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Analyzing so-called Point-Particles in Physics:

In general, in all analyses of physical objects, whether large or small, these objects are analyzed with mathematical points, which may for example be the center-of-mass of a larger massive object. For example, the speed of a car is "*almost*" always analyzed by the speed of the center-of-mass of the car along a certain direction. And because the structure of a car can in most cases be assumed to be completely rigid, i.e. without any change of the car itself, this analysis will in most cases be sufficient.

However, when analyzed objects are themselves moving with non-zero speeds of most parts of this object related to its center-of-mass, then the assumption of a rigid object will fail.

All cars are build from materials with periodic structures of atoms, molecules and surrounding electrons. And all these components of materials used to build a car cannot be described static, but shall always have to be described as harmonic-oscillating waves. So, an analysis of the center-of-mass of a car will only result in a first-order approximation of the searched for answer.

Of structured atoms into ordered molecules, such as wood, plastics, steel etc., it is obvious that they have to be described as harmonic oscillating interacting objects "electrons, photons, neutrons, protons, neutrinos, $W^{\pm}$,Z^{0}", because they should always be analyzed at temperatures $T > 0$ K, i.e. with phonons to be described as harmonic oscillations of the grid of the nucleons and surrounding electrons. I.e. all materials are always "on-the-move" with respect to arbitrary parts of these materials.

This at-once shows that objects build from atoms and molecules cannot be analyzed correctly using point-particles, so it is an in-correct first-order analysis that should actually not be used.

However, right now we haven't focused yet on Elementary Particles. Are we allowed to analyze elementary {leptons, quarks} of the 3 different Fermi-Families in our universe or all elementary Force-particles {photon γ, weak nuclear forces $W^{\pm}$,Z^{0}, so-called "gluons", and other combined mesons and the NOT EM-detectable i.e. "***invisible***" spin2 "dual" graviton} as mathematical point-particles!?!
At first sight, this seems a bit of a not-understood question. Because why wouldn't it be possible to analyze Elementary Particles as logic-analyzable Point-Particles!?!

But there are a view reasons why Elementary Particles cannot be analyzed as Point-Particles:

1. Elementary Particles posses energy of an ideal harmonic-oscillating wave proportional to a frequency. This harmonic oscillating wave not only oscillates in the direction of motion, but of-course also in the 2D-plane orthogonal to the direction of motion. This Only POSSIBLE 4D-Spacetime-like-energy is usually given by: $E_{oscillation} = h \cdot f = \hbar \cdot \omega$
   In 2003 Grigori Perelman together with mathematician Prof. Dr. Richard Hamilton proved in his published 3 papers the Poincaré-conjecture. In this proof, Grigori Perelman also showed that mathematical (i.e. closed) knots can only be analyzed in 3D-Space, i.e. the easy imaginable 4D-Spacetime of Special Relativity!
2. To make the description of elem. particles comply to the CAP, i.e. to also include the gravitational "dual" curvature of the analyzed 4D-Spacetime in the description of all possible Elementary Particles, one should describe them as ideal harmonic oscillators in the 2D-plane orthogonal to the described direction of motion. In this CAP required description of Elementary Particles, the usually called "intrinsic" spin is described mathematically explicitly as: $S = \hbar \cdot \mathbf{s}$. For elem. Bosons $\mathbf{s} \in \{1, 2\} \wedge$ for elementary Fermions $\mathbf{s} \in \{½, 1½\}$.
3. Fermions have to be described with Open-Boundary Conditions and Bosons with closed-BC. This explains why only fermions allow more families and only bosons can possess zero rest-mass.

4. In polar-coordinates (cτ, iρ, iθ, iz): $2<\rho> = \rho_{max} + \rho_{min} = 1½\rho_{max} = 3\rho_{min} = \mathbf{s}\cdot\varphi\cdot l_h > 0$, $\forall\{0 < \theta < 2\pi, -\infty < z < \infty \wedge -\infty < \tau < \infty\}$. And this implies that oscillating Elementary Particles cannot reach one-another at single-points, but must be described as melting together of two 2D-open sheets (fermions) into one closed oscillating 2D-tube (boson) and vice-versa.

Albert Einstein described GR curvature of Space-Time with the mathematical work of Bernard Riemann. Riemann used a so-called Riemann index 'n' which could take more positive integer values than the 4 of curved 4D-Spacetime. Actually, Einstein needed 10 indices: $1 \leq n \leq 10$ to describe curvature completely by linear mathematical means. However, Einstein did not like the Riemann-indices and always wrote final results in easy understandable (however curved) 4D-Spacetime of SR. This just requires contractions of all appearing dual Riemann indices.

