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A non Relativistic Dual/Quaternal Unified Atomic & Astro Physics

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(Aging, do illustrate the falseness of the concept of relativistic space/time.
Matter is linked to Time, quite independently of space)
Toward a
New, Leaner, Lighter , Engineered more Inclusive, Absolute
DUAL/QUATERNAL UNIFIED ATOMIC & ASTRO-PHYSICS

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March 20th   Abstract Z21.00002 Claude MASSOT
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Abstract
A non Relativistic Dual/Quaternal Unified Atomic & Astro Physics

My non relativist hypothesis of a complex mass for de Broglie's dual wave/particle, (1994, French Académie des Sciences), still unifies most incompatible relativistic and quantum concepts. Real inertial particles, move, pulled by a linked imaginary wave/mass, itself moving at the speed of light. The dual particle mass modulus dilation partly follows relativity, but remains finite at the speed of light. Time, itself, is dual and complex, linked to mass (there is no space/time). At high energy, I add spin and helicity by introducing quaternions. To unify sub-atomic and astro Physics I treat Michelson's result as photons carried by and with the earth gravitational field and I define gravity as an electrical residual force between the opposite fields of protons and electrons. This leads to a quantized (only slightly perturbed) solar system. Gravitational waves and gravitons can be astro-photons from orbital transitions of planets. I define the red shift not as a Doppler effect, but as gravitational attrition of the pure imaginary mass of outgoing always-escaping redder photons. There could be no expansion of the Universe, no black holes but hypermassive dark stars, no dark matter, nor dark energy.
My much lighter Physics should be, also, much more easily inclusive.

Urgent Need to Develop a XXI st Century Engineering Physics
Leaner, Lighter, UNIFIED and more Inclusive

1900 Today Physics explains everything

2000 The Standard Model has been established as a well tested theory

XXth Century	XXIst Century
Physics reserved for an elite	**Physics Engineering**
Dirac :	**Rutherford/Bohr**
Nobody can pretend understand Quantum Mechanics	*Physics is not playing with symbols but discovering the secrets of Nature*
	OCKHAM
STANDARD MODEL	**DESCARTES**
RELATIVITY	**PLANCK**
QUANTUM MECHANICS	**RUTHERFORD**
STRING THEORIES, QCD	**de BROGLIE**
GUT	**QUEST**
(Great, Unified Theory)	**Quaternal, Unified, Engineered Simple, Theory**

XXIst Century Challenges

for

the Present Assumptions

&

Interpretations

of

The Standard Model

Today's still unresolved questions
Sub-ATOMIC PHYSICS Assumptions

The origin of matter
The physical nature of matter
Incompatibility between relativity and Quantum Mechanics
The Physical nature of anti-matter
The missing anti matter
The physical nature of the wave/particle
Spin in Schrodinger Equation
The structure of particles
The reality of the quarks and gluons
The strong interaction
Nuclear Fusion has not yet been experimentally demonstrated
The real nature of the neutron
The reality of the neutrino
The presence of neutron in the nucleus
The mass defect in the fusion of light element

Astro-Physics Assumptions
(RELATIVITY & ASTROPHYSICS)

