \boldsymbol{\sigma}\cdot\mathbf{E} \\ i\boldsymbol{\sigma}\cdot\mathbf{B} \end{pmatrix}=\begin{pmatrix} -i\boldsymbol{\sigma}\cdot(\psi^{\dagger}\beta\boldsymbol{\alpha}\psi) \\ -i(\psi^{\dagger}\beta\beta\psi) \end{pmatrix}_e ,$$

where $(\ )_p\ (\ )_p$ denotes a proton-photon system, $(\ )_e\ (\ )_e$ denotes an electron - photon system, (A,ϕ) denotes electromagnetic potential, E denotes electric field, B denotes magnetic field, $\boldsymbol{\sigma}=(\sigma_1,\sigma_2,\sigma_3)$ denote Pauli matrices, (α,β) denote Dirac matrices, Ψ denotes wave function, and $\Psi^{\dagger}$ denotes conjugate transpose of Ψ; and

presenting and/or modeling said first representation in a device for teaching and/or

research.

II. Modeling Apparatus Based on Prespacetime Model I

(13) A model for presenting and/or modeling generation, sustenance and evolution of an elementary particle through hierarchical self-referential spin in prespacetime, as a teaching and/or modeling tool, comprising:

> a drawing which represents said generation, sustenance and evolution of said elementary particle through said hierarchical self-referential spin in said prespacetime, said drawing comprising:

$$1 = e^{i0} = 1e^{i0} = Le^{-iM+iM} = L_e L_i^{-1} \left(e^{-iM} \right) \left(e^{-iM} \right)^{-1} \rightarrow$$

$$\left(L_{M,e} \quad L_{M,i} \right) \begin{pmatrix} A_e e^{-iM} \\ A_i e^{-iM} \end{pmatrix} = L_M \begin{pmatrix} \psi_e \\ \psi_i \end{pmatrix} = 0$$

> where e is natural exponential base, i is imaginary unit, L_M represents rule of one, M is a phase, $A_e e^{-iM} = \psi_e$ represents external object, $A_i e^{-iM} = \psi_i$ represents internal object, L_e represents external rule, L_i represents internal rule, $L = (L_{M,e} \ L_{M,i})$ represents matrix rule, $L_{M,e}$ represents external matrix rule and $L_{M,i}$ represents internal matrix rule; and

> a device for presenting and/or modeling said drawing, said device being for teaching and/or research.

(14) A model as in (13) wherein said external object comprises of an external wave function; said internal object comprises of an internal wave function; said elementary particle comprises of a fermion, boson or unspinized particle; said matrix rule contains an energy operator $E \rightarrow i\partial_t$, momentum operator $\mathbf{p} \rightarrow -i\nabla$, spin operator $\boldsymbol{\sigma}$ where $\boldsymbol{\sigma} = (\sigma_1, \sigma_2, \sigma_3)$ are Pauli matrices, spin operator $\mathbf{S}$ where $\mathbf{S} = (s_1, s_2, s_3)$ are spin 1 matrices, and/or mass; ~~and~~ said matrix rule further has a determinant containing $E^2\text{-}\mathbf{p}^2\text{-}m^2=0$, $E^2\text{-}\mathbf{p}^2=0$, $E^2\text{-}m^2=0$, or $0^2\text{-}\mathbf{p}^2\text{-}m^2=0$; $c=1$ where c is speed of light; and $\hbar=1$ where $\hbar$ is reduced Planck constant.

(15) A model as in (14) wherein formation of said matrix rule in said drawing comprises:

$$\rightarrow 1 = L = \frac{E^2 - m^2}{\mathbf{p}^2} = \left(\frac{E-m}{-|\mathbf{p}|} \right) \left(\frac{-|\mathbf{p}|}{E+m} \right)^{-1} \rightarrow \frac{E-m}{-|\mathbf{p}|} = \frac{-|\mathbf{p}|}{E+m} \rightarrow \frac{E-m}{-|\mathbf{p}|} - \frac{-|\mathbf{p}|}{E+m} = 0$$

$$\rightarrow \begin{pmatrix} E-m & -|\mathbf{p}| \\ -|\mathbf{p}| & E+m \end{pmatrix} \rightarrow \begin{pmatrix} E-m & -\boldsymbol{\sigma}\cdot\mathbf{p} \\ -\boldsymbol{\sigma}\cdot\mathbf{p} & E+m \end{pmatrix} \text{ or } \begin{pmatrix} E-m & -\mathbf{s}\cdot\mathbf{p} \\ -\mathbf{s}\cdot\mathbf{p} & E+m \end{pmatrix} \ ,$$

$$\rightarrow 1 = L = \frac{E^2-\mathbf{p}^2}{m^2} = \left(\frac{E-|\mathbf{p}|}{-m}\right)\left(\frac{-m}{E+|\mathbf{p}|}\right)^{-1} \rightarrow \frac{E-|\mathbf{p}|}{-m} = \frac{-m}{E+|\mathbf{p}|} \rightarrow \frac{E-|\mathbf{p}|}{-m} - \frac{-m}{E+|\mathbf{p}|} = 0$$

$$\rightarrow \begin{pmatrix} E-|\mathbf{p}| & -m \\ -m & E+|\mathbf{p}| \end{pmatrix} \rightarrow \begin{pmatrix} E-\boldsymbol{\sigma}\cdot\mathbf{p} & -m \\ -m & E+\boldsymbol{\sigma}\cdot\mathbf{p} \end{pmatrix} \text{ or } \begin{pmatrix} E-\mathbf{s}\cdot\mathbf{p} & -m \\ -m & E+\mathbf{s}\cdot\mathbf{p} \end{pmatrix} \ ,$$

$$\rightarrow 1 = L = \frac{m^2+\mathbf{p}^2}{E^2} = \left(\frac{E}{-m+i|\mathbf{p}|}\right)^{-1}\left(\frac{-m-i|\mathbf{p}|}{E}\right)$$

$$\rightarrow \frac{E}{-m+i|\mathbf{p}|} = \frac{-m-i|\mathbf{p}|}{E} \rightarrow \frac{E}{-m+i|\mathbf{p}|} - \frac{-m-i|\mathbf{p}|}{E} = 0$$

