

Field Mechanics

John Caywood
Independent Researcher
john_caywood@hotmail.com

Abstract

Fields have an infinite distance of influence and act instantaneously without transit time of a vector boson.

Keywords

Fields, gravity

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Claims of Novelty

- Fields have an infinite distance of influence
- Fields propagate instantaneously without time of flight of a vector boson

Mathematical Foundation

This paper's mathematical method uses vectors because they don't refer to arbitrary coordinates. Unit values are used in equations so empirical constants are not necessary. In particular, vector cross products are used to define values in another dimension.

- The symbol is \times or x or X means cross product or vector product or directed area product.
- A new operator \underline{x} or \underline{x} or \underline{X} means the inverse cross product, which amount to division.
- For example, $v \underline{X} v$ is the directed area product of velocity and velocity.

- The scalar v^2/c^2 can be written as a vector $(v \times v) \times (c \times c)$.

Cross products preserve the sign of the input vectors. In normal algebra $(-c) * (+c) = +c^2$, but the cross-product yields $(-c \times +c)$ and the resultant sign depends on choosing right- or left-hand rule for vector products.

Chapter 2 Introduction

Dedication

This work is dedicated to Ginger

Previous Work

The text and diagrams are substantially the same as my paper posted on the physics archive <https://vixra.org/abs/2209.0057>. More specifically, this paper attempts to illustrate the concepts put forward in [Tetrons, viXra.org e-Print archive, viXra:2307.0050](#)

Chapter 3 Fields

Gravitational field

$$F = G * (m_1 * m_2 / r^2)$$

Neglecting the constant to make the units correct, the gravitational force is $m_1 * m_2 / r^2$

Since multiplication is associative and commutative, it is also $(m_1/r) * (m_2/r)$.

What does “m/r” mean? The best description is the gradient (slope) of a single mass field. What is the cross product of two mass fields as in $(m_1/r) \times (m_2/r)$? The best description is the attractive force between two objects due to their mass.

The prerequisite paper [Tetrons, viXra.org e-Print archive, viXra:2307.0050](#) contains an assertion that “Plus-spin operates in a different dimension from minus-spin. Plus-spin and minus-spin form a cross product area.”. For fermions, matter is always plus spin and antimatter is always minus spin, so gravity potential is always attractive. Leptons are neither matter nor antimatter, so their role in gravitational attraction may be neglected.

Electrostatic field

Another field instance is the electrostatic field. The gradient (slope) of a charge field is q/r . The electromotive force between two charges bodies is $(q_1/r) \times (q_2/r)$. Because q_1 and q_2 operate in the same dimension as scalars, their charges add and subtract like any scalar.

Magnetic field

The gradient of a magnetic field is B/r . The magnetism between two magnets is $(B_1/r) \times (B_2/r)$.

Each tetron has a unit charge and unit spin, and each tetron both creates fields and responds to fields.

Chapter 4 Review of Gravity

Galileo's Experiment

As told by history, Galileo dropped an iron cannon ball and a same diameter cork ball from the Leaning tower of Pisa. They hit the ground at the same time, contrary to the layman's expectation that the heavier ball would hit the ground first. The same diameter balls negated air friction differences of two different size balls.

Consider two sacks of marbles. The sacks are different sizes and contain identical marbles. One sack's marbles total the same weight as the iron cannon ball and the second sack's marbles total the same weight as the cork ball. If both sacks have rip cords that are pulled at the same instant, which group of marbles will hit the ground first? They will all hit the ground at the same time. Which sack they came out of makes no difference. In a vacuum, you could pour out a sack of cannon balls, feathers, water and a kitchen sink. They would all hit the ground at the same time.

One unit of spin field is created by one positive spin tetron and one negative spin tetron. Plus spin and minus spin do not cancel like scalars. They form a cross product which is a unit of spin field. A spin field by itself does not constitute gravity. A receiving or responding tetron's spin is necessary to call this gravity. The spin field is received and acted on by all spins in all tetrons. Gravity is mutual relationship. Gravity waves and gravitons are not necessary to make gravity work. Fields don't oscillate. They provide a constant gradient to move tetrons in 3D.

A spin field pervades the universe without diminution. A spin field goes thru everything without velocity. Like all fields, it is communicated instantaneously without time passage.