Maxwell's equations
Principle of Relativity
Constancy of the velocity of light
Local value of the velocity of light
Maximum value of the velocity of light
Interpretation of Michelson's Experiment
Mechanics of motion of a dual wave/particle
Physical Structure of a wave/particle
Link between Matter and Time
Spin of a wave/particle
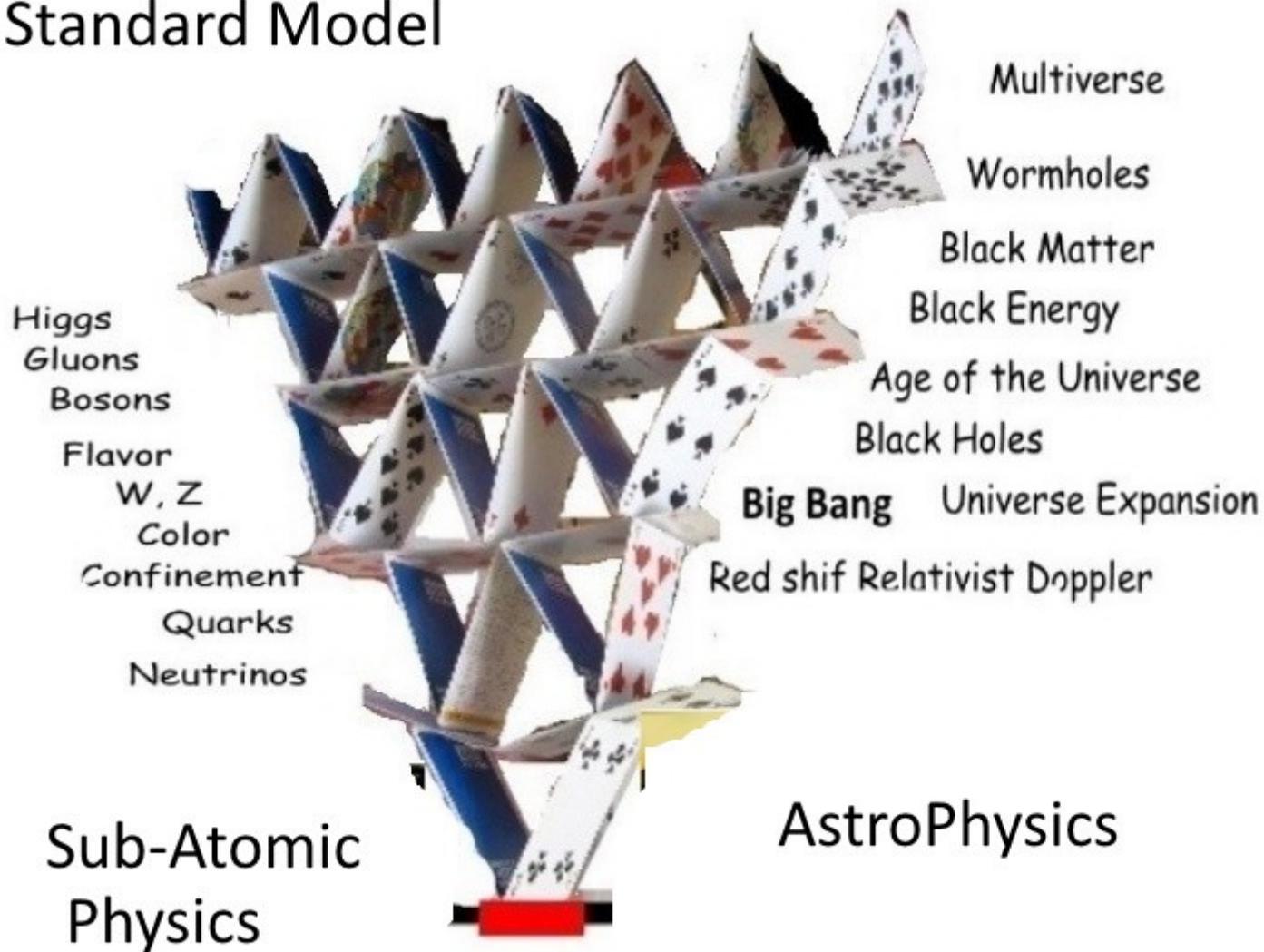**Nature of Gravitation**
Origin of the Universe
Dark Matter
Red Shift

Expansion of the Universe
Acceleration of the expansion

STANDARD MODEL HOUSE of CARDS of INTERPRETATIONS

Standard Model

Multiverse

Wormholes

Black Matter

Black Energy

Age of the Universe

Black Holes

Big Bang   Universe Expansion

Red shif Relativist Doppler

Higgs
Gluons
Bosons
Flavor
W, Z
Color
Confinement
Quarks
Neutrinos

Sub-Atomic Physics

AstroPhysics

AFTER A CENTURY OF BRILLIANT SUCCESS
IT IS NECESSARY, NOW, TO CHALLENGE
EINSTEIN, SCHRODINGER, DIRAC & Standard Model Equations
which could be dramatically misleading,
for example, in nuclear fusion plasma projects
(50 years of plasma fusion experiments have failed, to produce 1 kwh
so far!)

