Monster Symmetry and Scalar Theory, Conformal Gravities: Birth of Symmetries from Euclidean Space

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Abstract

A physical theory combining the cosmological inflationary period and the low energy quantum vacuum utilizing global structure involving the Monster symmetry and the Standard Model. The placement of supergravities in the hierarchies are speculated upon.

This is a continuation of ‘Weak Gravity Unification with the Quantum Vacuum’ program.

In prior presentation:

Monster Group is a ‘hidden symmetry’ and Monster Symmetry elements represent a ‘gravitational amplitude’ of the quantum vacuum ***potential*** (maybe not even actualized or manifested but as a symmetry source).

The elements can be realized as a ‘double copy’ thus with tensorial and scalar elements.

The structure is a *Scalar Tensor Theory* which at higher vacuum/gravitational energies move into conformal gravity theory including up to *Supergravity Theories*.

The theoretical construction is:

$$16\,\phi \frac{m_P^2}{m_{e^+e^-}^2}\,\frac{(\phi\pi^+)^2}{m_{e^+e^-}^2}\,\frac{(\phi\pi^-)^2}{m_{e^+e^-}^2} = \text{Monster Group Order of Elements}$$

$$16\,\phi^5\; m_P^2\,\frac{(\pi^{+-})^4}{m_{e^+e^-}^6} = \text{Monster Group Order of Elements}$$

Particle-antiparticle elements of the Higgs and Coloumb branch are the charged pions (boson) π^{+-} and the electron-positron $m_{e^+e^-}$ pair. Interestingly, the pi-meson is the lightest hadron and the electron is the lightest lepton. (m_p is the Planck mass)

The scalar ϕ includes the gravitational action with electromagnetic handshaking (modulation) enabling graviton ensembles to have a Lorentz action like the photon (following Maxwell). This is a form of Kaluza-Klein gravity. See past presentations.

Its form is:

$$\phi = \sqrt[2048]{\frac{1}{\sqrt[65536]{\sqrt[4]{8e}\,\alpha^4\, e^{\pi/4\alpha}\,\alpha^3\sqrt{2}\,{M_p}^2} - 1}} \quad \text{or ,}$$

$$\phi = \sqrt[2048]{\frac{1}{\sqrt[65536]{\frac{hc}{2\pi G m_p m_n}\frac{\sqrt{2}\,{M_p}^2}{\alpha}} - 1}}$$

Both low energy forms where $m_p m_n$ are the proton neutron mass of chemical/nuclear potential in our low energy Universe. (α is the fine structure constant)

The scalar ϕ has the form of the Bose-Einstein distribution:

$$f(E) = \frac{1}{e^{E/KT} - 1}$$

Though a more complexified form this implies that the scalar is related to the graviton distribution. The presence of the fine structure constant suggests a Kaluza-Klein action. Also, Newton constant in the denominator is somewhat similar to Brans-Dicke Scalar-Tensor theory

Because of the scaling action of the Newton constant the theory obeys *Mach's principle.*

Almost everything in the vacuum equation suggests *Scalars* except for the Planck mass which stays invariant.

The pseudo-scalars π^{+-} and the scalar ϕ have a stickiness which suggests a coupling particle (but what?). The relation $\phi\pi^{+-}$ is invariant no matter the running vacuum/gravitational energy. (See prior presentations).

It follows that $\phi\pi^{+-} = 140.0502 \text{ MeV}/c^2$ which is slightly larger than its PDG value of $139.57039 \text{ MeV}/c^2$

This is due to the scalar ϕ exhibiting close to the unity value 1 in the flat Minkowski space of our low energy place in the vacuum. The 'scalar coupled pseudo-scalar' energy value stays close to the mass gap value of the Goldstone boson no matter the vacuum/gravitational change. Going up the energy gravitational scale the pion mass gets smaller and is the result of the 'negative beta function' while the scalar ϕ gets larger due to more space-time curvature and vacuum energy.