In addition to matter//antimatter pairs creating a gravity field, they also are affected by it. One unit of gravity field is one unit of gradient towards to center of the gravity field. There is no transmitter/receiver relationship in gravity where the earth is a transmitter and an apple is a receiver. There is, however, a transmitter/receiver relationship between every single tetron (receiver) which moves toward every tetron pair (transmitter).

Since all matter contains tetron pairs, all particles have potential to move due to gravity. Earth attracts apple, apple attracts earth. Everything is made of tetrons, so everything is affected by gravity.

The difference between nucleons and leptons is nucleons have multiples of half integer spin, like the $+3/2$ proton or neutron and the $-3/2$ anti-proton or anti-neutron. Leptons always work in matter//antimatter pairs as a propagating, co-orbiting pair. This allows them to retain their individual charges and spins but work together as a charge and spin balanced pair so the net exterior charge is zero and the net exterior spin is zero. Instead of producing a unipolar gravity field as the nucleons do, the opposite spin electron and positron in one polarity of the photon become a bipolar self-propagating spin pair.

The electron becomes part of the photon complex which is charge neutral. Internally, the electron still has its charge and spin. When the photon is absorbed into an electron shell, the photon complex divides back into electron//positron pairs.

The photon is charge and spin inert when its electron//positron components are outside of an electron orbit. Neutrino//anti-neutrino pairs are also charge and spin inert, except when a specific C quark tetron pair is attracted to opposite spins in a specific nucleon C quark tetron pair. This neutrino exception is the beta reaction discussed in detail in [The Weak Reaction, viXra.org e-Print archive, viXra:2307.0076](#)

A traveling photon's internal charge and spin states cause propagation in space, but leave it unaffected by electric, magnetic or gravitation fields. Propagation by the photon is bidirectional. Propagation of a photon from an emitting atom in cause-effect direction is balanced by propagation of an anti-photon toward that emitting atom. Because the anti-photon is antimatter, its velocity is reversed and propagation occurs in cause-effect direction congruent with the photon.

Because the spin energy of the photon is expended in propagation, it is not expended in moving toward a gravity source in the center of a gravity field. Likewise, the charge neutral photon//anti-photon complex is using all its charge energy propagating and not expending charge energy moving toward a charge source at the center of a charge field.

Propagation is like gravity without the necessity of a field to gravitate along. Or, in the case of charge, propagation is like electric attraction without the necessity of an electric field to attract to or be repulsed from. Propagation is a short circuit version of gravity.

In both propagation and gravity, tetron pairs are responding to the field created by two tetron pairs in gluons. The difference is $3/2$ spin nucleons with their two tetron pairs in gluons create gravity and anti-gravity fields acting in reciprocity with remote tetron pairs. In contrast, $\pm 1/2$ spin leptons produce exactly the same spin as they consume.

Neutrinos have the same propagation as photons and have matter//antimatter pairs of particles. The difference is they propagate by spin alone and not with charge. Neutrinos do not form into a complex of four particles as in the photon because they don't have electron shells to go into and come out from where the opposite spin electrons go into transverse orbits. That means neutrinos do not have the polarity that photons do and don't have the Pauli exclusion principle to obey.

Refer to the below diagram about the 3 configurations of particles.