PRESENTATION OF MY NON RELATIVISTIC

QUEST PHYSICS

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Quaternal/Unified/Engineered Simple Theory

for SUB-ATOMIC & ASTRO PHYSICS

A leaner, lighter, more inclusive Physics

PLANCK   1900

$$E = h\nu$$

Quaternal Unified, Engineered Simple, Theory
QUEST   1994

m=m°+ im'   i²=-1

p=mv=m°c   p°=m°v=mc

$$m = \sqrt{\left(m^{\circ 2} + m'^{2}\right)}$$

$$E^2 = m^{\circ 2} c^4 + p^2 c^2$$

$$\lambda = h/mv$$

1905		**1925**
EINSTEIN	$m = m^{\circ}/\sqrt{\left(1 - v^2/c^2\right)}$	**de BROGLIE**
E=mc²		$\lambda = h/mv$

$$m = m^{\circ}/\sqrt{\left(1 - v^2/c^2\right)}$$

$$E = h\nu$$

$$E^2 = m^{\circ 2} c^4 + p^2 c^2$$

m#=m0+ im'+jm''+km''' (2015)

i²=j²=k²=-1

With my QUEST THEORY   I REFUTE

- The **PRINCIPLE OF RELATIVITY**
 (Motion is an absolute phenomena)
- THE CONCEPT OF SPACE TIME
 (Space and Time are totally independent)
- The CONSTANCY OF LIGHT VELOCITY
 (The velocity of Light is a local maximum velocity)
- I question the PRINCIPLE OF EQUIVALENCE
(Nuclear Inertial mass equal to gravitational mass?)
- THE PRINCIPLE OF HEISENBERG
 I replace $\Delta p \Delta x > h/2\pi$ by $\Delta p \Delta x > \alpha h/2\pi$

I propose a
COMPLEX DUAL WAVE/PARTICLE MECHANICS
for the MOTION of the ELECTRON
(The only moving stable elementary particles being: electron, proton and photon)

The motion of an electron is an absolute phenomenon
with respect to the laboratory.

An electron motion is not
a relative linear uniform translation
Electrons do spin and wobble.
A Moving electron is dual
(Louis de Broglie did discover the DUALITY of Electrons)

But what is really meant by dual motion???

a real mesoscopic model of DUAL MECHANICS !!!:
MOTION OF A TRACTOR Tread !!!!

The inertial mass of the tractor is pulled by the the moving mass of the spinning caterpillar! One part of the caterpillar is stationary on the ground, another part is moving, thus pulling the whole tractor. Walking is even a simpler example. One foot is stationary on the ground, while the other foot is moving the body !!

SIMPLE MODELS of MECHANICS   of DUAL Real MOTION
Motion of an inertial mass m° at velocity v

1) pulled by a weighting mass m' moving at the velocity c

(cart m° , pulled by horses)
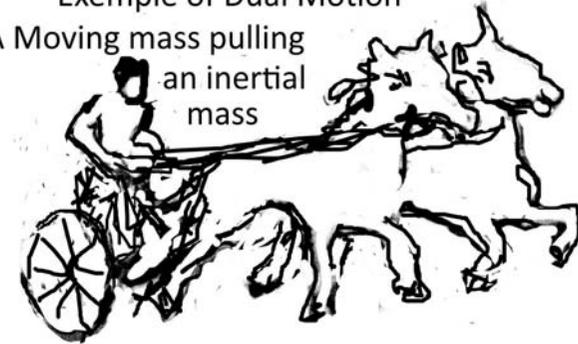
$$m = m° + m' ; \quad p = m v = (m° + m')v = m' c$$

$$m = m°/(1 - v/c)$$

When $v \rightarrow c$ $m \rightarrow \infty$

The total mass of the (cart $+$ the horses) is infinite
when v=c

But the cart cannot go faster than the horses

----

2) pulled by non weighting momentum moving at velocity c

(surfer m°, pulled by the wind)

$$p = m° v = m' c \qquad\qquad m = m° + m'$$

$$m = m°(1 + v/c)$$

When $v \rightarrow c$ $m \rightarrow 2m°$

but the doubling of the mass is virtual.

