Disrupting the 3-Quarks fermion/baryon neutron model
The free NEUTRON IS A SUB ATOM OF HYDROGEN
(*Visual Proof that Matter is linked to time, not to space, so, Relativistic Space/Time is a false concept, unrealistic!*)
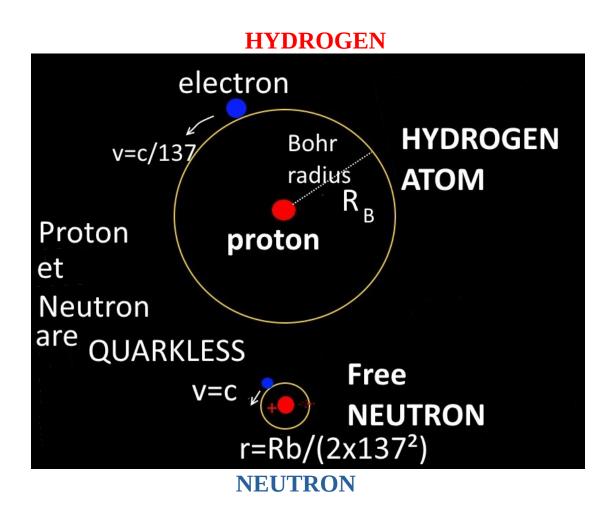
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INITIATIVE PHYSIQUE HEURISTIQUE INDUCTIVE et DETERMINISTE

Plasma nuclear fusion has repeatedly failed for 50 years to produce any energy. It is thus urgent to reconsider the Standard Model of Elementary particles and the old Fermi elementary particle model for the neutron. Rutherford's assumption of the neutron as a proton with a closely bound electron, was thought dismissed by Chadwick's precise measure of the neutron mass which seemed too small, given estimates based on Heisenberg uncertainty, or too large as a simple proton electron addition. My new Post Quantum Physics, briefly presented at the recent April Washington Meeting of APS leads to a sub atomic model by rejecting three pillars of XXth Century Physics: 1) the theory of relativity, (clearly violated in the moving clock experiments). 2) the Heisenberg uncertainty principle which can be reduced by the fine structure constant x 1836; and 3) the neutron as an 3 quarks elementary fermion. In my new theory the neutron is a sub hydrogen atom: a proton with an electron spinning at very high velocity, on a low unstable orbit, with a kinetic mass slightly larger than twice its rest mass and an unstable orbit about 137 times smaller than the Bohr radius. There are no quarks inside the neutron, just a proton and an electron. The potential impact is huge on new future approaches for fusion.

I present here
a brand new non relativistic and non classical quantum Physics for
elementary particles. At this stage of development, as an engineer,
to disrupt the present old theoretical standards of nuclear physics,
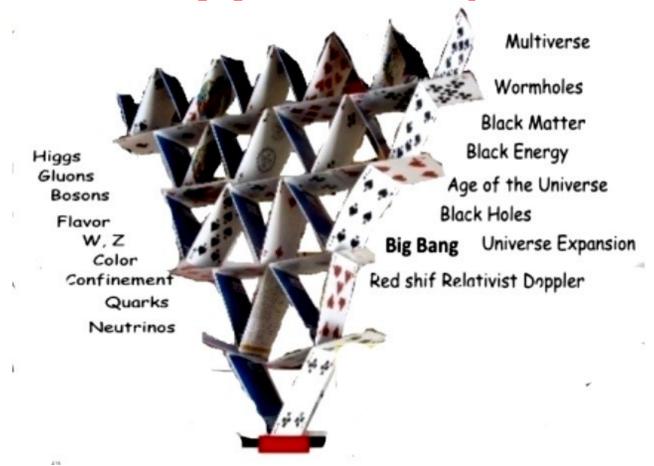I introduce new concepts and orders of magnitudes of their effects.

HYDROGEN

THE NEUTRON IS NOT AN ELEMENTARY PARTICLE

the free neutron is a sub-atom of hydrogen

**Apparently unnoticed by the scientific community,
the Future of Nuclear Physics is threatened by deep clouds**

**Fermi took, only 4 years to prove Nuclear fission
But since 60 years
all controlled nuclear fusion attempts, in the world
have failed to produce a single kwh.
Giant ITER, in France will not be proven until 2060, at best!
RISC in the US, will not be proven until 2035**

The EARTH IS ON FIRE

**(Competition is vital in Politics, Business, Sport…)
The Standard Model of Elementary Particles, also**

must be challenged

DISRUPTING the Standard Model of Elementary Particles Starts by challenging its relativistic and quantum roots.

