From Elementary Particles to Gravity Control

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Abstract

The quark model for baryons within the Standard Model yields gravity as a correction to the Electromagnetic interaction. It leads to a tangent bundle Coulomb Law, orientation dependent, with direction dependent coupling term besides the usual electric force, which is responsible for gravitational attraction.

Hence Gravity is not a fundamental force, has a quantum origin and can be controlled by dynamically orienting the spin directions.

1 On the Standard Model

The Standard Model contains three of the four fundamental interactions. Gravity is considered too weak to matter at the level of elementary Particle Physics, hence neglected. But the simple fact that it exists is a qualitative feature showing the limitations and mandatory inadequacy of the SM, since it has no mechanism to possibly produce such an interaction.

EM, weak and strong force were studied independently and the theories are only formally related via distinct gauge groups. A search for a unifying gauge group containing $U(1), SU(2), SU(3)$ are labeled as Grand Unified Theories.

The real progress will happen when understanding conceptually that quarks are not independent particles, confined by the strong force, but their states form a 3D frame of a baryon (mesons are a different matter), each quark vector belonging to $SU(2)$ and that $SU(3)$ is a symmetry group of the frame itself (see L.I. and also Z...).

In this article we restrict to the electric aspects of baryon interactions, especially for protons and neutrons. A Coulomb Law in the tangent bundle is envisioned, relating the fractional charges of two such baryons. The key case is that of two interacting neutrons: total charge being zero, the resulting force is responsible for Gravity. The weakness of Gravity comes from the random orientation of spin directions, yielding a G-force as an average over orientations, which depart slightly from random orientations when several masses are considered, bracking the isotropy of "space" e.g. for two bodies defyning an axis joining their centers of mass.

2 A Tensorial Coulomb Law (TCL)

2.1 Large vs. Small Scale Electric Charges

At simplified level, a neutron $n(-1/3, -1/3), +2/3$ can be roughly approximated as defining a Coulomb field $n^0_{Cl}(-1/3, -1/3, -1/3)$, i.e. isotropic, with a polar correction $g(0, 0, +1)$, in the positive direction of the (say) 3rd axis.

These axes of a baryon's quark frame correspond to the R, G, B colors in the absence of an ambient field, e.g. a macroscopic magnetic field in the Lab. The baryon's 3D-frame is a local frame, with vectors correlated to the ambient space via a gauge group $SU(3)$.

The distance dependency of the TCL is as usually proportional to $1/r^2$.

The charge of a baryon is a 3D-matrix which when diagonalized is $(+2/3, -1/3, -1/3)$, defining its fractional charges. This is a consequence of directional dependence of the force between two interacting 3D-frames.

Recall that Coulomb's Law is "just" math: a conserved potential in 3D is a harmonic function $\Delta\phi = 0$ (Laplace eq.); in 3D this is proportional to $1/r$ (a fundamental solution of Poisson equation).

The corresponding force is proportional to the number of elementary charges and inverse proportional to $grad(1/r)$. Once the unit of charge is chosen, the coefficient of proportionality results (Coulomb's constant): $F = k_C n_1 n_2 q^2/r^2$. The Laplacian is determined by the metric and requiring isotropy: $\Delta = (d + d^*)^2$. The presence of a gauge field A (e.g. EM vector potential) replaces d by $d + A$.

Here the electric charge structure of a baryon breaks rotational symmetry.

2.2 Relation between TCL and Strong Force

Formally, the interaction is comparable with the Strong Force, except it is not present for inter-quark interactions within a baryon. In the qubit model of the Standard Model, quarks are not independent particles; a baryon is rather a 3D-body.

This suggests that the attraction of nucleons within a nucleus attributed to the strong force is related to electric repulsion. The unified in the Electroweak Theory rather refers to changes of flavors, the geometry of the baryons, in the sense of Felix Klein. But the transition from small scale to large scale of electric interaction, from matrix charges to point charges suggests that the electroweak theory can be unified with the Strong Interaction via the TCL.

Again, $SU(3)$-symmetry group is rather the symmetry of a baryon frame and controlling the TCL. Its representation theory describes the linearized geometries, beyond the generic Platonic groups geometries that define the flavors of quarks.

Hence at small distances the "strong" force is not so strong after all, being derived from a tensorial charge matrix extending the pointwise charge of EM. It is strong enough to keep together protons and neutrons in a braid-like fashion, with contributions from the negative electric part of protons and neutrons.

2.3 QC / Network like model of TCL E force at small distances

A neutron-proton pair has three $+2/3$ and three $-1/3$ fractional charges, forming a network with outward lines of force and inward loops. At effective distances and directions between these sources in such an extended object like a baryon are essential to yield an almost stable configuration in such a system (e.g. He nucleus).

A network model of electro-strong force at small distances is worth considering. Total charge will yield the open outward lines (e.g. $+1$ in neutron-proton pair) while the othe fractional charges may close on themselves like closed strings and hold the system together.

