# Prospects of a *Unified Field Theory* Including Gravity

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*Essay written for the Gravity Research Foundation*
*2020 Awards for Essays on Gravitation.*

**Abstract**. The generic relativistic version of a particle-field theory, with non-isotropic sources, includes a Gravity force perturbation of Coulombian Force, with the usual Magnetic Force resulting from Lorentz transformations.

The quark model of Standard Model, with fractional charge structure of nucleons enveloped by electronic clouds, mandates such non-isotropic charges.

Dynamic Nuclear Orientation (DNO), via electronic spin and LS-coupling, allows to invert the population of low energy Gravitational attraction states, and achieve Gravity Control.

The 1994 scientific experiment of Dr. Frederick Alzofon has confirmed Gravity Control can be achieved via DNO.

Other researchers have contributed in the same general direction of unifying Electromagnetism and Gravity, supporting the non-isotropic charge concept, including Paul LaViolette, author of *Subquantum Kinetics*.

April 1, 2020

## 1. Introduction

The goal in this article is to provide the design specifications for a theoretical model of Gravity that allows to control it, at an engineering level. Then only, it can be said the theory *explains* Gravity.

### 1.1. Brief overview of Prior Physics, relevant to our Problem.

Newton's Theory of Gravity addressed a special case, that of *neutral matter*, as a *test probe* moving around a large *source* of the interaction.

Maxwell's Theory, addressed mathematically the *Field Theory* aspects of Electromagnetism, after Oerstead, Ampere, Faraday, Biot-Savart etc. This time charges were comparable in size and their moving contributions could not be ignored.

Lorentz Force and Lorentz transformations revealed the hidden "source" of Magnetism: transforming the electric field due to a static charge, yields a magnetic component.

Yet at this stage *all charges, as sources of field, were assumed spherically symmetric*, with no internal structure, hence satisfying Poisson equation.

General Relativity recast *(Relativistic) Mechanics* from "curved motion in flat space-time" to "geodetic flat-motion in curved space-time", with its initial goal of implementing Mach's phylosophy: there is no intrinsic space or time, only matter and its properties:

$$ma = F \quad \Rightarrow \quad G = \chi T.$$

Physics remained hidden in the "constitutive force" / energy-momentum tensor, without additional explanations, including of course, Gravity.

A closer look, *avoiding the natural and expected separation of these theories, due to the historical development*, will reveal the on-the-nose the *Unified Field Theory*, as a generic *Particle-Field Theory*: test probe dynamics "a la Newton-Lorentz" (relativistic), and charges as sources of the whole field, without separation according to the type of charges and index of singular points of the associated vector field.

The "closer look" benefits from the tremendous progress in Elementary Particle Physics, thanks to the Standard Model.

## 2. From Newton, Maxwell and Lorentz to a Generic Particle-Field Theory

"Hypothesis non fingo" said Newton ... Thus let's not implicitly assume we are modeling EM or Gravity, but whatever total force field some particles, isolated or as a 3D-density object, might have as *sources* of this *Unified Field F* on just one *test particle*, of *charge q* (real or complex, as needed later).

2.1. **On Helmholtz Decomposition.** Now such a force can be "Lorentz decomposed" as $F = F_l + F_t$. The longitudinal part $F_l$, relative to the particle's velocity, does the work, and the remaining orthogonal one $F_t$, curves the trajectory[1]. Assuming $F_l$ is conservative, its *intensity* is a gradient $E = grad(\phi)$, with divergence $div(E) = \rho$ yielding the density of its sources, which we will call *E-charges*. The orthogonal "geometric" force can be represented as $F_t = v \times B$, arriving at the usual *Lorentz force* of this *Unified Field*:

$$F = q(E + v \times B). \tag{1}$$

Again we emphasize the *necessary steps*, i.e. the uniqueness of definitions, when starting from an arbitrary force field, which includes "everything": EM and G contributions, historically studied and modeled separately, as well as Weak and Strong ... *if* they would exist.

*Remark* 2.1. Since in hindsight we know "reality" is Lorentz invariant (EM, relativity, QFT etc.), we expect that the dynamics equation $F = ma$ of Newtonian Mechanics *must* be completed with the velocity Lorentz term, since any Coulomb field (harmonic potential), when Lorentz transformed acquires a "curly compagnion", similar to the magnetic field $B$ in EM.

From the above one also derives an analog of *Maxwell's equations*:

$$Helmholtz\ decomposition: \quad curl(E(t)) = 0,\ div(B(t)) = 0$$

showing that it leads to Helmholtz decomposition, together with the associated sources:

$$Sources\ definition: \ div(E(t)) = \rho(t),\ curl(B(t)) = j(t).$$

Here the time dependence of the vector fields and source distributions refers to the "Lab" reference frames, and at this stage we don't assume a transformation law, if we change the coordinate system.

2.2. **What about the Sources!?** The Helmholtz decomposition is based on the polar decomposition of the conformal group of transformations, locally consisting of similarities and rotations; hence the two $SO(3)$-invariant operators *div* and *curl*.