The discovery of Grigori Perelman, that knots can only be described mathematically in 4D-Spacetime at-once ***only** allows **4D-Spacetime analyses of all fermions***. Harmonic-oscillating fermions have to be described with Open-BC. As a result all fermions always interact in all 3D-Space-like directions with at-least the spin2 gravitational-field. And this is why all possible fermions must posses ***Non-Zero** rest-masses*. Without fermions no direct-sources of force-fields described by harmonic-oscillating waves to be solved with closed-BC, so not a valid mathematical analysis of our reality, i.e. all possible analyses of our Theories Of Everything.

In the only analyzable 4D-Spacetime analyses, all possible 4D-Spacetime symmetries are described as a product of the direct sum of just two 4 x 4 tensors describing infinitesimal translations and rotations. A direct-sum can of-course also always be described as one summed 4 x 4 tensor. Any arbitrary transformation-tensor can now be given by just one transformation-tensor, given by:

$$T^{\mu\nu} = S^{\mu\nu} \oplus A^{\mu\nu} \tag{1}$$

With the most general expression of a "linear", i.e. SR, transformation-tensor operating on any possible 4D-Spacetime vector, i.e. a tensor of smallest degree 1 or any higher dimensional tensor. $S^{\mu\nu}$ is a symmetrical transformation-tensor with 10D-of freedom and $A^{\mu\nu}$ is an anti-symmetrical transformation-tensor with 6D-of freedom.

Transformation-tensor (1) uses a 4D-Spacetime analysis. The needed "dual" representation to analyze Elementary Particles is, the 4D-Energy-Momentum representation $p_\mu = (E, ip_\rho c, ip_\theta c, ip_z c)$. In a real Minkowski representation, using the Minkowski metric in real 4D-spacetime, the symmetrical use of imaginary-space $i = \sqrt{(-1)}$, is ***NOT*** used resulting in non-symmetrical different co- and contra-variant 4-vectors.
The fact that a symmetrical analysis of 4D-tensors of any degree $n > 1$ needs doubled 4D-spacetime degrees-of-freedom, i.e. Space-time $\in \mathbb{R} \rightarrow$ Space-time $\in \mathbb{C}$, is a direct result of the symmetrical spin2 "***dual***" gravitational-field.

Assume the wave-function of a symmetrical spin2 graviton is given by: $\Psi_2(x^\mu)$.
This spin2 function now has the following symmetry:

$$\text{Any rotation around the axis of motion of } \Delta\theta = (2\pi)/\mathbf{s}\ , \tag{2}$$

keeps the wave-function invariant. As a result of this symmetry (2) the wave-function of the spin2 gravitational-field described by "*invisible*" $\Psi_2(x^\mu)$ repeats itself "twice" by a complete rotation of 2π radians around the axis of motion. This is the basic reason why all characteristics of the spin2 gravitational-field have to be analyzed mathematically in a "***dual***" way!

When analyzing spin½ particles, we now at-once know that the spin½ wave-function must be rotated by 4π radians, i.e. two complete rotations, to obtain the same wave-function again. This explains mathematically why only half of the possibilities of spin½ fermions occurs in daily life. For example, neutrinos moving with speeds almost equal to the maximum speed-of-light, almost have conserved helicity, so most of the observed neutrinos have left-handed helicities and most "actually almost-all" anti-neutrinos posses right-handed helicities. But always massive spin½ neutrinos actually can NOT be described by a conserved helicity because they travel with speeds smaller than the speed-of-light c, but should be described by conserved Chirality, "*handedness*": Neutrinos only have left-handed chirality and Anti-neutrinos only have right-handed chirality.

The most general complete non-reducible transformation-tensor in the only possible 4D-Spacetime analyses (1) should of-course also be analyzed in a spin2 "dual" manner.

According to the CAP, **spin** should be analyzed mathematically explicitly. As a direct result of this compliance to the CAP, we can use spin-representations to express the most general non-reducible representation of transformation-tensor (1).