2.4 Quantum Space-Time

The primary object of a unified field theory is the Hopf bundle $U(1) \to SU(2) \to S^2$. It allows to model a periodic local time (Einstein's clock), the 3D pixel of quantized space, as well as the qubit / quarks state space $SU(2)$. Beyond SM should unify the three "fundamental " interactions not via a larger gauge group but rather via a new more complex structure: Hopf fibration. In this way the role of $SU(3)$ becomes also apparent as a symmetry group of a 3-quarks frame in $SU(2)$ qubit space (related to T, U, V vectors).

A Quantum Space-Time is a network of such Hopf bundles with 3D-frames as quark frames of baryons and mesonic chaneles as QC-morphism.

2.5 Electroweak Theory and Gravity

One could venture saying that break of rotational symmetry in the Electroweak Model yields a correction term responsible for Gravity. This may conceivable be related to Weinberg angle, embedding EM's $U(1)$ gauge group into $SU(2)$ gauge group of quark state space (qubits).

A break of symmetry results from postulating a discrete gauge group: from $SU(2)$ to a Platonic symmetry (binary point group in 3D, its double).

2.6 Structure of electric charges and fields

Weather the passage from continuous to discrete should allow for a discrete distribution of fractional electric charges, as sources at nodes of an orbit of a point under the action of a Platonic group of symmetry: vertices of Platonic solids.

The three fractional charges should have axial symmetry, hence there should be six antipodal sources and sinks on a baryon.

The indexes of the corresponding electric fields are of type $(+,+,-)$ and $(+,-,-)$ with axial symmetry, a superposition of Coulomb, isotropic electric field of index $(+,+,+)$ and $(-,-,-)$ *and* Gravitational, unipolar directional, of index type $(0,0,+)$.

2.7 Quark flavors and Platonic symmetries

Note that the 1st generation of fermions is governed by tetrahedral symmetry, in a direct correspondence model of quark flavors and Platonic symmetry groups. Yet the mixture of flavors, even u and d within the 1st generation, could be due to an interplay between the tetrahedral symmetry and cubical symmetry, since the cube has two natural tetrahedra within it.

This may also be related to the beta decay of neutron, from a more symmetric state ($SU(2)$-invariant) to $U(1)$-invariant once an interaction with the neutron defines a preferred direction in space.

3 Quantum Gravity

Gravity has thus a quantum origin, hence we call it *Quantum Gravity*, although it has nothing to do with an elusive quantization of Einstein's theory of gravity. In fact QFT is an "upgrade" of GR, as scketched below, and GR and QFT need not be "unified": QFT in principle may model Gravity as a gauge interaction via gravitons of spin 2.

3.1 Quantum Gravity and General Relativity

Einstein's equation is a deformation of the Euclidean metric due to the momentum-energy tensor, yielding the Ricci tensor describing the local behaviour of geodesics. Such a use of Deformation Theory of the metric, hence of the Laplace-Poisson Equation, implying a deformation of the fundamental solution, is a *precursor* of QFT with its use of propagators to to *explicitly* stipulate the fundamental solutions as Green functions.

Reiterating, GR needs no "quantization" of Space-Time; the elimination of the later as non-physical was one initial motivation of Einstein, following Mach's phylosophy. Einstein was in fact disappointed that an empty ST exists, like Schwartschild solution of his equations.

3.2 Gravitational attraction

The spin orientation of nucleons in a nucleus is random. Hence the orientation of the g-term is random too.

The interaction of two neutrons for instance, exhibiting only the g-term of index type $(0,0,+)$ is orientation depending and the corresponding energy is minimized when the two directions of two neutrons point from one to the other. Since the orientation is coupled with that of the spin [1]

When two bodies interact, the axis determined by their center of masses breaks the $SO(3)$ symmetry to a $U(1)$-symmetry and the g / spin directions distribution acquires a bias towards one another. The corresponding energy change leads to a gravitational potential. The conservation of energy mandates that this energy is acquired by other degrees of freedom (The g-direction is coupled with the spin direction).

3.3 Controlling Gravity

Affecting the spin will affect the g-direction, hence the G-force between two bodies. Dynamic Nuclear Orientation is the process where a microwave radiation is used to pump the spin of electrons at Larmour frequency (Electron Precession Resonance), and via orbit-spin coupling, to change the spin

[1] We conjecture that spin is correlated to this polar axis g, i.e. in a magnetic field of a Stern-Gerlach experiment the polar g direction may be conjectured to align with the magnetic field, hence curving the trajectory "up" or "down" relative to a "vertical" magnetic field. N.B. the 3 vs. 6 fractional charges models, as alternative, and their relation to the double cover, remains to be debated; spin is unipolar ...

/ orientation of the g-term. This changes the Gravitational attraction between the radiated body and a 2nd body, e.g. Earth.

Alzofon experiments confirmed the effect, although his theory was stated as a thermodynamic theory (Laplace equation again) with the gravitational potential as an analog of temperature. Thus the G-potential was "cooled" via DNO.

4 Conclusions

Quark structure of protons and neutrons mandate a modification of the electric force field at quantum scale, which is responsible for Gravity. This correction term is direction dependent, given by a tensorial version of Coulomb Law.

Gravity is a result of a bias in the otherwise chaotic orientation of the g-correction term.

References

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