The board can go as fast as the wind with a finite mass

The weighted mass of the board does not change

Exemple of Dual Motion
A Moving mass pulling
an inertial
mass

BASIS OF A DUAL ABSOLUTE NON RELATIVISTIC PHYSICS
for low energy electrons

My 1994 Hypothesis of the complex nature of matter
and of the complex dual wave/particle
(presented at the Académie des Sciences in 1994 by André Lichnerowicz)

I postulate that
the mass m of a de Broglie's dual wave/particle, an electron,
moving at a velocity v
is a complex entity m*, with a real inertial rest mass m°
pulled by an imaginary wavy mass im' moving at the speed of light c.

$$m* = m° + i\,m' \qquad i = \sqrt{(-1)} \qquad m = \sqrt{(m°^2 + m'^2)}$$

v : absolute velocity of the electron with respect to the laboratory
c : local velocity of light and of the the imaginary mass m'

Two momentum balances are possible

1) the imaginary mass is **weightable** and adds to the inertial mass!
A simple momentum balance yields :
   $p = mv = m'c$ ---> $m = m°/\sqrt{(1 - v^2/c^2)}$ **(idem relativity)**
the mass becomes infinite at the velocity of light

2) the imaginary mass **not weightable**, does not add to the mass
  $p° = m°v = m'c$ ---> $m = m° \sqrt{(1 + v^2/c^2)}$
the mass stays finite at the velocity of light
This verifies also the relativist total energy
 $E^* = m^* c^2 = (m°^2 + m'^2) c^2$ $E^2 = m°^2 c^4 + p^2 c^2$

 and can be unified with Planck's law :
   the imaginary mass of de Broglie's wave, verifies Planck's law
       $\lambda = h/mv = h/m'c$ $E = hf = hc/\lambda = m'c^2$
So there is no mass dilation but complex addition of masses

Since the mass is dual/complex, each mass does depend on its own time
**   SO :   Time must also be complex ,**
while Space remains real and unaffected by the motion.
The concept of Space/Time can be rejected.
There is a need for a new model for gravitation.

$$\text{t* = t°+ it'} \qquad t=\sqrt{(t^{\circ 2}+t'^{2})}$$

According to the choice of the dual model   one has:

$$L = v\,t\ = c\,t' \quad or \quad L= v\,t°=c\,t' ,$$

$$t=t^{\circ}/\sqrt{(1-v^2/c^2)} \ \textbf{or} \ t=t^{\circ}\sqrt{(1+v^2/c^2)}$$

So there is no mass and time dilation, but addition of a driving mass and a driving time. Mass and Time do not swell because of the motion! They get bigger because of a dual supplement It is a deep reinterpretation of the relativist hypothesis with identity of results without any relativist hypothesis The electron radius decreases as 1/m by conservation of orbital momentum

(<u>At high energy</u>, I introduce quaternions for spin and helicity
m# = m° + im' + j m''+km'' with i²=j²=k²=-1   )

QUATERNAL, QUEST MODEL at HIGH ENERGY

At high Energy it is necessary to take into account
the spin and the helicity of the wave/particle
with the use of Quaternion Algebra
m*=m°+im'+jm''+km''' with i²=j²=k²=-1
with   m'c=m°v'   m''c=m°v''   m'''c=m°v'''