$$\rightarrow \begin{pmatrix} E & -m-i|\mathbf{p}| \\ -m+i|\mathbf{p}| & E \end{pmatrix} \rightarrow \begin{pmatrix} E & -m-i\boldsymbol{\sigma}\cdot\mathbf{p} \\ -m+i\boldsymbol{\sigma}\cdot\mathbf{p} & E \end{pmatrix} \text{or} \begin{pmatrix} E & -m-i\mathbf{s}\cdot\mathbf{p} \\ -m+i\mathbf{s}\cdot\mathbf{p} & E \end{pmatrix}, \text{ or}$$

$$\rightarrow 1 = L = \frac{E^2-\mathbf{p}_i^2}{m^2} = \left(\frac{E-|\mathbf{p}_i|}{-m}\right)\left(\frac{-m}{E+|\mathbf{p}_i|}\right)^{-1} \rightarrow \frac{E-|\mathbf{p}_i|}{-m} = \frac{-m}{E+|\mathbf{p}_i|} \rightarrow \frac{E-|\mathbf{p}_i|}{-m} - \frac{-m}{E+|\mathbf{p}_i|} = 0$$

$$\rightarrow \begin{pmatrix} E-|\mathbf{p}_i| & -m \\ -m & E+|\mathbf{p}_i| \end{pmatrix} \rightarrow \begin{pmatrix} E-\boldsymbol{\sigma}\cdot\mathbf{p}_i & -m \\ -m & E+\boldsymbol{\sigma}\cdot\mathbf{p}_i \end{pmatrix} \text{ or } \begin{pmatrix} E-\mathbf{s}\cdot\mathbf{p}_i & -m \\ -m & E+\mathbf{s}\cdot\mathbf{p}_i \end{pmatrix},$$

where $\boldsymbol{\sigma} = (\sigma_1, \sigma_2, \sigma_3)$ are Pauli matrices, $|\mathbf{p}| = \sqrt{\mathbf{p}^2} = \sqrt{-Det(\boldsymbol{\sigma}\cdot\mathbf{p})} \rightarrow \boldsymbol{\sigma}\cdot\mathbf{p}$ represents fermionic spinization of $|\mathbf{p}|$, $\mathbf{s} = (s_1, s_2, s_3)$ are spin operators for spin 1 particle, $|\mathbf{p}| = \sqrt{\mathbf{p}^2} = \sqrt{-\left(Det(\mathbf{s}\cdot\mathbf{p}+I_3) - Det(I_3)\right)} \rightarrow \mathbf{s}\cdot\mathbf{p}$ represents bosonic spinization of $|\mathbf{p}|$, $\mathbf{p}_i$ represents imaginary momentum, $|\mathbf{p}_i| = \sqrt{\mathbf{p}_i^2} = \sqrt{-Det(\boldsymbol{\sigma}\cdot\mathbf{p}_i)} \rightarrow \boldsymbol{\sigma}\cdot\mathbf{p}_i$ represents fermionic spinization of $|\mathbf{p}_i|$, and $|\mathbf{p}_i| = \sqrt{\mathbf{p}_i^2} = \sqrt{-\left(Det(\mathbf{s}\cdot\mathbf{p}_i+I_3) - Det(I_3)\right)} \rightarrow \mathbf{s}\cdot\mathbf{p}_i$ represents bosonic spinization of $|\mathbf{p}_i|$.

(16)   A model as in (14) wherein said drawing of said generation, sustenance and evolution of said elementary particle comprises:

$$1 = e^{i0} = 1e^{i0} = Le^{+iM-iM} = \frac{E^2 - m^2}{\mathbf{p}^2} e^{+ip^\mu x_\mu - ip^\mu x_\mu} =$$

$$\left(\frac{E-m}{-|\mathbf{p}|}\right)\left(\frac{-|\mathbf{p}|}{E+m}\right)^{-1}\left(e^{-ip^\mu x_\mu}\right)\left(e^{-ip^\mu x_\mu}\right)^{-1} \rightarrow \frac{E-m}{-|\mathbf{p}|}e^{-ip^\mu x_\mu} = \frac{-|\mathbf{p}|}{E+m}e^{-ip^\mu x_\mu} \rightarrow$$

$$\frac{E-m}{-|\mathbf{p}|}e^{-ip^\mu x_\mu} - \frac{-|\mathbf{p}|}{E+m}e^{-ip^\mu x_\mu} = 0 \rightarrow \begin{pmatrix} E-m & -|\mathbf{p}| \\ -|\mathbf{p}| & E+m \end{pmatrix}\begin{pmatrix} a_{e,+}e^{-ip^\mu x_\mu} \\ a_{i,-}e^{-ip^\mu x_\mu} \end{pmatrix} = 0$$

$$\rightarrow \begin{pmatrix} E-m & -\boldsymbol{\sigma}\cdot\mathbf{p} \\ -\boldsymbol{\sigma}\cdot\mathbf{p} & E+m \end{pmatrix}\begin{pmatrix} A_{e,+}e^{-ip^\mu x_\mu} \\ A_{i,-}e^{-ip^\mu x_\mu} \end{pmatrix} = \begin{pmatrix} L_{M,e} & L_{M,i} \end{pmatrix}\begin{pmatrix} \psi_{e,+} \\ \psi_{i,-} \end{pmatrix} = 0 \quad \text{or}$$

$$\begin{pmatrix} E-m & -\mathbf{s}\cdot\mathbf{p} \\ -\mathbf{s}\cdot\mathbf{p} & E+m \end{pmatrix}\begin{pmatrix} \mathbf{A}_{e,+}e^{-ip^\mu x_\mu} \\ \mathbf{A}_{i,-}e^{-ip^\mu x_\mu} \end{pmatrix} = \begin{pmatrix} L_{M,e} & L_{M,i} \end{pmatrix}\begin{pmatrix} \psi_{e,+} \\ \psi_{i,-} \end{pmatrix} = 0$$

where $\begin{pmatrix} E-m & -|\mathbf{p}| \\ -|\mathbf{p}| & E+m \end{pmatrix}\begin{pmatrix} a_{e,+}e^{-ip^\mu x_\mu} \\ a_{i,-}e^{-ip^\mu x_\mu} \end{pmatrix} = 0$ is a first equation for said unspinized

