# Synopsis of Main Theories of Gravity

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September 22, 2022

**Abstract**

There are many Theories of classical and quantum gravity. We summaries a few points regarding the Theories of Gravity by Newton, Einstein, Alzofon and Ionescu. The first two are "static", implying that Gravity is a fundamental interaction, while the later two are "dynamic", deriving Gravity from the elementary particles structure and predicting Gravity Control.

Further explanations are provided in other dedicated articles.

That Gravity is a quantum effect is also advocated by other researchers on the SM with discrete symmetry groups [7], p.3.

## 1 Introduction

Newton and Einstein's Theory of Gravity are static": the position of sources, i.e. matter, determine the field in Newton's theory and space-time curvature in Einstein's General Relativity. Moreover, in both theories Gravity is a fundamental force.

Alzofon's Theory is the first theory of Gravity as a byproduct of quantum phenomena and implying Gravity can be controlled.

The author's theory of Gravity derives Gravity as a byproduct of quark structure of baryons, the lower energy levels represented by proton and neutron.

## 2 Static Gravity

### 2.1 Newton's Theory of Gravity

Newton set-up a framework for dynamics using DE, known as Newton's Laws. The 2nd law $ma = F_c$ allows to determine the trajectories of a "probe" in a force (field) of an interaction defined by a constitutive law specifying $F_c$. In general, a conservative force has the generic constitutive law $F_c \sim q_1 q_2/r^2$, where $q_i$ are the sources of the field, called charges, e.g. electric charges for electric field and $\sim$ denotes proportional (same fundamental constant, units dependent, e.g. Faraday's constant or universal constant of gravity).

The possible cases for (real) charges are 3: $0, +, -$ together with the "rules of signs: same sign attracts or repels.

This leads to Poisson equation for the associated potential, with the Green function as the fundamental solution.

In any case, the theory is *static*: positions determine the outcome.

### 2.2 Einstein's Theory of Gravity

It is a theory that uses deformation theory on top of Newton's approach, where matter deforms the metric (tensor energy-momentum deforms the metric in a way compatible with the Ricci tensor):

$$Ric_{ij} = \frac{1}{2} R \ g_{ij} + kT_{ij}.$$

This in turn deforms the Laplacian and its Green function, the fundamental solution of the corresponding Poisson equation.

Viewed this way, GR is a precursor of QFT with its propagator ("Green function") as primary concept, determining the strength of the interaction relative to the standard metric, instead of providing its deformation.

It is again a static theory: the configuration of charges, i.e. matter, essentially determines the outcome (momentum contributes as a very weak correction ... unless we get close to a black-hole, possibly rotating etc.).

Gravitational waves are extremely week and secondary in the theory, and do not reflect the actual physical experiments in the Lab, with moving masses, like a pendulum for instance, where a phenomenon similar to induction has been measured [8].

# 3 Dynamic Gravity

Dynamic gravity refers to the presence of additional phenomena when masses are in motion, e.g. [8]. This can be modeled classically using a variation of Maxwell's equations, prescribing curl and div (flow of a generic vector field within the group of conformal transformations of space or space-time) with appropriate signs for the charges and charge-charge rule of signs.

The term *Quantum Gravity* may be misleading as well it is used in connection with quantization of Space-Time, starting from General Relativity as a framework.

Here Dynamics / Quantum Gravity refers to the dependence of the interaction on the spin orientation of the elementary particles involved, essentially the proton and the neutron; this is done by lifting the Coulomb/Newton Law from configuration space to its tangent bundle. Then changing relative directions of spins will change the Gravity, a component of the long range $U(1)$-component of the quark field. For a neutron there is no other electric component, as there is for the proton. Note that in the Hydrogen atom the total charge of the proton is screened by the electron cloud, but the lack of isotropy of the fractional electric charges of the quarks, is not; the long range contribution to an interaction between such to atoms is their gravitational attraction, corresponding to the minimal energy level spin direction dependent.