then   m² = m°²+ m'²+m''²+m'''²

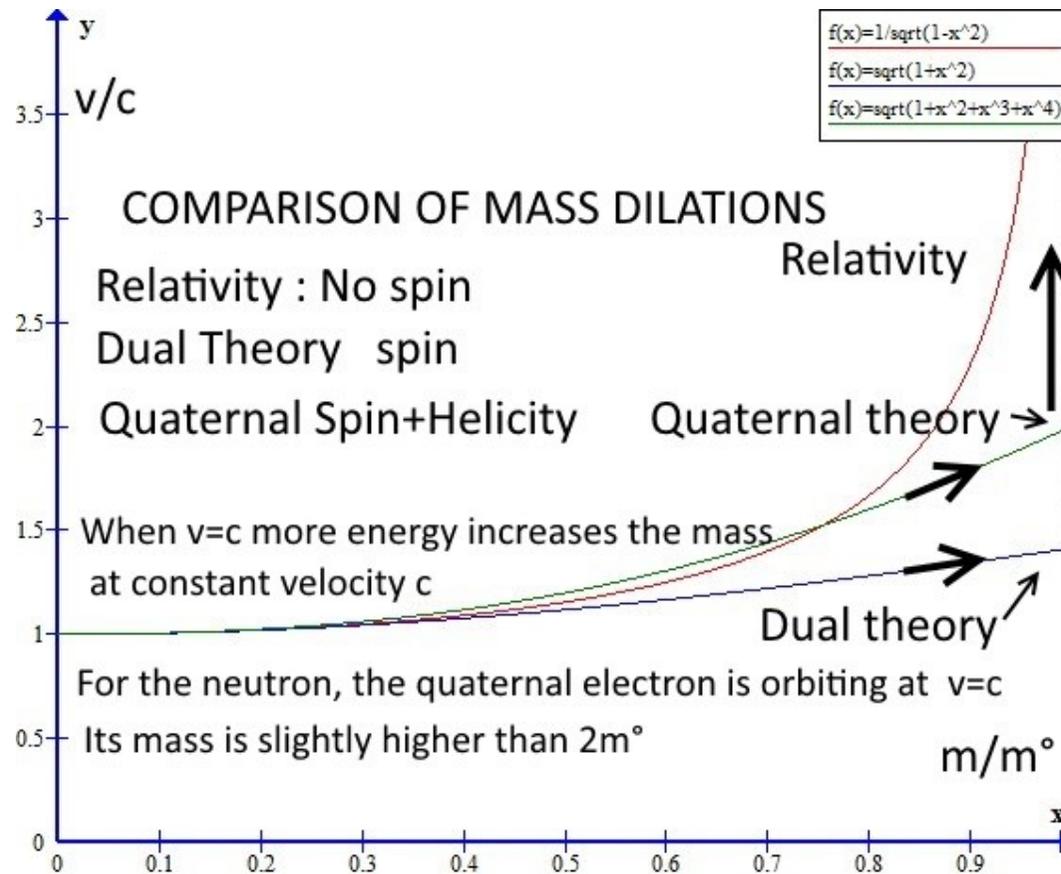**and**

$$m = m° \sqrt{(1 + v'^2/c^2 + v''^2/c^2 + v'''^2/c^2)}$$

with four waves: Compton, translation, spin and helicity waves

$$\lambda° = h/m°c \quad \lambda' = h/m'c \quad \lambda'' = h/m''c \quad \lambda''' = h/m'''c$$

E=m°c²+m'c²+m''c²+m'''c²

COMPARISON OF MASS DILATIONS

v/c

Relativity : No spin

Dual Theory spin

Quaternal Spin+Helicity   Quaternal theory →

Relativity

When v=c more energy increases the mass
at constant velocity c

Dual theory

For the neutron, the quaternal electron is orbiting at v=c
Its mass is slightly higher than 2m°

m/m°

$f(x)=1/sqrt(1-x^2)$

$f(x)=sqrt(1+x^2)$

$f(x)=sqrt(1+x^2+x^3+x^4)$

Mass dilation, instead of being a purely relativistic effect, stems actually, from the presence of a driving i-material mass pulling the inertial rest mass of the particle.

The various masses of the wave/particle do not add up arithmetically but according to complex algebra, not to any relativity!

NEW INTERPRETATION OF MASS and TIME Dilation

Mass dilation is not a swelling of the mass of the particle.

