Essay

If the LHC Particle Is Real, What Is One of the Other Possibilities than the Higgs Boson?

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ABSTRACT

In the prespacetime model, an unspinized particle governed by a matrix law is the precursor of all spinized particles and thus steps into the shoes played by the Higgs particle. We speculate here that what has been found at the LHC, if real, is plausibly the unspinized particle of the prespacetime model. The wave function of a fermion or boson is respectively a bispinor or bi-vector but that of the unspinized particle is two-component complex scalar field. Thus, it may have different behavior than that of either the boson or fermion which may be detectable at LHC.

Key Words: LHC, Higgs boson, unspinized particle, Prespacetime Model.

Hints of a New LHC Particle

Based on the CERN announcement on December 13, 2011, the hints of a new particle commonly attributed to Higgs boson of the Standard Model have been observed at the Large Hadron Collider. Philip E. Gibbs has done some important combinations and calculations and concluded that "I get an overall probability for such a strong signal if there is no Higgs to be about 1 in 30…everything considered I take the observed result to be a two sigma effect. [1-2]."

Prespacetime Model in a Nutshell

We have previously formulated a prespacetime model of elementary particles and four forces [3]. The model illustrates how self-referential hierarchical spin structure of the prespacetime provides a foundation for creating, sustaining and causing evolution of elementary particles through matrixing processes embedded in prespacetime:

$$
\begin{gathered}
1 = e^{i0} = 1e^{i0} = Le^{-iM+iM} = \frac{E^2 - m^2}{\mathbf{p}^2} e^{-ip^{\mu}x_{\mu} + ip^{\mu}x_{\mu}} = \\
\left(\frac{E-m}{-|\mathbf{p}|}\right)\left(\frac{-|\mathbf{p}|}{E+m}\right)^{-1}\left(e^{-ip^{\mu}x_{\mu}}\right)\left(e^{-ip^{\mu}x_{\mu}}\right)^{-1} \rightarrow \\
\frac{E-m}{-|\mathbf{p}|} e^{-ip^{\mu}x_{\mu}} = \frac{-|\mathbf{p}|}{E+m} e^{-ip^{\mu}x_{\mu}} \rightarrow \frac{E-m}{-|\mathbf{p}|} e^{-ip^{\mu}x_{\mu}} - \frac{-|\mathbf{p}|}{E+m} e^{-ip^{\mu}x_{\mu}} = 0
\end{gathered} \tag{1}
$$

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$$\rightarrow \begin{pmatrix} E-m & -|\mathbf{p}| \\ -|\mathbf{p}| & E+m \end{pmatrix} \begin{pmatrix} a_{e,+} e^{-ip^{\mu} x_{\mu}} \\ a_{i,-} e^{-ip^{\mu} x_{\mu}} \end{pmatrix} == L_M \begin{pmatrix} \psi_{e,+} \\ \psi_{i,-} \end{pmatrix} = L_M \psi = 0 \tag{2}$$

$$\rightarrow \begin{pmatrix} E-m & -\boldsymbol{\sigma}\cdot\mathbf{p} \\ -\boldsymbol{\sigma}\cdot\mathbf{p} & E+m \end{pmatrix} \begin{pmatrix} A_{e,+} e^{-ip^{\mu} x_{\mu}} \\ A_{i,-} e^{-ip^{\mu} x_{\mu}} \end{pmatrix} = L_M \begin{pmatrix} \psi_{e,+} \\ \psi_{i,-} \end{pmatrix} = L_M \psi = 0 \tag{3}$$

or

$$\rightarrow \begin{pmatrix} E-m & -\mathrm{s}\cdot\mathbf{p} \\ -\mathrm{s}\cdot\mathbf{p} & E+m \end{pmatrix} \begin{pmatrix} A_{e,+} e^{-ip^{\mu} x_{\mu}} \\ A_{i,-} e^{-ip^{\mu} x_{\mu}} \end{pmatrix} = L_M \begin{pmatrix} \mathbf{E} \\ i\mathbf{B} \end{pmatrix} = L_M \psi = 0 \tag{4}$$

In the above, Equation (2) governs unspinized particles, Equation (3) governs spin-1/2 particles after spinization from (2); and Equation (4) governs spin-1 particles after spinization from (2).

Implication of LHC Finding (If Real) for Prespacetime Model

Traditionally, a spinless particle is presumed to be described by the Klein-Gordon equation and is classified as a boson. However, we have suggested in [3] that Kein-Gordon equation is a determinant view of a fermion, boson or an unspinized particle and the latter is neither a boson nor a fermion but may be classified as a **third state of matter** described by the unspinized equation (2) above in Dirac form. The Weyl (chiral) form is given below:

$$\begin{pmatrix} E-|\mathbf{p}| & -m \\ -m & E+|\mathbf{p}| \end{pmatrix} \begin{pmatrix} a_{e,l} e^{-ip^{\mu} x_{\mu}} \\ a_{i,r} e^{-ip^{\mu} x_{\mu}} \end{pmatrix} = L_M \begin{pmatrix} \psi_{e,l} \\ \psi_{i,r} \end{pmatrix} = L_M \psi = 0 \tag{5}$$

The wave function of a fermion or boson is respectively a bispinor or bi-vector but that of the third state is a two-component complex scalar field. In the prespacetime model, the third state of matter is the precursor of both fermionic and bosonic matters/fields before fermionic or bosonic spinization.

Thus, it steps into the shoes played by the Higgs particle in the Standard Model and may be what has been seen at the LHC, if it is real. The third state of matter may have different behavior from that of either the boson or fermion which may be detectable at LHC.

References

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