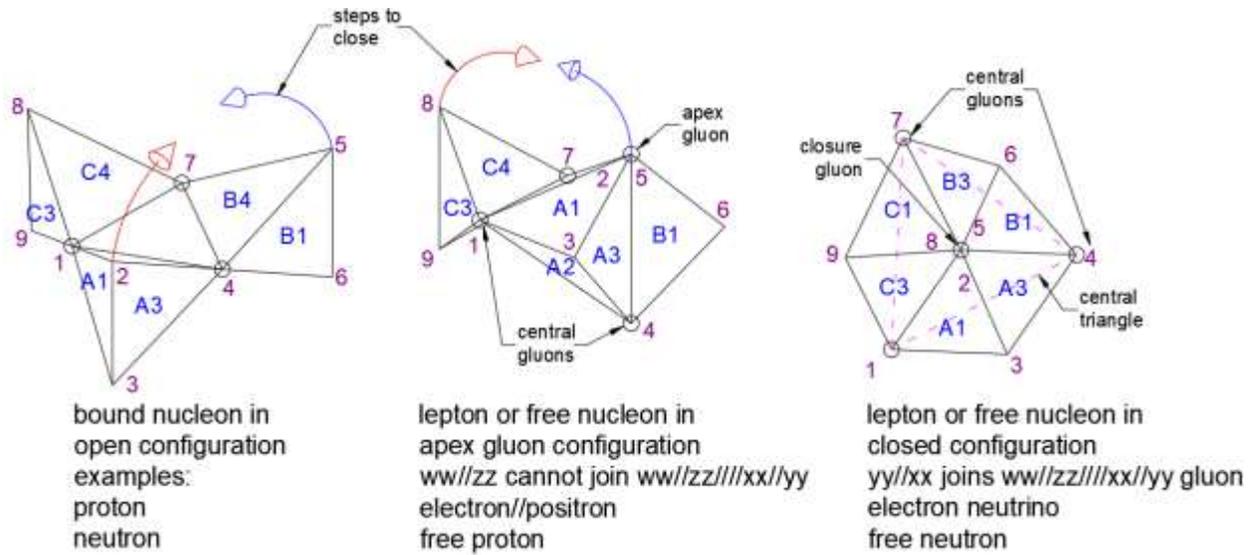


Figure 1 - Three Configurations of Particles

Generating and Consuming Spin Field

The 4 gluons in the apex gluon configuration create a short-range spin field entirely within the lepton. The reason for short range is that spin field is immediately consumed by the 4 single tetrons in the course of propagation.

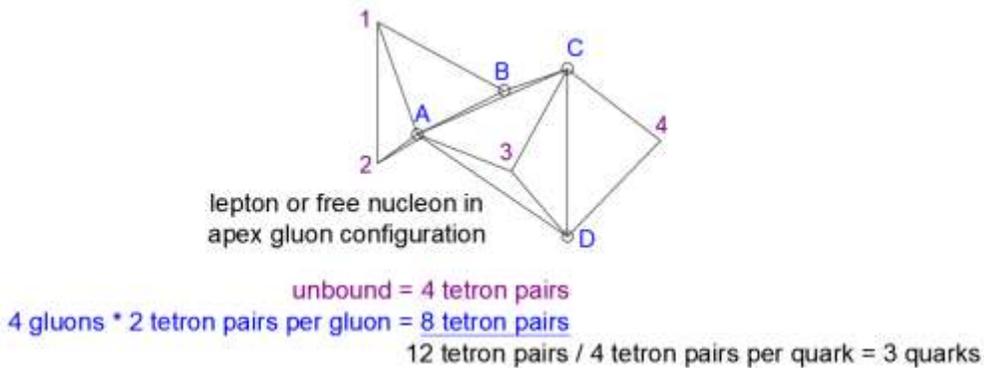


Figure 2 - Lepton or Free Nucleon in Apex Gluon Configuration

Spin Field Outside of the Nucleus is a Gravity Field

The closed configuration of the neutrino has two important features. First, it has one ww//zz and one zz//ww tetron pair, which are not reactive with the same kind of tetron pairs in any nucleus. Second, it has a 1.5 gluon, which means one true gluon and one extra tetron. The “1.0” part is xx//yy///ww//zz. The “0.5” part is yy//xx which is allowed because the yy//xx is not the same as xx//yy.

The matter//antimatter tetron pair xx//yy is different from yy//xx the cross product of xx X yy is opposite spin field direction from yy X xx. Positive spin field is produced by xx X yy and negative spin field is produced by yy X xx. The positive and negative spin fields cancel effect, so no net spin field is generated in that gluon to be consumed by self-propagation. The opposite charges in the normal two-part gluon hold the quarks together and the additional opposite charges in the half gluon also hold the

quarks together. The 1.5 gluon described holds the 3 quarks together but is reactive when contacting another particle as happens in the beta reaction to follow in [The Weak Reaction, viXra.org e-Print archive, viXra:2307.0076](https://arxiv.org/abs/2307.0076)