For moving, the electron a new dynamic, an imaginary mass is added

A low energy wave/particle is Dual/complex : $m^* = m° + im'$

Spin and helicity at high energy are introduced by quaternions

The moving high energy mass can be expressed as a quaternion

$$m\# = m° + im' + jm'' + km'''$$

When the particle velocity can reach the speed of light, its mass is doubled at this velocity
For larger energy the velocity stays equal to the speed of light, but its mass keeps growing.
(Important development for quantum computers: the spin can be perturbed by helicity.

On the above graph we see that all the models, relativist or complex
- give almost identical results for velocities less than c/2 ,
- but they diverge for higher velocities.

At the velocity of light, the relativistic mass can become infinite, but never greater than c.
The low energy dual complex model is not valid for velocities greater than c/2.
The quaternal model, allows to cover all velocities and t the spin and the helicity.

COMPARATIVE SUMMARY
Absolute low energy Physics non relativistic

Real Mesoscopic Dual Physics   **Dual Complex Physics**

$$m = m° + m'$$ $$m^* = m° + im' \quad (i^2 = -1)$$

1st Model $m = m°/(1-v/c)$ $m = m°/\sqrt{1-v^2/c^2}$

If v --»c   m--» infinity   m--» infinity

2nd Model $m = m°(1+v/c)$ $m = m°\sqrt{1+v^2/c^2}$

If   v --» c   m stays finite   m stays finite

These results are obtained without the principle of Relativity and without any relativistic hypothesis

Reinterpretation of   Planck's E=hf

I introduce a true Dual/QUATERNAL Quantum Mechanics
4 energies : inertial, orbital, spin, helicity energies
4 frequencies of 4 waves/particle:

E°=hf°   E'=hf'   E"=hf" and E'''= hf'''

and instead of $\lambda = h/mv$ **4 Wavelength**

$$\lambda° = h/mc \quad \lambda' = h/mv' \quad \lambda'' = h/mv'' \quad \lambda''' = h/m'''c$$

inertial,   *spin orbital*   *intrinsic spin*   *helicity*

APPLICATION TO SUB-ATOMIC PHYSICS

the FREE NEUTRON is a sub-atom of hydrogen

The neutron is not an elementary particle, but a sub-hydrogen atom

I model the free neutron as an electron spinning around a proton at velocity c, or very near c, on an unstable orbit, with a mass of about 1.3 MeV, attracted by the strong force, 137 time stronger than Coulomb's electric force. The radius of its orbit is about 1.4 fm

Feynman's life/time t= h/E for a particle ,yields a rather good order for the free neutron life

The neutron electric dipole moment, is rigorously equal to zero,

(since the proton and electron have the same center of mass.)

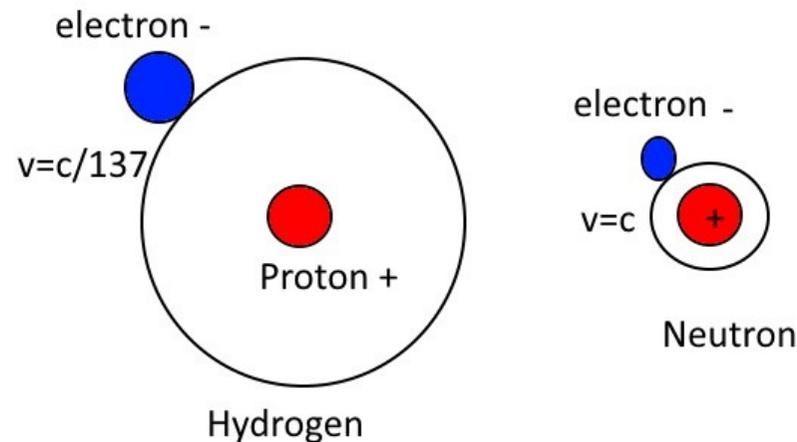A flux of free neutron is a flow of unstable gas subatoms

The neutron and proton Quarkless? Beta Decay   Neutrinoless?