particle, $\begin{pmatrix} E-m & -\boldsymbol{\sigma}\cdot\mathbf{p} \\ -\boldsymbol{\sigma}\cdot\mathbf{p} & E+m \end{pmatrix}\begin{pmatrix} A_{e,+}e^{-ip^\mu x_\mu} \\ A_{i,-}e^{-ip^\mu x_\mu} \end{pmatrix} = 0$ is Dirac equation in Dirac form for said

fermion, and $\begin{pmatrix} E-m & -\mathbf{s}\cdot\mathbf{p} \\ -\mathbf{s}\cdot\mathbf{p} & E+m \end{pmatrix}\begin{pmatrix} \mathbf{A}_{e,+}e^{-ip^\mu x_\mu} \\ \mathbf{A}_{i,-}e^{-ip^\mu x_\mu} \end{pmatrix} = 0$ is a first equation for said boson;

$$1 = e^{i0} = 1e^{i0} = L_1 e^{+iM-iM} = \frac{E^2 - \mathbf{p}^2}{m^2} e^{+ip^\mu x_\mu - ip^\mu x_\mu} =$$

$$\left(\frac{E-|\mathbf{p}|}{-m}\right)\left(\frac{-m}{E+|\mathbf{p}|}\right)^{-1}\left(e^{-ip^\mu x_\mu}\right)\left(e^{-ip^\mu x_\mu}\right)^{-1} \rightarrow \frac{E-|\mathbf{p}|}{-m}e^{-ip^\mu x_\mu} = \frac{-m}{E+|\mathbf{p}|}e^{-ip^\mu x_\mu} \rightarrow$$

$$\frac{E-|\mathbf{p}|}{-m}e^{-ip^\mu x_\mu} - \frac{-m}{E+|\mathbf{p}|}e^{-ip^\mu x_\mu} = 0 \rightarrow \begin{pmatrix} E-|\mathbf{p}| & -m \\ -m & E+|\mathbf{p}| \end{pmatrix}\begin{pmatrix} a_{e,l}e^{-ip^\mu x_\mu} \\ a_{i,r}e^{-ip^\mu x_\mu} \end{pmatrix} = 0$$

$$\rightarrow \begin{pmatrix} E-\boldsymbol{\sigma}\cdot\mathbf{p} & -m \\ -m & E+\boldsymbol{\sigma}\cdot\mathbf{p} \end{pmatrix}\begin{pmatrix} A_{e,l}e^{-ip^\mu x_\mu} \\ A_{i,r}e^{-ip^\mu x_\mu} \end{pmatrix} = \begin{pmatrix} L_{M,e} & L_{M,i} \end{pmatrix}\begin{pmatrix} \psi_{e,l} \\ \psi_{i,r} \end{pmatrix} = 0 \quad \text{or}$$

$$\begin{pmatrix} E-\mathbf{s}\cdot\mathbf{p} & -m \\ -m & E+\mathbf{s}\cdot\mathbf{p} \end{pmatrix}\begin{pmatrix} \mathbf{A}_{e,l}e^{-ip^{\mu}x_{\mu}} \\ \mathbf{A}_{i,r}e^{-ip^{\mu}x_{\mu}} \end{pmatrix} = \begin{pmatrix} L_{M,e} & L_{M,i} \end{pmatrix}\begin{pmatrix} \psi_{e,l} \\ \psi_{i,r} \end{pmatrix} = 0$$

where $\begin{pmatrix} E-|\mathbf{p}| & -m \\ -m & E+|\mathbf{p}| \end{pmatrix}\begin{pmatrix} a_{e,l}e^{-ip^{\mu}x_{\mu}} \\ a_{i,r}e^{-ip^{\mu}x_{\mu}} \end{pmatrix} = 0$ is a second equation for said unspinized

particle, $\begin{pmatrix} E-\boldsymbol{\sigma}\cdot\mathbf{p} & -m \\ -m & E+\boldsymbol{\sigma}\cdot\mathbf{p} \end{pmatrix}\begin{pmatrix} A_{e,l}e^{-ip^{\mu}x_{\mu}} \\ A_{i,r}e^{-ip^{\mu}x_{\mu}} \end{pmatrix} = 0$ is Dirac equation in Weyl form for

said fermion, and $\begin{pmatrix} E-\mathbf{s}\cdot\mathbf{p} & -m \\ -m & E+\mathbf{s}\cdot\mathbf{p} \end{pmatrix}\begin{pmatrix} \mathbf{A}_{e,l}e^{-ip^{\mu}x_{\mu}} \\ \mathbf{A}_{i,r}e^{-ip^{\mu}x_{\mu}} \end{pmatrix} = 0$ is a second equation for said

boson;

$$1 = e^{i0} = 1e^{i0} = Le^{+iM-iM} = \frac{E^2}{m^2+\mathbf{p}^2}e^{+ip^{\mu}x_{\mu}-ip^{\mu}x_{\mu}} =$$

$$\left(\frac{E}{-m+i|\mathbf{p}|}\right)\left(\frac{-m-i|\mathbf{p}|}{E}\right)^{-1}\left(e^{-ip^{\mu}x_{\mu}}\right)\left(e^{-ip^{\mu}x_{\mu}}\right)^{-1} \rightarrow$$

$$\frac{E}{-m+i|\mathbf{p}|}e^{-ip^{\mu}x_{\mu}} = \frac{-m-i|\mathbf{p}|}{E}e^{-ip^{\mu}x_{\mu}} \rightarrow \frac{E}{-m+i|\mathbf{p}|}e^{-ip^{\mu}x_{\mu}} - \frac{-m-i|\mathbf{p}|}{E}e^{-ip^{\mu}x_{\mu}} = 0$$

$$\rightarrow \begin{pmatrix} E & -m-i|\mathbf{p}| \\ -m+i|\mathbf{p}| & E \end{pmatrix}\begin{pmatrix} a_{e}e^{-ip^{\mu}x_{\mu}} \\ a_{i}e^{-ip^{\mu}x_{\mu}} \end{pmatrix} = 0$$