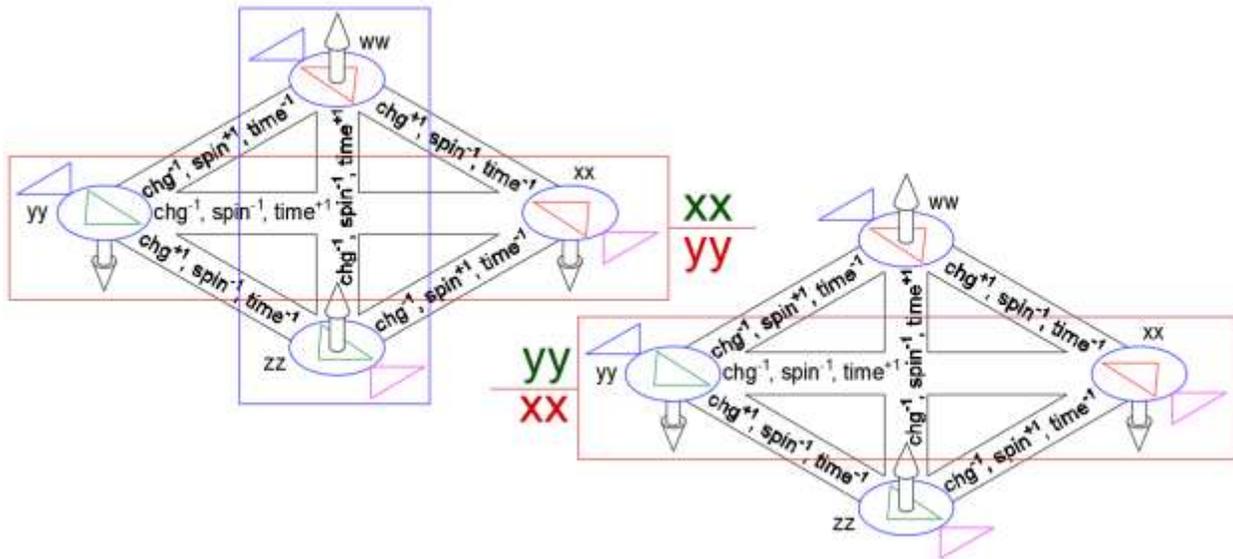


Figure 3 - Similar Tetrons are Not Exactly Alike

Planar Configuration of Bound Nucleons

The planar configuration of bound nucleons is due to sharing gluons with neighboring particles. In particular, the 2 vertices available for attachment of the neutron compared to the 1 vertex available for attachment of the proton is responsible for the mass difference of the neutron and proton. This can be calculated.

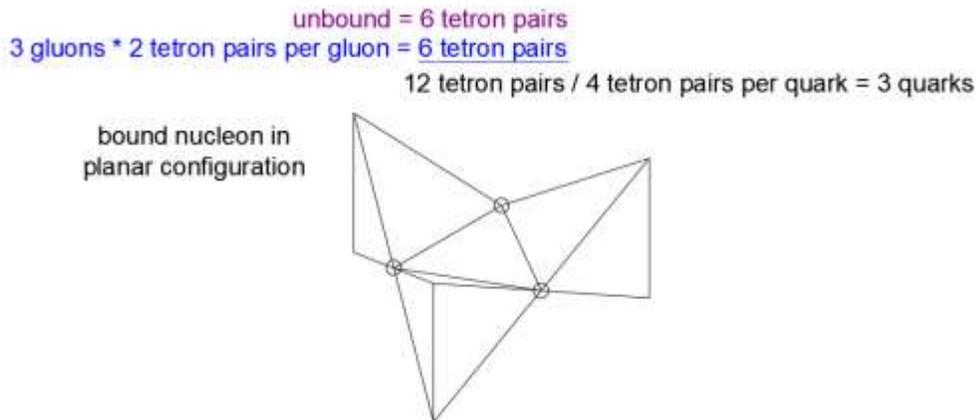


Figure 4 - Bound Nucleon in Planar Configuration

Proton mass = $938.27208816 \text{ MeV}/c^2$ ¹

¹ [Proton - Wikipedia](https://en.wikipedia.org/wiki/Proton)

Neutron mass = $939.56542052 \text{ MeV}/c^2$

Difference = $1.29333 \text{ MeV}/c^2$

Neutron mass = $3 \times \text{quark mass} + 3 \times \text{ internal gluon mass} + 2 \times \text{ inter-particle gluon mass}$

Proton mass = $3 \times \text{quark mass} + 3 \times \text{ internal gluon mass} + 1 \times \text{ inter-particle gluon mass}$

Assume internal gluon mass = inter-particle gluon mass

Neutron mass = $3 \times \text{quark mass} + 5 \times \text{ gluon mass}$

Proton mass = $3 \times \text{quark mass} + 4 \times \text{ gluon mass}$

Difference = 1 gluon mass

Free neutron mass = free proton mass = bound proton mass - gluon mass = $938.27208816 - 1.29333 = 936.97876 \text{ MeV}/c^2$

The Strong Force

A gluon is also formed when which connects two quarks. In a high energy state, a gluon simply be extra mass added to a quark's spine tetrons via $E=mc^2$. The secondary gluon or gluons formed between particles is the strong force. That means the strong force between two particles will be 1, 2 or 3 units of strength.