Under this assumption, the Laplace equation for the sources emerges, together with its fundamental solution (distribution), the Coulomb law [1]:

$$\Delta\phi = \rho, \quad \phi = \rho \star 1/r \qquad (Poisson\ integral).$$

This is all classical, and we arrive at the question: "What are the "signs" of the charges?"

[1]A proper treatment requires Hamiltonian formalism.

2.3. **Dynamic Gravity.** All charges positive yields *Dynamic Gravity*, a Lorentz invariant form of Newton's Gravity (Eq. 1), with a correction term analog to the magnetic field, due to rotating masses, playing the role of *mass currents*.

This is expected, and of course can be neglected when considering motion around the Sun, as long as we place our "Lab"-Coordinate System attached to the largest (by far) charge in the system, so that it's static, not moving, and hence the $B$-analog term vanishes.

2.4. **The Electromagnetism Case.** If the charges are $+$ and $-$, again assuming the elementary charge *isotropic*, i.e. $SO(3)$-invariant, we end-up with Coulomb potential $1/r$. If we allow for the larger conformal group, we include in this way Lorentz tranformations, with the resulting Maxwell's Equations.

## 3. Electro-Gravity: Let the Charges be "Anything"

If we allow the charges to have an internal structure, in hindsight of the Standard Model, we should take into account that "quarks" have fractional charge and a fermion, like the electron, is an "electrically" charged cloud (i.e. responsible for the work component of EM), but with a "magnetic" moment (due to a *magnetic charge*.

Hence we assume that matter, mainly composed of neutrons, protons and electrons have the following types of charges, in terms of the index of the singularities of the corresponding (unified) vector field they generate:

- Electron $(0, 3)$,
- Proton $p^+(uud)$: index type $(2, 1)$, and
- Neutron $n = (udd)$: index type $(1, 2)$,

in units of $+1/3$.

3.1. **What about the Field Equations?** The "Plan" to include Gravity by allowing charges to have internal structures as above, is to look for a modification of the Electro-Weak Theory, to include the Gravity Interaction as a perturbation.

3.2. **Other Electro-Gravity Theories.** The idea that the "Universe is Electric" and that the ether "does exist" abound [2] etc.

That the elementary constituents of matter do not have a spherically symmetric symmetry, also appears at least in the theory of *Subquantum Kinetics* of Paul LaViolatte [3].

But the practical confirmation come from an experiment designed to test the Unified Field Theory of Frederick Alzofon, based on a "hint out-of-this-world" ...

## 4. Gravity Control

Although not based on the internal structure of elementary particles via the quark model within the Standard Model, in the 1960s a tentative of a Unified Field Theory was proposed by Frederick Alzofon [4].

4.1. **Dynamic Nuclear Orientation.** Let us briefly recap the main point: atoms have a $G$-force polarity, a result of the break of $SO(3)$-symmetry of an "extended" Electromagnetic Theory. In the specialized literature it also occurs under different names: $SO(3) - EM$ [5], scalar waves [6], torsion fields [7] etc., but it is considered pseudoscience.

The corresponding split of energy levels, for "up/down" in a bi-atom interaction, is orders of magnitude lower in energy than the "pure" $U(1)$-EM hyperfine energy split, and the claim is that it accounts for Gravity.

Now the random transitions of orientations of the protons in a nucleus lead to the *lower energy state corresponding to gravitational attraction.*

A mechanism for exciting the nuclei to the higher state, and *to invert the population in the same way as in a LASER* is via a *resonant microwave excitation with a pumping mechanism which allows for the stimulated emission, and hence leads to a coherent multi-particle state*, in the essentially the same way as with the LASER technology.

This is referred to as *Dynamical Nuclear Orientation* (DNO) [8],[9], p.117, 220.

4.2. **The Evidence.** The actual scientific experiment, using a microwave radiation to alter was carried out confirmed that gravity can be controlled in this way [9], Ch.21, p.135. The story of the prior R & D leading to this experiment can be found in [9].

Similarly, *Dynamical Gravity* predicting the coupling between moving masses, characteristic of a gravitational analog of magnetic induction, and demanded by the Newton-Lorentz relativistic model, coined and explained at the beginning of this essay, was actually experimentally observed [10]; except that the authors tried a different approach for explaining the coupling between a pendulum, isolated from a rotating mass.

Our *qualitative explanation* comes naturally from demanding relativistic invariance, and we emphasize "qualitative", since we did not carry out the computations to check the match with the actual measurements.

## 5. Conclusions

In brief, a perturbation of EM *has to be included* in the classical EM. This is consistent to upgrading Newton's Gravity with a Lorentz term, to make it relativistic invariant, independent of General Relativity.

Moreover the Standard Model demands this too, at a conceptual level, but physicists are too much used to *neglect Gravity, as being too weak*; yes, weak, but important, and a major "clue" that the "reality" differs from what the SM portrays.

The Electroweak Theory misses this possibility, namely to include a Gravity-force correction, accounting for the quark structure of protons, with the electronic shells/clouds around them!

The experiments are here to confirm the above: Gravity has a Lorentz term, analog to electromagnetism, and Gravity can be controlled via Dynamical Nuclear Orientation.

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