$$\rightarrow \begin{pmatrix} E & -m-i\boldsymbol{\sigma}\cdot\mathbf{p} \\ -m+i\boldsymbol{\sigma}\cdot\mathbf{p} & E \end{pmatrix}\begin{pmatrix} A_{e}e^{-ip^{\mu}x_{\mu}} \\ A_{i}e^{-ip^{\mu}x_{\mu}} \end{pmatrix} = \begin{pmatrix} L_{M,e} & L_{M,i} \end{pmatrix}\begin{pmatrix} \psi_{e} \\ \psi_{i} \end{pmatrix} = 0 \text{ or }$$

$$\begin{pmatrix} E & -m-i\mathbf{s}\cdot\mathbf{p} \\ -m+i\mathbf{s}\cdot\mathbf{p} & E \end{pmatrix}\begin{pmatrix} \mathbf{A}_{e}e^{-ip^{\mu}x_{\mu}} \\ \mathbf{A}_{i}e^{-ip^{\mu}x_{\mu}} \end{pmatrix} = \begin{pmatrix} L_{M,e} & L_{M,i} \end{pmatrix}\begin{pmatrix} \psi_{e} \\ \psi_{i} \end{pmatrix} = 0$$

where $\begin{pmatrix} E & -m-i|\mathbf{p}| \\ -m+i|\mathbf{p}| & E \end{pmatrix}\begin{pmatrix} a_{e}e^{-ip^{\mu}x_{\mu}} \\ a_{i}e^{-ip^{\mu}x_{\mu}} \end{pmatrix} = 0$ is a third equation for said unspinized

particle, $\begin{pmatrix} E & -m-i\boldsymbol{\sigma}\cdot\mathbf{p} \\ -m+i\boldsymbol{\sigma}\cdot\mathbf{p} & E \end{pmatrix}\begin{pmatrix} A_{e}e^{-ip^{\mu}x_{\mu}} \\ A_{i}e^{-ip^{\mu}x_{\mu}} \end{pmatrix} = 0$ is Dirac equation in a third form

for said fermion, and $\begin{pmatrix} E & -m-i\mathbf{s}\cdot\mathbf{p} \\ -m+i\mathbf{s}\cdot\mathbf{p} & E \end{pmatrix}\begin{pmatrix} \mathbf{A}_e e^{-ip^\mu x_\mu} \\ \mathbf{A}_i e^{-ip^\mu x_\mu} \end{pmatrix} = 0$ is a third equation

for said boson; or

$$1 = e^{i0} = 1e^{i0} = Le^{+iM-iM} = \frac{E^2-m^2}{\mathbf{p}_i^2}e^{+ip^\mu x_\mu - ip^\mu x_\mu} =$$

$$\left(\frac{E-m}{-|\mathbf{p}_i|}\right)\left(\frac{-|\mathbf{p}_i|}{E+m}\right)^{-1}\left(e^{-ip^\mu x_\mu}\right)\left(e^{-ip^\mu x_\mu}\right)^{-1} \rightarrow \frac{E-m}{-|\mathbf{p}_i|}e^{-ip^\mu x_\mu} = \frac{-|\mathbf{p}_i|}{E+m}e^{-ip^\mu x_\mu} \rightarrow$$

$$\frac{E-m}{-\mathbf{p}_i}e^{-ip^\mu x_\mu} - \frac{-|\mathbf{p}_i|}{E+m}e^{-ip^\mu x_\mu} = 0 \rightarrow \begin{pmatrix} E-m & -|\mathbf{p}_i| \\ -|\mathbf{p}_i| & E+m \end{pmatrix}\begin{pmatrix} S_{e,+}e^{-iEt} \\ S_{i,-}e^{-iEt} \end{pmatrix} = 0$$

$$\rightarrow \begin{pmatrix} E-m & -\boldsymbol{\sigma}\cdot\mathbf{p}_i \\ -\boldsymbol{\sigma}\cdot\mathbf{p}_i & E+m \end{pmatrix}\begin{pmatrix} S_{e,+}e^{-iEt} \\ S_{i,-}e^{-iEt} \end{pmatrix} = \begin{pmatrix} L_{M,e} & L_{M,i} \end{pmatrix}\begin{pmatrix} \psi_{e,+} \\ \psi_{i,-} \end{pmatrix} = 0 \quad \text{or}$$

$$\begin{pmatrix} E-m & -\mathbf{s}\cdot\mathbf{p}_i \\ -\mathbf{s}\cdot\mathbf{p}_i & E+m \end{pmatrix}\begin{pmatrix} S_{e,+}e^{-iEt} \\ S_{i,-}e^{-iEt} \end{pmatrix} = \begin{pmatrix} L_{M,e} & L_{M,i} \end{pmatrix}\begin{pmatrix} \psi_{e,+} \\ \psi_{i,-} \end{pmatrix} = 0$$

where $\begin{pmatrix} E-m & -|\mathbf{p}_i| \\ -|\mathbf{p}_i| & E+m \end{pmatrix}\begin{pmatrix} S_{e,+}e^{-iEt} \\ S_{i,-}e^{-iEt} \end{pmatrix} = 0$ is a first equation for said unspinized particle

with said imaginary momentum $\mathbf{p}_i$, $\begin{pmatrix} E-m & -\boldsymbol{\sigma}\cdot\mathbf{p}_i \\ -\boldsymbol{\sigma}\cdot\mathbf{p}_i & E+m \end{pmatrix}\begin{pmatrix} S_{e,+}e^{-iEt} \\ S_{i,-}e^{-iEt} \end{pmatrix} = 0$ is Dirac equation

in Dirac form for said fermion with said imaginary momentum $\mathbf{p}_i$, and

$\begin{pmatrix} E-m & -\mathbf{s}\cdot\mathbf{p}_i \\ -\mathbf{s}\cdot\mathbf{p}_i & E+m \end{pmatrix}\begin{pmatrix} S_{e,+}e^{-iEt} \\ S_{i,-}e^{-iEt} \end{pmatrix} = 0$ is a first equation for said boson with said imaginary

momentum $\mathbf{p}_i$.