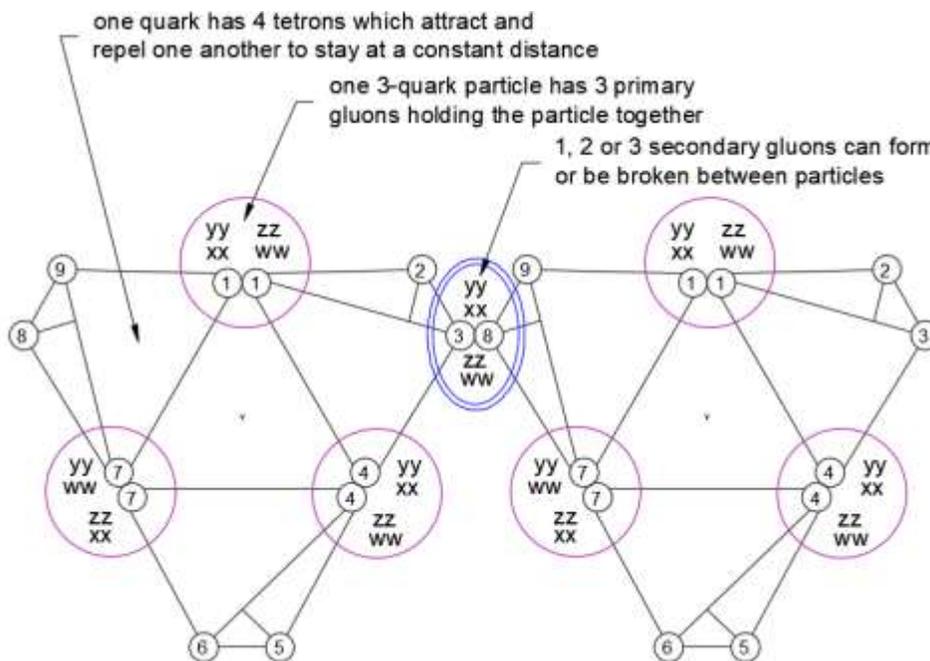


Figure 5 - Comparing Forces Within a Quark, Particle and Between Particles

The Equivalence Principle in More Detail

The previous “Equivalence Principle” section described time as being equally slowed by mechanical acceleration and gravity acceleration. “Galileo’s Experiment” section above describes gravity as being two parts; creation and action. In this light, a review of the equivalence principle is due. Mechanical acceleration is a force applied to a container full of contents. There is no way each mechanical force can

² [Neutron - Wikipedia](#)

be applied to atoms individually in a rocket, but that is what gravity does. Therefore, mechanical and gravity acceleration are dissimilar in application but equivalent in time rate slowing.

Eventually, the container hierarchy all catches up with exterior mechanical acceleration via compressive force. Each mass in the container hierarchy only knows its own momentum, until force is applied by the container and it catches up with everything else in the rocket. By isolating every mass in a hierarchy of containers, a hysteresis is put in the system. A rigid body has no hysteresis during alternating acceleration and deceleration, but a hierarchy of containers has hysteresis to the degree it is not a rigid body.

The opposite of a rigid body is a complex system of linkages, ropes, springs and viscous dampers. The more complex the system, the more force it takes to accelerate or decelerate it, due to interaction of the parts. Even a "rigid" body will experience Poisson deformation due to compression. Nothing is like gravity, which is pervasive and accelerates all tetrons at the same distance from the gravity source equally. This holds true up to the point where tidal force overcomes gravity force.

You can only hold that gravity and acceleration are equivalent for the purpose of slowing time rate down for a single tetron. Larger than a tetron, the time rate slows for each component of a mechanically separated system differently, depending on its acceleration at that instant.