As the pi-meson has a smaller mass going up in energy its coupling strength reduces and the quarks become asymptotically free (‘er). This may be due to entering a higher dimensional space (e.g. going from 4D to 5D). The light lepton antiparticle pair $m_{e^{+-}}$ will increase in mass with increasing vacuum and gravitational energies due to positive beta function.

The isospin symmetry *SU(2)* flavor symmetry *SU(3)* (with pion exchange) will change the $m_p m_n$ chemistry/nuclear potential as the energies climb toward neutron star type gravitational fields ending as $m_{nn} m_{nn}$.

If we use 2018 Codata:

$$16\,\phi\,\frac{m_P^2}{m_{e^+e^-}^2}\,\frac{(\phi\pi^+)^2}{m_{e^+e^-}^2}\,\frac{(\phi\pi^-)^2}{m_{e^+e^-}^2} = 8.0798329 \times 10^{53}$$

If you consider that the fine structure constant α runs (which it does). There is an identity based upon,

$$\phi\pi^{+-} = \frac{m_{e^+e^-}}{\alpha}$$

$$16\,\frac{{m_P}^2}{m_{e^+e^-}\,\pi^{+-}}\,\frac{1}{\alpha^5} = 8.0798329 \times\ 10^{53}$$

$$16\,\phi\,\frac{m_P^2}{m_{e^+e^-}^2}\,\frac{(\phi\pi^+)^2}{m_{e^+e^-}^2}\,\frac{(\phi\pi^-)^2}{m_{e^+e^-}^2} = 16\,\frac{m_P{}^2}{m_{e^+e^-}\,\pi^{+-}}\,\frac{1}{\alpha^5}$$

Since the Newton constant is the most uncertain of the Codata parameters (and PDG pi-meson) the scalar $\phi = 1.003438218$,

$$G = 6.674013\ \times\ 10^{-11}\,m^3kg^{-1}s^{-2}$$

The current Codata value is ,

$$G = 6.67430\ \times\ 10^{-11}\,m^3kg^{-1}s^{-2}$$

The new G value is also figured from the Planck mass in the equation using the very good fine structure constant (Codata 2018) and setting it to equal the Monster number of elements.

$$16\ \frac{{m_P}^2}{m_{e^+e^-}\ \pi^{+-}}\ \frac{1}{\alpha^5} = 8.0801742479\ldots \times\ 10^{53}$$

From the new G we obtain the scalar value for the equation using the pi-mesons by setting it to also equal the Monster number of elements.

The scalar determined from this,

$$\phi = \sqrt[2048]{\frac{1}{\sqrt[65536]{\sqrt[4]{8e}\,\alpha^4 e^{\pi/4\alpha}\,\alpha^3\sqrt{2}\,{M_p}^2} - 1}}$$

ϕ =1.003438219 that is assuming that,

$$G = 6.6740132 \times 10^{-11}\, m^3 kg^{-1} s^{-2}$$

We can do the same for our scalar pseudo-scalar form,

$$16\,\phi \frac{m_P^2}{m_{e^+e^-}^2}\,\frac{\left(\phi\pi^+\right)^2}{m_{e^+e^-}^2}\,\frac{(\phi\pi^-)^2}{m_{e^+e^-}^2} = 8.0801742479\ldots \times 10^{53}$$

$$\phi = \sqrt[2048]{\frac{1}{\sqrt[65536]{\frac{hc}{2\pi G m_p m_n}\frac{\sqrt{2}\,{M_p}^2}{\alpha}} - 1}}$$

$\phi = 1.003438219$ again assume that ,

$G = 6.6740132\ \times 10^{-11}\, m^3 kg^{-1} s^{-2}$

We can also configure the scalar value near to the surface of a neutron star if we have a belief in a certain ‘number theoretic form’.