## 3.1 Alzofon's Theory of Gravity

Frederick Alzofon worked on a Unified Field Theory starting from Einstein's Special Relativity. Inspired (or puzzled) by the UFO phenomenon [1] to devise a theory of Gravity based on quantum vacuum fluctuations of pairs of particle-antiparticle, to explain the flight behaviour of UFOs.

His theory was is based on thermodynamics, involving an analog of kinetic motion in gases, i.e. how temperature changes under heat flow. This is subject to Laplace equation, with boundary conditions, so a Poisson equation without static sources.

The consequence would be that Gravity potential can be "cooled", hence controlled.

Thinking on why do they emit microwave radiation (see UFOlogy book by James McCampbell), he came onto the book on Dynamic Nuclear Orientation by Jefries Carson, and his experiments confirmed his theory, that Gravity can be controlled and that weight can be reduced.

## 3.2 Theory of Gravity based on Quarks

Pointwise charges of EM are rotational symmetric. Yet baryons, like protons and neutrons have electrical fractional charges: quark model. The interaction between such a pair is spin orientation dependent, and the total charge contribution yields Coulomb's law, while the actual structure interaction yields a correction responsible for Gravity.

The weakness of Gravity is only due to the random orientation of spin directions of nucleons in nuclei. One can compare this phenomenon with magnetism, and various types of materials: diamagnetic, paramagnetic and ferromagnetic.

The inter-quark interaction responsible for nuclear force is also direction dependent and was referred to as Gravity A-Force, since in high mass elements can bend light, hence reinterpreted as curving Space-Time in the spirit of General Relativity.

[1] Astronaut Edgar Mitchel: "We all know UFOs are real ...".

### 3.2.1 Rethinking the Standard Model

A better model for the Strong Force is needed: a) the three quarks of a baryon are not "free particles", but rather centers (sources / sinks) of the quark interaction, manifested as fractional electric charges when probed with electrons in scattering experiments; b) there is no interaction between the same baryon quarks, but rather modes of vibration (resonance) of the respective baryon, corresponding to the Platonic finite geometries of the qubit space (spinors); c) the mesons and gluons exchange the vibration modes ("flavors") and energy-momentum between baryons.

The $SU(2)$-quark space (qubit model) has an RGB-frame whose symmetries is the $SU(3)$ group, controlling the baryon excited states (classification of baryons).

The fractional charges correspond to embeddigs of EM $U(1)$-gauge group, related to the spin property and axis (Hopf bundle). The spin of a baryon should be computable from the interaction between the magnetic field (Stern-Gerlach experiment) and quark structure (fractional electric charges as EM-shadow of the quark field with the corresponding index / type of vector field flow).

3rd quantization means to consider the discrete reduction of these symmetry groups: $Z/n$ ("Bohr's model) and Platonic symmetries $\Gamma_i$ (3 generations / six flavors).

Quark Lines Diagrams represent how baryons interact via mesons exchange[2]. The three vector bosons $W_\pm, Z_0$ play the role of basis for transitions between baryonic states, when modeled as a "weak force" (gauge) interaction. The role of the 3 vector bosons for mesons is analog to the role of 3 quarks for baryons. The Weak Interaction theory should be derived from (replaced by) the representation of Platonic symmetries as Weyl groups of exceptional Lie algebras $E_{6..8}$ (see [5] [3]).

### 3.2.2 Computing the Gravitational "constant": a sketch

The statistics of spin directions is described by an application of the Boltzman distribution $\sigma$. Different pairs of spin directions yield a finite set of energy levels. The relative angles will yield the fine split of the electric interaction $E_{i,j}$, depending on $< S_i, S_j >$. Note that the finite set of spin directions correspond to the finite Platonic geometries of the baryons (cubical symmetry).

A pair of bodies with $n_1, n_2$ nucleons at distance $r$ apart is a bipartite graph of electro-gravitic interactions. The distance and spin direction determines the strength of the interaction, with a correction term to the classical pointwise model, involving $< S_1, S_2 > /r^2$ in appropriate units.