(17)   A model as in (16) wherein said elementary particle comprises of:

an electron, equation of said electron being modeled as:

$$\begin{pmatrix} E-m & -\boldsymbol{\sigma}\cdot\mathbf{p} \\ -\boldsymbol{\sigma}\cdot\mathbf{p} & E+m \end{pmatrix}\begin{pmatrix} A_{e,+}e^{-ip^\mu x_\mu} \\ A_{i,-}e^{-ip^\mu x_\mu} \end{pmatrix} = 0, \begin{pmatrix} E-\boldsymbol{\sigma}\cdot\mathbf{p} & -m \\ -m & E+\boldsymbol{\sigma}\cdot\mathbf{p} \end{pmatrix}\begin{pmatrix} A_{e,l}e^{-ip^\mu x_\mu} \\ A_{i,r}e^{-ip^\mu x_\mu} \end{pmatrix} = 0 \quad \text{or}$$

$$\begin{pmatrix} E & -m-i\boldsymbol{\sigma}\cdot\mathbf{p} \\ -m+i\boldsymbol{\sigma}\cdot\mathbf{p} & E \end{pmatrix}\begin{pmatrix} A_e e^{-ip^\mu x_\mu} \\ A_i e^{-ip^\mu x_\mu} \end{pmatrix} = 0;$$

a positron, equation of said positron being modeled as:

$$\begin{pmatrix} E-m & -\boldsymbol{\sigma}\cdot\mathbf{p} \\ -\boldsymbol{\sigma}\cdot\mathbf{p} & E+m \end{pmatrix}\begin{pmatrix} A_{e,-}e^{+ip^{\mu}x_{\mu}} \\ A_{i,+}e^{+ip^{\mu}x_{\mu}} \end{pmatrix}=0\,,\quad \begin{pmatrix} E-\boldsymbol{\sigma}\cdot\mathbf{p} & -m \\ -m & E+\boldsymbol{\sigma}\cdot\mathbf{p} \end{pmatrix}\begin{pmatrix} A_{e,r}e^{+ip^{\mu}x_{\mu}} \\ A_{i,l}e^{+ip^{\mu}x_{\mu}} \end{pmatrix}=0 \text{ or}$$

$$\begin{pmatrix} E & -m-i\boldsymbol{\sigma}\cdot\mathbf{p} \\ -m+i\boldsymbol{\sigma}\cdot\mathbf{p} & E \end{pmatrix}\begin{pmatrix} A_{e}e^{+ip^{\mu}x_{\mu}} \\ A_{i}e^{+ip^{\mu}x_{\mu}} \end{pmatrix}=0\,;$$

a massless neutrino, equation of said neutrino being modeled as:

$$\begin{pmatrix} E & -\boldsymbol{\sigma}\cdot\mathbf{p} \\ -\boldsymbol{\sigma}\cdot\mathbf{p} & E \end{pmatrix}\begin{pmatrix} A_{e,+}e^{-ip^{\mu}x_{\mu}} \\ A_{i,-}e^{-ip^{\mu}x_{\mu}} \end{pmatrix}=0\,,\quad \begin{pmatrix} E-\boldsymbol{\sigma}\cdot\mathbf{p} & \\ & E+\boldsymbol{\sigma}\cdot\mathbf{p} \end{pmatrix}\begin{pmatrix} A_{e,l}e^{-ip^{\mu}x_{\mu}} \\ A_{i,r}e^{-ip^{\mu}x_{\mu}} \end{pmatrix}=0 \text{ or}$$

$$\begin{pmatrix} E & -i\boldsymbol{\sigma}\cdot\mathbf{p} \\ +i\boldsymbol{\sigma}\cdot\mathbf{p} & E \end{pmatrix}\begin{pmatrix} A_{e}e^{-ip^{\mu}x_{\mu}} \\ A_{i}e^{-ip^{\mu}x_{\mu}} \end{pmatrix}=0\,;$$

A massless antineutrino, equation of said antineutrino being modeled as:

$$\begin{pmatrix} E & -\boldsymbol{\sigma}\cdot\mathbf{p} \\ -\boldsymbol{\sigma}\cdot\mathbf{p} & E \end{pmatrix}\begin{pmatrix} A_{e,-}e^{+ip^{\mu}x_{\mu}} \\ A_{i,+}e^{+ip^{\mu}x_{\mu}} \end{pmatrix}=0\,,\quad \begin{pmatrix} E-\boldsymbol{\sigma}\cdot\mathbf{p} & \\ & E+\boldsymbol{\sigma}\cdot\mathbf{p} \end{pmatrix}\begin{pmatrix} A_{e,r}e^{+ip^{\mu}x_{\mu}} \\ A_{i,l}e^{+ip^{\mu}x_{\mu}} \end{pmatrix}=0 \text{ or}$$

$$\begin{pmatrix} E & -i\boldsymbol{\sigma}\cdot\mathbf{p} \\ +i\boldsymbol{\sigma}\cdot\mathbf{p} & E \end{pmatrix}\begin{pmatrix} A_{e}e^{+ip^{\mu}x_{\mu}} \\ A_{i}e^{+ip^{\mu}x_{\mu}} \end{pmatrix}=0\,;$$

a massive spin 1 boson, equation of said massive spin 1 boson being modeled as:

$$\begin{pmatrix} E-m & -\mathbf{s}\cdot\mathbf{p} \\ -\mathbf{s}\cdot\mathbf{p} & E+m \end{pmatrix}\begin{pmatrix} \mathbf{A}_{e,+}e^{-ip^{\mu}x_{\mu}} \\ \mathbf{A}_{i,-}e^{-ip^{\mu}x_{\mu}} \end{pmatrix}=0\,,\quad \begin{pmatrix} E-\mathbf{s}\cdot\mathbf{p} & -m \\ -m & E+\mathbf{s}\cdot\mathbf{p} \end{pmatrix}\begin{pmatrix} \mathbf{A}_{e,l}e^{-ip^{\mu}x_{\mu}} \\ \mathbf{A}_{i,r}e^{-ip^{\mu}x_{\mu}} \end{pmatrix}=0 \text{ or}$$