$$e^{2\pi\sqrt{163}}\,70^2 =$$

$$337736875876935471466319632506024463200.0000008023\ldots$$

It is close to a physics form which is also a quadratic,

$$\frac{hc}{\pi G m_{nn}^2} = 3.37698 \times 10^{38}$$

$$\frac{hc}{\pi G m_{nn}^2} = \frac{e^{2\pi\sqrt{163}}\,70^2}{2}$$

And since , $\frac{hc}{G}$ is invariant

See prior presentation

$$m_{nn} = 1.67486829 \times 10^{-27} kg$$

The neutron mass (and hadrons) get smaller as the vacuum energy and curvature increases. The coupling strength of pions also becomes less (negative beta function).

In past presentation the it was wrongly assumed that the neutron mass increases with the vacuum energy increase. It does not, as the gravitational coupling constant increases with the vacuum and curvature increase the masses in the denominator have to decrease (my bad). But, it is rightly assumed that the Newton constant runs and gets larger like the gravitational coupling constant. The running of the Newton constant is hard to see as the relation $\frac{hc}{G}$ is invariant and thus Planck mass/energy stays invariant.

Another slight change from prior presentation is the introduction of the Planck mass squared directly into the scalar equation, introducing a dimensionality of mass into an otherwise dimensionless equation form. Although this could be wrong it enables all equations to correctly calculate the Monster number of elements 5 or 6 decimal places with all the other parameters using Codata 2018 and PDG. More work is required to rectify or explain this or Nature accepts dimensional change to mass-energy. Maybe this is similar to the asymptotic freedom of quarks as they transition to higher dimensions? The fixed Planck mass introduced is $2.176481 \times 10^{-8} g$. Compare to Codata 2018 $2.176434 \times 10^{-8} g$.

High energy scalar forms at or near neutron star surface (all equivalent).

$$\phi = \sqrt[2048]{\frac{1}{\sqrt[65536]{\frac{hc}{2\pi G m_{nn} m_{nn}} \frac{\sqrt{2}\, {M_p}^2}{\alpha_{nn}} - 1}}}$$

$$\phi = \sqrt[2048]{\frac{1}{\sqrt[65536]{\frac{\exp(2\pi\sqrt{163})70^2}{2} \frac{\sqrt{2}\, {M_p}^2}{\alpha_{nn}} - 1}}}$$

$$\phi = \sqrt[2048]{\frac{1}{\sqrt[65536]{\sqrt[4]{8e}\, \alpha_{nn}^3\, e^{\pi/4\alpha nn}\, \sqrt{2}\, {M_p}^2 - 1}}}$$

For our higher energy scalar forms for neutron star gravities ~2⊙ we obtain a scalar value slightly larger ($m_{nn}m_{nn}$) than our low energy ($m_p m_n$). This calculates the Monster number of elements to be nearly the same value as the low energy value.

$$\phi = 1.003438286 \text{ for } m_{nn}m_{nn}$$

$$\phi = 1.003438218 \text{ for } m_p m_n$$

The higher energy value also has a slightly larger *fine structure constant* value.

$$\alpha_{nn} = 0.0073466...$$

This value obeys a positive beta function as the energies and curvature get larger.

The vacuum energy difference between the $m_p m_n$ and $m_{nn} m_{nn}$ potential is not that great but the gravitational fields of $m_{nn} m_{nn}$ is more extremal to our experience. The slightly larger α also indicates that the electron-positron mass pair in the higher energy equation will have a larger mass (+ beta function). Additionally, the pi-meson mass obeys the negative beta function and is a smaller mass.

$$m_{e^{+nn}e^{-nn}} = 1.8218768426\ \times 10^{-30}\ kg$$

$$\pi^{+-}{}_{nn} = 2.488071948 \times 10^{-28}\ kg$$

At the neutron star level minor changes occur in our masses and vacuum energies. Not extreme changes to the parameters but extremal gravity begins. After the neutron star densities black holes form, the scalar can go exponential depending on mass. The gravitational curvature can become *beyond huge* compared to neutron star gravities (no comparison).