QUESTION?:
the neutron being not a particle,
how does it fit in the nucleus?
ANSWER?
no neutrons in the nucleus?

electron -

v=c/137

Proton +

Hydrogen

electron -

v=c

+

Neutron

APPLICATION TO ASTRO PHYSICS

UNIFICATION OF GRAVITATION with the ELECTRIC FORCE

For unifying gravitation and electric forces in my new Physics, I reject entirely the relativistic astrophysics of the Standard Model. I interpret Michelson's experiment as showing that the photons emitted on earth are carried along by the gravitational field of the earth (as in the old Stokes hypothesis, confirmed by Fizeau's experiment of light transported by moving water).
I reject the reality of gravitation as a curvature of space/time .
Space is absolutely independent of matter.
Space/ Time has no physical reality. It cannot be curved by matter.

I consider gravitation as an attractive tiny residual electric force between the opposite electric fields of the protons and electrons in neutral matter . The residual Coulomb's law, identified with the gravitational law becomes:

$$F = GMM'/R^2 = \beta^2 e^2 NN'/4\pi\varepsilon° m^2 R^2$$

$$F = \beta^2 e^2/4\pi m^2 \epsilon° R^2 \text{ with } \beta \text{ of the order of } 10^{-18}$$

For an aggregate of independent particles, a planet for example, de Broglie's law becomes independent of the mass of the aggregate and we can define a astro/de Broglie's wave length

APPLICATION TO THE SOLAR SYSTEM

$$\Lambda = H/V \quad \text{with} \quad R_n V_n = n \text{ Constant}$$

H is an astro Planck constant and V the orbital planet velocity
The quantification for a system of planet n can be written:

$$R_n V_n = n H$$
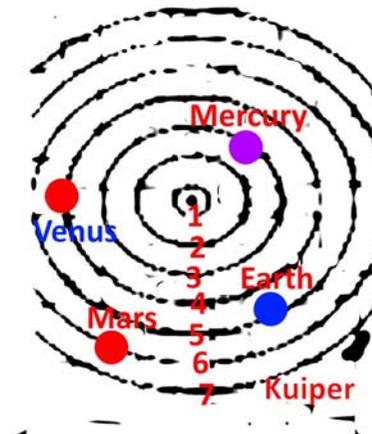
For the solar system, this law gives as quantum numbers
Mercury n=3 , Venus n=4 , Earth n=5, and Mars n=6, (10% accuracy).
(This quantification was also obtained, earlier, by Laurent Nottale, with a totally different fractal theoretical approach)

So gravitation appears confirmed as a residual electric force, a very complex average, between the electric fields of protons and electrons in matter. It becomes very likely that it should depend on the local structures and geometries of atoms. likely to be local constant and should slightly vary between materials So the equality between the gravitational and the inertial mass cannot be ascertained.

Logarithmic
Quantized Solar System

REINTERPRETATION
OF THE EXPANSION of THE UNIVERSE and of BLACK HOLES

**Interpretation of the red shift and refutation of black holes
by an attrition of the escaping photons energy.**

Photons once emitted can never stop nor go backward,
But under gravitational attraction, their pure imaginary mass does diminish so they get redder

$$F = cdm'/dt = -GMm'/R^2 \qquad dt = dR/c \qquad dm'/m' = -GM/c^2 dR/R^2$$

$$m' = m'^\circ \exp(1/R - 1/R^\circ)GM/c^2$$

$$m' \rightarrow m'^\circ \exp(-GM/c^2 R^\circ) \ when \ R \rightarrow \infty$$

**I interpret the red shift , not as a Doppler effect from the expansion of the Universe
but as attrition of the photon imaginary mass due to gravitation.**

So is there, really any Expansion, black holes, darkmatter?

Longitudinal and transversal Doppler Effect. ????

Reinterpretation of a non Relativistic Doppler Effect by the energetic quantum nature of photons.