Summing over such pairs, and disregarding the electric force due to total charge, yields the total $G$ force.

In what follows we assume electron orbitals screen the total charge of protons, hence the two bodies are neutral in the main approximation, from the electric point of view.

Mean Value Theorem will yield the average force in Newton's Law and gravitational constant:

$$G\ m_1 m_2/r^2 = k \sum_{i,j} \sigma(i,j) < S_i, S_j > m^2/r^2.$$

Here $m_i = n_i\ m_p$ with $m$ the mass of a nucleon (average of mass of proton and neutron, to get a first estimate). The units are such that inertial mass equals gravitational charge.

The constant $k$ "hides" several details concerning the interaction of fractional electric charges of the nucleons (form factors?). Some hints are given in [6] p.180, 182, in the computation of masses and magnetic moments of mesons and baryons. The inertial (kinetic) masses of the baryons are related to the gravitational charge (potential) as explained in the Higgs mechanism ("trading" a potential / interaction term for a kinetic term). It is said that at high temperatures, where electro-weak symmetry is unbroken, all particle masses are zero ... yet, there is much to this then the theoretical considerations in the SM state: when controlling Gravity the inertial mass is affected too.

After simplification:

$$G = \frac{k}{n_1 n_2} \sum_{i,j} \sigma(i,j) < S_i, S_j >,$$

in the limit of large numbers of particles. [4]

[2] A good framework for this is presented in "TQFTs from subfactors" by Kodyalam and Sunder.

[3] Note that the 3D case is reminiscent of an optical quantum computer and ray tracing process for creating a virtual reality: here we use 3 mirrors beam-splitters instead of binary ones.

[4] A Physicist's derivation is needed here ...

### 3.2.3 Mass of the neutron

Neutron-neutron large scale interaction has strong force (exponential) and electric "turned-off". The remaining interquark interaction is gravitational, spin direction dependent, yet not so weak as expected (see the averaging of G-component).

The averaging process used before yields the inertial mass equal to gravitational mass. A technical computation should involve the form factors of the neutron.

When the computation considers two hydrogen atoms, in principle should yield the contribution of the electron's mass. Will this explain their ratio?

Note that the fine structure constant $\alpha = (h/e)/(e/c) == g_m/g_e \sim 1/137$ as the ratio of "magnetic" coupling constant over electric coupling constant seams to rather be related to the gravitational force as a perturbation of the electric force due to quark structure (fractional electric charges); here Planck's constant is the deformation parameter.

In a previous article ("On the arrow of time") the fine structure constant was related to primes, as basic finite modes / subgroups of $U(1)$[5]. The 3 Platonic symmetry groups should be also involves, from the quark model side.

# 4 Gravity Control and Applications

Dynamic Nuclear Polarization can increase Gravity interaction, decrease it or even reverse it: anti-gravity. This is achieved via reorienting the three fractional charges of quarks, by reorienting their spins. DNO uses microwaves at Larmour frequency to orient the electron's spin, and then using the orbital-nuclear coupling to transfer "angular momentum".

The control of quark field force (nuclear force, electric and gravitational; see also "Gravity A-Force") via DNO can control cold fusion and allow the production of high mass elements that *are* stable: various allotropic forms of the same isotope, e.g. element 115.

# 5 Conclusions

The above considerations need a solid mathematical presentation, especially the tangent (spinor) bundle version of Coulomb's Law, when considering the electric component of the Electro-Weak Theory. The author claims that the gravitational constant can be computed in this Theory of Gravity, based on Elementary Particle Physics.

To account for the full inter-quarks interaction requires an updated version of the Standard Model, incorporating the Strong Force as part of the Electro-weak Theory. Recall that $SU(3)$ is the symmetry group of the Hopf bundle (Qubit Model) that allows to unify interactions beyond the GUT routine, limited to gauge theories.

The technologies applying the above theoretical possibilities are in place, yet not "advertized" [4].

# References


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[5] See also M. Atyiah's work on this topic.

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