This shall at-once open our eyes to the beauty of any possible Theory Of Everything:

$$T^{\mu\nu} = (\text{spin } ½ \otimes \text{spin1}) \oplus (\text{spin } ½ \otimes \text{spin2}) \qquad (3)$$

The complete non-reducible representation of the 4D-Spacetime transformation tensor expressed completely non-reducible in possible Spin-Representations of Elementary Particles.
As a direct result of representation (3) the only possible spin-values of observable particles, whether elementary or compound, are now given by:

$$\mathbf{s} \in \{½, 1, 2\} \qquad (4)$$

So, the only possible spin-values of elementary particles are: $\mathbf{s} \in \{½, 1, 1½, 2\}$ (5)

In this way one can deduce that elementary quarks must be described as spin1½ and not as not-understood "intrinsic unstable" spin½ particles with additional so-called iso-spin of also spin½. Because, if quarks would have been spin½ elementary particles, they would according to spin-representation (3) also be allowed to be observed alone as stable particles without an always surrounding connecting sea-of-quarks.

So, as a direct consequence of compliance to the spin2 CAP, unstable elementary quarks must be described as harmonic oscillating waves in the 2D-plane orthogonal to the direction of motion with spin1½ without incorrect assumed so-called iso-spin½!

All quarks are described mathematically by a CAP compliant anti-symmetrical SU(3) gauge-symmetry. So,quarks must be analyzed mathematically as harmonic oscillating waves in the 2D-plane orthogonal to the direction of motion of the harmonic oscillating identity with open-BC. The conserved chirality of any quark must be positive or negative spin1½ in the direction of motion and because the spin is 3/2, all quarks can posses both left-handed and right-handed chirality. This is usually explained not-understood in the SU(3) gauge-symmetry QCD. Where, one should realize that gluons cannot be elementary spin1 bosons, but must consist of quark anti-quark combinations with the quark with a color-value equal to the color-value created by the quark and the anti-quark with a color-value of a quark in a baryon which is changed to the color of the combined quark. So the color-value in the range RGB can be exchanged from one color to another color by a so-called combination of 2 quarks in a quark anti-quark combination with two different color-values.

I.e. gluons must be massive combined quark anti-quark combinations with the colors of the particle anti-particle combinations any of the 9 possible values (RGB) ⊗ (RGB) in which an embossed R represents a quark and engraved G represents an anti-quark of any of the 3 possible color-values.

This now results in the following Elementary Particles in our 3 Fermi-Families universe, completely analyzed in a "***dual***" spin2 gravitational-field CAP-compliant manner:

1. Fermions: Leptons consisting of particles, anti-particles and their third total-uncharged neutrino's and spin1½ quarks describing all 4 different baryonic constituents available in every Fermi-Family, yielding:
   (3 + 4) x 3 = 21 different Elementary Fermions.
2. Bosons: Now, just one species for every degree of freedom of the analyzed symmetry-group: The mixed by the Weinberg-angle U(1) ⊗ SU(2) spin1 massless photon massive uncharged Z^0 massive spin1 Z-boson and the two charged $W^{\pm}$, also massive W-bosons. So, we have $\{\gamma, Z^0, W^{\pm}\}$ four different anti-symmetrical spin1 related bosons and just one symmetrical transformation-tensor (3) related spin2 graviton: Five different elementary bosons.

The total amount of different Elementary Particles particles in an universe with N different Fermi-Families is now easily given complete in a non-reducible manner by:

$$\sum(\text{Elementary "Fermions \& Bosons"}) = N \cdot (3+4) + 5 = 7N + 5 \text{ different Elementary Particles} \quad (6)$$

In these simple ***linear*** mathematical analyses of Theoretical High Energy Physics, all difficulties related to the mathematical still not-understood Standard-Model are explained from a simple explanation of spin2 induced "***dual***" curvature of the only possible 4D-Spacetime analyses. Required compliance to Einstein's CAP requires all possible Elementary Particles (6), either Fermions called "matter"-particles or Bosons called Force-particles, to be described as harmonic oscillating waves of mathematical points in the 2D-plane orthogonal to the described direction of motion. In this way all possible characteristics of all possible Elementary Particles can be explained completely. The usually analyzed "intrinsic" spin in SR QFT will now be re-written as a mathematical property needed to explain why Elementary Particles themselves have to be described as extended harmonic oscillating waves to rewrite everything in a required spin2 "***dual***" manner. This at-once shows why any mathematical analysis of our everyday experienced reality cannot use a mathematical point-analysis, but all constituents of any possible Universe should always be analyzed as harmonic oscillating waves orthogonal to the described direction of movement.

So, mathematical analyzed points to describe motion/movement of any possible analyzed object, should be described as extended harmonic oscillating waves in the 2D-plane orthogonal to the analyzed direction of motion. This at-once shows why mathematical point-analyses to analyze dynamic changes of objects are just first order approximations and CAP in-correct at the deepest level of "microscopic" Quantum Mechanics!