**Photons emitted by a moving atom should be more blue that from a stationary one
whether the emitting atom is moving forward or backward,
not because of any relativistic effect but because since they are more energetic**

The spacing between photons should be different, but their frequency identical.
If the observer is moving its measuring scale should be reduced so that his measurement of wave length should be reduced,s o his observation would be bluer.
For transversal Doppler all the photons should look bluer.
But in none of these observations, time is involved. Only energy.
In Vera Rubin measurement of the constancy of rotation across the branches of spiral galaxies his transverse Doppler results should have been perturbed by our attritional red shift. So there could be no Dark Matter.
(Actually the spiral shape of the arms show that the velocity is greater near the center.)

Brief SUMMARY of MY SCIENTIFIC ENGINEERING, basis OF QUEST

Rejecting the past Standard Model I have extended
Planck's quantum and de Broglie's duality,
for both Sub-Atomic and Astro/Cosmic Physics.

I started with my postulate of the complex nature of matter presented at the French Academy of Sciences in 1994 by André Lichnérowicz :

The mass of the dual wave/particle is complex:

$$m* = m° + im' \quad \text{with} \quad i^2 = -1 \; , \; m^2 = m°^2 + m'^2$$

the inertial mass m° being the real mass and
the imaginary mass m' being the mass of de Broglie's wave ,

which is pulling the inertial mass m° of the particle according to the
momentum balances : $mv = m'c$ or $m°v = m'c$

This new theoretical context, reevaluates the basic concepts of
Matter, Time and Space, since the motion of an electron or of a planet,
is no longer a simple uniform translation of a point mass, but involves
a subtle mechanics of spinning and wobbling.

Actually, this observation led me to the conclusion that the proper
mechanics had to take into account various other movements visibly
always associated with translation, namely spin and helicity.

Fortunately, quaternion algebra do provide a useful tool to treat it.

*And so, I did extend my dual to a quaternal formalism, with the
defining of four new masses for the particle, in other words,
defining   a quaternal mass for the moving particle or planet.*

Fundamental   DIFFERENCE
BETWEEN
SUB - ATOMIC PHYSICS & ASTROPHYSICS
due to the
Physical Relation between Electric Force and Force of Gravitation

The proton and the electron do emit the electric Coulomb Force
Each Planet emits a (sub-electric) gravitational Force

Rejecting the unrealistic relativistic hypothesis of gravitation as a curvature of the space/Time
I define gravitation as a very tiny residue of the difference of opposite electrical forces of protons and electrons in the atoms of the planets.
I equate   sub-electrical residue to Newton's gravitation force
to model the gravitational solar system

Short Summary

DUAL MATTER IS A COMPLEX ENTITY!

**Far-Away from the present Particle Zoo of the Standard Model
I focus my Physics on only 3 stable physical sub-atomic particles**
electron   proton   photon

Electron & proton move with a dual complex mass
the i-material photon   has a pure imaginary mass
it moves at the local speed of light
According to de Broglie's discovery, the electron is dual

the neutron is not a particle
but an unstable sub-atom of Hydrogen.

LIGHT

According to Planck's discovery light is quantized
According to Einstein's discovery, light is dual.

New properties of the velocity of light.
LIGHT VELOCITY IS A LOCAL CONSTANT
depending on the local value of the gravitational field!

I reject Michelson's interpretation
My Interpretation of Michelson's experiment :
photons are transported by the gravitational field of the earth.

New Hypothesis and questions:
the Velocity of Light depend on the local gravitational Field

So, in deep Space, the velocity of light could become infinite?????
It it does the whole Universe shrinks to a point

**TOWARD A BRAND NEW
PHYSICAL ENGINEERING
FOR THE NEW MILLENIUM**

*EXTRACTION OF NUCLEAR   ENERGY
SUPRA-CONDUCTIVITY at ROOM TEMPERATURE
QUATERNAL COMPUTING
NUCLEAR PROPULSION
GALACTIC   EXPLORATION
ANTI – MATERIALS
TRAVEL AT THE VELOCITY OF LIGHT
HYDROGEN FROM SUN & WATER
TESLA ENERGY FROM SPACE*