$$\begin{pmatrix} E & -m-i\mathbf{s}\cdot\mathbf{p} \\ -m+i\mathbf{s}\cdot\mathbf{p} & E \end{pmatrix}\begin{pmatrix} \mathbf{A}_{e}e^{-ip^{\mu}x_{\mu}} \\ \mathbf{A}_{i}e^{-ip^{\mu}x_{\mu}} \end{pmatrix}=0\,;$$

a massive spin 1 antiboson, equation of said massive spin 1 antiboson being modeled as:

$$\begin{pmatrix} E-m & -\mathbf{s}\cdot\mathbf{p} \\ -\mathbf{s}\cdot\mathbf{p} & E+m \end{pmatrix}\begin{pmatrix} \mathbf{A}_{e,-}e^{+ip^{\mu}x_{\mu}} \\ \mathbf{A}_{i,+}e^{+ip^{\mu}x_{\mu}} \end{pmatrix}=0\,,\quad \begin{pmatrix} E-\mathbf{s}\cdot\mathbf{p} & -m \\ -m & E+\mathbf{s}\cdot\mathbf{p} \end{pmatrix}\begin{pmatrix} \mathbf{A}_{e,r}e^{+ip^{\mu}x_{\mu}} \\ \mathbf{A}_{i,l}e^{+ip^{\mu}x_{\mu}} \end{pmatrix}=0 \text{ or}$$

$$\begin{pmatrix} E & -m-i\mathbf{s}\cdot\mathbf{p} \\ -m+i\mathbf{s}\cdot\mathbf{p} & E \end{pmatrix}\begin{pmatrix} \mathbf{A}_{e}e^{+ip^{\mu}x_{\mu}} \\ \mathbf{A}_{i}e^{+ip^{\mu}x_{\mu}} \end{pmatrix}=0\,;$$

a massless spin 1 boson, equation of said massless spin 1 boson being modeled as:

$$\begin{pmatrix} E & -\mathbf{s}\cdot\mathbf{p} \\ -\mathbf{s}\cdot\mathbf{p} & E \end{pmatrix}\begin{pmatrix} A_{e,+}e^{-ip^{\mu}x_{\mu}} \\ A_{i,-}e^{-ip^{\mu}x_{\mu}} \end{pmatrix} = \begin{pmatrix} E & -\mathbf{s}\cdot\mathbf{p} \\ -\mathbf{s}\cdot\mathbf{p} & E \end{pmatrix}\begin{pmatrix} \mathbf{E} \\ i\mathbf{B} \end{pmatrix} = 0 ,$$

$$\begin{pmatrix} E-\mathbf{s}\cdot\mathbf{p} & \\ & E+\mathbf{s}\cdot\mathbf{p} \end{pmatrix}\begin{pmatrix} A_{e,l}e^{-ip^{\mu}x_{\mu}} \\ A_{i,r}e^{-ip^{\mu}x_{\mu}} \end{pmatrix} = 0 \text{ or } \begin{pmatrix} E & -i\mathbf{s}\cdot\mathbf{p} \\ +i\mathbf{s}\cdot\mathbf{p} & E \end{pmatrix}\begin{pmatrix} A_{e}e^{-ip^{\mu}x_{\mu}} \\ A_{i}e^{-ip^{\mu}x_{\mu}} \end{pmatrix} = 0$$

where $\begin{pmatrix} E & -\mathbf{s}\cdot\mathbf{p} \\ -\mathbf{s}\cdot\mathbf{p} & E \end{pmatrix}\begin{pmatrix} \mathbf{E} \\ i\mathbf{B} \end{pmatrix} = 0$ is equivalent to Maxwell equation $\begin{pmatrix} \partial_{t}\mathbf{E} = \nabla\times\mathbf{B} \\ \partial_{t}\mathbf{B} = -\nabla\times\mathbf{E} \end{pmatrix}$;

a massless spin 1 antiboson, equation of said massless spin 1 antiboson being modeled as:

$$\begin{pmatrix} E & -\mathbf{s}\cdot\mathbf{p} \\ -\mathbf{s}\cdot\mathbf{p} & E \end{pmatrix}\begin{pmatrix} A_{e,-}e^{+ip^{\mu}x_{\mu}} \\ A_{i,+}e^{+ip^{\mu}x_{\mu}} \end{pmatrix} = 0 , \begin{pmatrix} E-\mathbf{s}\cdot\mathbf{p} & \\ & E+\mathbf{s}\cdot\mathbf{p} \end{pmatrix}\begin{pmatrix} A_{e,r}e^{+ip^{\mu}x_{\mu}} \\ A_{i,l}e^{+ip^{\mu}x_{\mu}} \end{pmatrix} = 0 \text{ or }$$

$$\begin{pmatrix} E & -i\mathbf{s}\cdot\mathbf{p} \\ -m+i\mathbf{s}\cdot\mathbf{p} & E \end{pmatrix}\begin{pmatrix} A_{e}e^{+ip^{\mu}x_{\mu}} \\ A_{i}e^{+ip^{\mu}x_{\mu}} \end{pmatrix} = 0 ;$$

an antiproton, equation of said antiproton being modeled as:

$$\begin{pmatrix} E-m & -\boldsymbol{\sigma}\cdot\mathbf{p}_{i} \\ -\boldsymbol{\sigma}\cdot\mathbf{p}_{i} & E+m \end{pmatrix}\begin{pmatrix} S_{e,+}e^{-iEt} \\ S_{i,-}e^{-iEt} \end{pmatrix} = 0 , \begin{pmatrix} E-\boldsymbol{\sigma}\cdot\mathbf{p}_{i} & -m \\ -m & E+\boldsymbol{\sigma}\cdot\mathbf{p}_{i} \end{pmatrix}\begin{pmatrix} S_{e,l}e^{-iEt} \\ S_{i,r}e^{-iEt} \end{pmatrix} = 0 \text{ or }$$

$$\begin{pmatrix} E & -m-i\boldsymbol{\sigma}\cdot\mathbf{p}_{i} \\ -m+i\boldsymbol{\sigma}\cdot\mathbf{p}_{i} & E \end{pmatrix}\begin{pmatrix} S_{e}e^{-iEt} \\ S_{i}e^{-iEt} \end{pmatrix} = 0 ; \text{ or }$$

a proton, equation of said proton being modeled as:

$$\begin{pmatrix} E-m & -\boldsymbol{\sigma}\cdot\mathbf{p}_{i} \\ -\boldsymbol{\sigma}\cdot\mathbf{p}_{i} & E+m \end{pmatrix}\begin{pmatrix} S_{e,-}e^{+iEt} \\ S_{i,+}e^{+iEt} \end{pmatrix} = 0 , \begin{pmatrix} E-\boldsymbol{\sigma}\cdot\mathbf{p}_{i} & -m \\ -m & E+\boldsymbol{\sigma}\cdot\mathbf{p}_{i} \end{pmatrix}\begin{pmatrix} S_{e,r}e^{+iEt} \\ S_{i,l}e^{+iEt} \end{pmatrix} = 0 \text{ or }$$

$$\begin{pmatrix} E & -m-i\boldsymbol{\sigma}\cdot\mathbf{p}_{i} \\ -m+i\boldsymbol{\sigma}\cdot\mathbf{p}_{i} & E \end{pmatrix}\begin{pmatrix} S_{e}e^{+iEt} \\ S_{i}e^{+iEt} \end{pmatrix} = 0 .$$

(18)   A model as in (16) wherein said elementary particle comprises an electron and said drawing is modified to include a proton, said proton being modeled as a second elementary particle, and interaction fields of said electron and said proton, said modified drawing comprising:

$$1 = e^{i0} = 1e^{i0}1e^{i0} = \left(Le^{+iM-iM}\right)_{p}\left(Le^{+iM-iM}\right)_{e}$$

$$= \left(\frac{E^{2}-m^{2}}{\mathbf{p}_{i}^{2}}e^{+ip^{\mu}x_{\mu}-ip^{\mu}x_{\mu}}\right)_{p}\left(\frac{E^{2}-m^{2}}{\mathbf{p}^{2}}e^{-ip^{\mu}x_{\mu}+ip^{\mu}x_{\mu}}\right)_{e} =$$

$$\left(\left(\frac{E-m}{-|\mathbf{p}_i|}\right)\left(\frac{-|\mathbf{p}_i|}{E+m}\right)^{-1}\left(e^{+ip^\mu x_\mu}\right)\left(e^{+ip^\mu x_\mu}\right)^{-1}\right)_p\left(\left(\frac{E-m}{-|\mathbf{p}|}\right)\left(\frac{-|\mathbf{p}|}{E+m}\right)^{-1}\left(e^{-ip^\mu x_\mu}\right)\left(e^{-ip^\mu x_\mu}\right)^{-1}\right)_e$$

$$\to\left(\begin{pmatrix}E-m & -|\mathbf{p}_i| \\ -|\mathbf{p}_i| & E+m\end{pmatrix}\begin{pmatrix}s_{e,-}e^{+iEt} \\ s_{i,+}e^{+iEt}\end{pmatrix}=0\right)_p\left(\begin{pmatrix}E-m & -|\mathbf{p}| \\ -|\mathbf{p}| & E+m\end{pmatrix}\begin{pmatrix}s_{e,+}e^{-iEt} \\ s_{i,-}e^{-iEt}\end{pmatrix}=0\right)_e$$

$$\to\left|\begin{array}{l}\left(\begin{pmatrix}E-e\phi-m & -\boldsymbol{\sigma}\cdot(\mathbf{p}_i-e\mathrm{A}) \\ -\boldsymbol{\sigma}\cdot(\mathbf{p}_i-e\mathrm{A}) & E-e\phi+m\end{pmatrix}\begin{pmatrix}S_{e,-}e^{+iEt} \\ S_{i,+}e^{+iEt}\end{pmatrix}=0\right)_p \\ \left(\begin{pmatrix}E+e\phi-m & -\boldsymbol{\sigma}\cdot(\mathbf{p}+e\mathbf{A}) \\ -\boldsymbol{\sigma}\cdot(\mathbf{p}+e\mathbf{A}) & E+e\phi+m\end{pmatrix}\begin{pmatrix}S_{e,+}e^{-iEt} \\ S_{i,-}e^{-iEt}\end{pmatrix}=0\right)_e\end{array}\right)$$

where ( )$_e$ denotes electron, ( )$_p$ denotes proton and (( )$_e$ ( )$_p$) denotes an electron-proton system.

(19)   A method as in (16) wherein said elementary particle comprises of an electron and said drawing is modified to include an unspinized proton, said unspinized proton being modeled as a second elementary particle, and interaction fields of said electron and said unspinized proton, said modified drawing comprising:

$$1=e^{i0}=1e^{i0}1e^{i0}=\left(Le^{+iM-iM}\right)_p\left(Le^{+iM-iM}\right)_e$$

$$=\left(\frac{E^2-m^2}{\mathbf{p}_i^2}e^{+ip^\mu x_\mu-ip^\mu x_\mu}\right)_p\left(\frac{E^2-m^2}{\mathbf{p}^2}e^{-ip^\mu x_\mu+ip^\mu x_\mu}\right)_e=$$

$$\left(\left(\frac{E-m}{-|\mathbf{p}_i|}\right)\left(\frac{-|\mathbf{p}_i|}{E+m}\right)^{-1}\left(e^{+ip^\mu x_\mu}\right)\left(e^{+ip^\mu x_\mu}\right)^{-1}\right)_p\left(\left(\frac{E-m}{-|\mathbf{p}|}\right)\left(\frac{-|\mathbf{p}|}{E+m}\right)^{-1}\left(e^{-ip^\mu x_\mu}\right)\left(e^{-ip^\mu x_\mu}\right)^{-1}\right)_e$$

$$\to\left(\begin{pmatrix}E-m & -|\mathbf{p}_i| \\ -|\mathbf{p}_i| & E+m\end{pmatrix}\begin{pmatrix}s_{e,-}e^{+iEt} \\ s_{i,+}e^{+iEt}\end{pmatrix}=0\right)_p\left(\begin{pmatrix}E-m & -|\mathbf{p}| \\ -|\mathbf{p}| & E+m\end{pmatrix}\begin{pmatrix}s_{e,+}e^{-iEt} \\ s_{i,-}e^{-iEt}\end{pmatrix}=0\right)_e$$