If we let the denominator Coloumb branch run to the Planck mass:

$$16\,\phi\,\frac{(\phi\pi^{+-})^4}{m_P^4} = \textit{Monster Group Order of Elements}$$

Since $\phi\pi^{+-}$ stays invariant,

$\phi = 2.9528 \times 10^{132}$ suspiciously close to 10^{120}

Let's look at the second and third generation leptons:

Running the denominator Coulomb branch to the muon value for its anti particle pair, (obtain)

$$\mu^{-}\mu^{+} = 3.767063254 \times 10^{-27}\ kg$$
$$\pi^{+-} = 3.1839 \times 10^{-48}\ kg$$
$$\phi = 7.8414079 \times 10^{19}$$

Running the denominator to the tau anti particle pair,

$$\tau^{-}\tau^{+} = 6.33508 \times 10^{-27}\ kg$$
$$\pi^{+-} = 1.40755 \times 10^{-48}\ kg$$
$$\phi = 1.7737368 \times 10^{21}$$

The scalar is exponential at these two different energies and the meson masses are very very small. Going up in vacuum energies and stronger gravity it does not appear for these two points to be transitional or actually meaningful. We actually need the D_s and the $T_b{}^{+}$ mesons to match the numerator Higgs branch values for second and third generation hadrons.

This means that $\phi\pi^{+-}$ change to ϕD_s will not remain invariant. If,

$$16\,\phi^5\, m_P^2\, \frac{(D_s)^4}{\left(m_{\tau^{+-}}\right)^6} = \text{Monster Group Order of Elements}$$

$$D_s = 3.509116 \times 10^{-27}\, kg \qquad \phi = 1149.75 \ldots$$

Then, $\phi D_s = 4.034606121 \times 10^{-24}\, kg$

Compare invariant value :

$$\phi\pi^{+-} = 2.49662665 \times 10^{-28}\, kg$$

We will not arrive at an exact value for the tau transition point as there is no current energy value for the $T_b^{\;+}$ meson determined by PDG.

Where do the transition points occur for the 3 generations ? Not, in our running vacuum up to neutron star/black hole end point in our current time.
If we look at the equation,

$$16\,\phi \frac{m_P^2}{m_{e^+e^-}^2} \frac{(\phi\pi^+)^2}{m_{e^+e^-}^2} \frac{(\phi\pi^-)^2}{m_{e^+e^-}^2} = Monster\ Elements$$

We see that running the scalar ϕ towards unity 1 the hadrons get larger and the leptons get smaller. At $\phi = 1$, the pi-meson mass has the value,

$\pi^{+-} = 140.0502\ \mathrm{MeV}/c^2$

$\pi^{+-} = 140.0502\ \mathrm{MeV}/c^2$ at $\phi = 1$

In our current time running vacuum this mass value is established as the invariant $\phi\pi^{+-}$ where $\phi > 1,$ If the equation $\phi < 1$, the hadrons continue to get larger and the leptons get smaller. This occurs as the gravitational fields get weaker. However, this appears to be running backwards in time and so there is more to it than that.

In 2000 the *Bogdanov brothers wrote a paper whereby at the beginning time $t = 0$ a fluctuation involving gravitational instanton occurred on a Euclidean space topology whereby a Euclidean spacetime with signature ++++ evolved and continued to a Lorentzian spacetime with signature +++- .

With the scalar $\phi > 1$ in the equations the space time is Minkowski (+++-). It is suggested the scalar $\phi < 1$ involves beginning inflation from $t = 0$ and that gravity is repulsive and very weak throughout inflation until certain transition points which are quantized are finished prior to formation of hadrons.

* Topological field theory of the initial singularity of space time

This would imply that there is an asymmetry of how the vacuum runs between the inflationary (cosmological) time at $\phi < 1$ and after our low energy (bottom of the hill) vacuum and attractive gravity $\phi > 1$ was established (at about 10^{-6} to ~ 1 seconds) after exponential inflation.