$$\to\left|\begin{array}{l}\left(\begin{pmatrix}E-e\phi-m & -|\mathbf{p}_i-e\mathrm{A}| \\ -|\mathbf{p}_i-e\mathrm{A}| & E-e\phi+m\end{pmatrix}\begin{pmatrix}s_{e,-}e^{+iEt} \\ s_{i,+}e^{+iEt}\end{pmatrix}=0\right)_p \\ \left(\begin{pmatrix}E+e\phi-V-m & -\boldsymbol{\sigma}\cdot(\mathbf{p}+e\mathbf{A}) \\ -\boldsymbol{\sigma}\cdot(\mathbf{p}+e\mathbf{A}) & E+e\phi-V+m\end{pmatrix}\begin{pmatrix}S_{e,+}e^{-iEt} \\ S_{i,-}e^{-iEt}\end{pmatrix}=0\right)_e\end{array}\right)$$

where ( )$_e$ denotes electron, ( )$_p$ denotes unspinized proton and (( )$_e$ ( )$_p$) denotes an electron-unspinized proton system.

(20)   A model as (13), (14), (15), (16) or (17) wherein said external object interacting with said internal object through said matrix rule is modeled as self-gravity or self-quantum-entanglement.

(21)   A model as in (15) or (16) wherein fermionic spinization $|\mathbf{p}| = \sqrt{\mathbf{p^2}} = \sqrt{-Det(\boldsymbol{\sigma}\cdot\mathbf{p})} \rightarrow \boldsymbol{\sigma}\cdot\mathbf{p}$ and/or reversal of said fermionic spinization $\boldsymbol{\sigma}\cdot\mathbf{p} \rightarrow \sqrt{-Det(\boldsymbol{\sigma}\cdot\mathbf{p})} = \sqrt{\mathbf{p^2}} = |\mathbf{p}|$ is modeled as a first form of weak interation; bosonic spinization $|\mathbf{p}| = \sqrt{\mathbf{p^2}} = \sqrt{-\left(Det(\mathbf{s}\cdot\mathbf{p}+I_3) - Det(I_3)\right)} \rightarrow \mathbf{s}\cdot\mathbf{p}$ of said elementary particle with rest mass and/or decay of said massive boson is modeled as a second form of weak interaction; and said bosonic spinization of said elementary particle with no rest mass and/or reversal of said bosonic spinization $\mathbf{s}\cdot\mathbf{p} \rightarrow \sqrt{-(Det(\mathbf{s}\cdot\mathbf{p}+I_3) - Det(I_3))} = \sqrt{\mathbf{p^2}} = |\mathbf{p}|$ of said massless boson is modeled as a form of electromagnetic interaction.

(22)   A model as in (15) or (16) wherein a form of interaction or process involving imaginary momentum $\mathbf{p}_i$ is modeled as strong interaction.

(23)   A model as in (13), (14), (15), (16) or (17) wherein said drawing is modified to include a second elementary particle comprising a second external object and a second internal object; and interaction between said external object and said second internal object and/or between said second external object and said internal object is modeled as gravity or quantum entanglement.

(24)   A model for modeling an interaction inside brain through hierarchical self-referential spin in prespacetime, as a teaching and/or modeling tool, comprising:

a drawing of said interaction through said hierarchical self-referential spin in said prespacetime, said drawing comprising:

$$\left[\begin{pmatrix} E-e\phi-m & -\boldsymbol{\sigma}\cdot(\mathbf{p}_i-e\mathbf{A}) \\ -\boldsymbol{\sigma}\cdot(\mathbf{p}_i-e\mathbf{A}) & E-e\phi+m \end{pmatrix}\begin{pmatrix} \psi_{e,-} \\ \psi_{i,+} \end{pmatrix}=0\right]_p \begin{pmatrix} E & -\boldsymbol{\sigma}\cdot\mathbf{p} \\ -\boldsymbol{\sigma}\cdot\mathbf{p} & E \end{pmatrix}\begin{pmatrix} \boldsymbol{\sigma}\cdot\mathbf{E} \\ i\boldsymbol{\sigma}\cdot\mathbf{B} \end{pmatrix}=\begin{pmatrix} -i\boldsymbol{\sigma}\cdot(\psi^\dagger\beta\boldsymbol{\alpha}\psi) \\ -i(\psi^\dagger\beta\beta\psi) \end{pmatrix}_p \; ,$$

and/or

$$\left[\begin{pmatrix} E+e\phi-m & -\boldsymbol{\sigma}\cdot(\mathbf{p}+e\mathbf{A}) \\ -\boldsymbol{\sigma}\cdot(\mathbf{p}+e\mathbf{A}) & E+e\phi+m \end{pmatrix}\begin{pmatrix} \psi_{e,+} \\ \psi_{i,-} \end{pmatrix}=0\right]_e \begin{pmatrix} E & -\boldsymbol{\sigma}\cdot\mathbf{p} \\ -\boldsymbol{\sigma}\cdot\mathbf{p} & E \end{pmatrix}\begin{pmatrix} \boldsymbol{\sigma}\cdot\mathbf{E} \\ i\boldsymbol{\sigma}\cdot\mathbf{B} \end{pmatrix}=\begin{pmatrix} -i\boldsymbol{\sigma}\cdot(\psi^\dagger\beta\boldsymbol{\alpha}\psi) \\ -i(\psi^\dagger\beta\beta\psi) \end{pmatrix}_e \; ,$$

where $(\ )_p (\ )_p$ denotes a proton-photon system, $(\ )_e (\ )_e$ denotes an electron - photon system, (A, ϕ) denotes electromagnetic potential, E denotes electric field, B denotes magnetic field, $\sigma = (\sigma_1, \sigma_2, \sigma_3)$ denote Pauli matrices, (α, β) denote Dirac matrices, Ψ denotes wave function, and $\Psi^\dagger$ denotes conjugate transpose of Ψ; and

a device for presenting and/or modeling said drawing, said device being for teaching and/or research.

Reference

1. Hu, H. & Wu, M. (2010), Prespacetime Model of Elementary Particles, Four Forces & Consciousness. Prespacetime Journal, 1(1): pp. 77-146.