If true where does supergravity lie?

1. Thermal event in Euclidean space (point)
2. Clocks start (with thermodynamics)
3. Imaginary time direction towards Lorentzian spacetime. Beginning of Euclidean spacetime (++++)
4. Euclidean spacetime evolves to Minkowski spacetime (+++-)

Hadrons are larger (leptons are smaller) in cosmological time than after the low energy vacuum and mass gap were established.

As gravity is very weak and repulsive running down from inflation the gravitational vacuum is fed energy from the large hadrons (unstable) as they get smaller going to the low energy (bottom of hill) near the scalar value $\phi \sim 1$.

At the point the inflationary momentum reaches at or near unity scalar $\phi = \sim 1$ a transition occurs in a quantum jump to the 3rd generation (due to inflationary momentum as an excitation). This includes the $T_b^{\;+}$ meson and the tau lepton. Extrapolating from the 2nd generation (where the scalar $= 1145.75..$) the scalar $\phi \sim 2000$ or about for the 3rd generation shell. Note that at these transitions gravity has become extremely strong but not exponentially so. At this transition level the distribution of matter is diluted but the strong gravitational curvature (fluctuations) attracts matter into clumps.

With the excitation of momentum tapering off the next quantized level at the 2nd generation transition occurs.

$$D_s = 3.509116 \times 10^{-27}\ kg \qquad \phi = 1149.75 \ldots$$

Note, that in the transition jumps of 3rd and 2nd generations ϕD_s and $\phi T_b^{\ +}$ are not invariant.

Gravity is still very strong but getting weaker going down the transition toward the 1st generation where $\phi \sim 1$. Is supergravity any where?

An exact supergravity may exist where the numerator and denominator masses are the same. Obtaining the mean of the electron and pion masses, $1.5050483 \times 10^{-29}\ kg$ and multiplying this by a factor of $2\times = 3.01009 \times 10^{-29}\ kg$

At this point (if it is supergravity) the superpartners will be equal and supersymmetry exact. The scalar at this point is still strong $\phi = 157.4$ but again not exponential. It might be assumed that supergravity occurs on the cosmological inflation side as well but superpartners may not be equal (again where?).

A physical theory has been presented which may or may not stand up to a measure of truth or correctness. What do we have,

1. A scalar tensor theory in 5 dimensions which moves into conformal gravity combined with the Standard Model (Coleman-Mandula theorem does not apply)
2. A theory (only a theory) of the connection of our low energy 5D World with the beginnings of cosmological time at $t = 0$.
3. A theory that is global in nature, which includes both lower and higher energy limits of supergravities which are the lower limits themselves of quantum gravities.
4. Some direct connections of ‘number theory’ near higher excitations of the quantum vacuum/gravitational field.

More work to be done if it has measure,

1. What are the *field equations* for the theory.
2. How to obtain local quantum gravities.
3. What are the partition functions of the theory?
4. Are the three generations involved with the inflationary momentum as an excitation?
5. Where are the mistakes in the theory if it is viable?

If it is not anything, what is it? (garbage)

At the least it should be amazing that,

$$16\,\phi \frac{m_P^2}{m_{e^+e^-}^2} \frac{(\phi\pi^+)^2}{m_{e^+e^-}^2} \frac{(\phi\pi^-)^2}{m_{e^+e^-}^2} = 16\ \frac{m_P{}^2}{m_{e^+e^-}\ \pi^{+-}} \frac{1}{\alpha^5}$$

And that both identities appear to,

$$= \mathit{Monster\ Group\ Order\ of\ Elements}$$

Taido Shufu 1776-1836

"… though the brain is immersed in darkness and enshrined in ignorance its perimeter, wherever that may be, has shores lapped by trickling light."
Author Unknown