A NEW, LIGHTER Nuclear Physics is needed.

MAIN CRITICS of Relativistic and Quantum PHYSICS

Special Relativistic and quantum models are unrealistic:
Real moving Particles are not simple, spinless, point entities,
just translating as inertial reference frames
nor pure fuzzy waves:

REAL MOVING PHYSICAL PARTICLES ARE dual and wavy,
they have a mechanical structures, they spin and wobble
Their new models should be quarkless!

Lorentz formulae are, actually, mathematically adhoc!

They have been established primarily
NOT to physically describe a real mechanics for particles
but to resolve Maxwell's Electromagnetic equations
Only Moving Clocks slow down : there is a twin paradox!

Conceived 20 years before de Broglie's wave/particle
Relativistic Physics is incompatible with the Quantum Theory
Recent Strings and GUT Theories are not validated.

Heisenber's uncertainty principle, actually expresses the
constant orbital momentum of electrons $mVR = h/2\pi$
with p=mV it can be written $pR = h/2\pi$
thus leading to $\Delta p . \Delta x > h/2\pi$
(R being the Bohr radius of the Hydrogen atom, for example)

Heisenber's uncertainty principle can be challenged and
reduced by factors of 137 or 1836 by taking instead of R
a much smaller radius r of the particle.
For the electron R=53800 fm and r = 386 fm

For the proton $\rho = 0.2\, fm$ **!!**

BASIS OF a Non Relativistic Physics
(compatible with most well confirmed results)

Born from my discovery of an **experimental observed analogy**, between diphasic Mechanics and deBroglie's wave/particle duality my **Hypothesis of the Complex Nature of Matter** was presented at the Académie des Sciences by André Lichnerowicz in 1994.

To build my new Dual Mechanics for deBroglie's wave/particle I discard relativistic hypothesis and call on Complex Algebra

I postulate that a dual wave/particle moving at absolute measurable velocity v with respect to the laboratory) has a dual complex mass m* , such that

m* = m°+i m' (with i²=-1)

m° being the real inertial static mass of the particle at rest
m' being the imaginary mass of the wave, mass moving always at the **constant, maximum, speed of light**, **c**.

I postulate that the real momentum **p** of the wave/particle is given by the momentum balance:

p = mv = m'c

thus meaning that the wave mass is pulling the wave/particle
So de Broglie's wave is not just, a pilot wave, but a driving wave
The measurable mass modulus of the wave/particle is then given

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

Surprisingly, the same relativistic mass dilation comes out:

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

as well as the same relativistic total energy :

$$E=mc^{2}=\sqrt{\left(m^{\circ 2}c^{4}+p^{2}c^{2}\right)}$$

In addition, de Broglie wave-length ad wave energy are

$$\lambda=h/mv=h/m'c=c/f$$

$$E'=m'c^{2}=hf$$

My hypothesis yields all the relativistic and quantum formulae _
without the need for any relativistic conditions!!!

Thus, I unify relativistic results with Planck's quantification et de Broglie's particle/wave duality without any relativistic conditions, without calling Lorentz Formulae, nor inertial reference frames...
The revolutionnarynew conclusion is that:
the basic laws of particle physics stem from the fact that
de Broglie's wave is an i-material mass driving the particle

The motion of a wave/particle is an **absolute dual mechanics**.
A moving mass is a **complex dual wave/particle**
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 two masses of the dual wave/particle
do not add up arithmetically
but according to complex algebra
with values coinciding with relativistic formulae
All this, shows now, that
Moving matter is different from Stationary matter

Relativity is only, a <u>subjective effect</u> .
Reality is objective!

(This was already, sensed, long time ago by Descartes who used to joke at relativity believers by saying:
"When my neighbour comes running to see me
He is all red and breathless, not me…
He, even, did speculate on the immaterial matter of our thoughts!)

REALITY OF SPACE BUT NOT OF SPACE/TIME

Empty **Space** is a **Real** entity independent of **Mass** and **Time,**
unable to undergo Curvature: SpaceTime is a false concept
The real and imaginary masses being always linked together the
same distance **L** is travelled by a dual particle and is real.

COMPLEX TIME:
A COMPLEX TIME $t^* = t° + it'$ **has to be introduced , so that**
$$L = vt = ct'$$
 Since a moving dual particle, is **associated with 4 masses**
a **real inertial mass** $m°$
an **imaginary mass** m'
a c**omplex mass** $m^* = m° + im'$

and a **mass modulus** $m = \sqrt{(m°^2 + m'^2)}$

naturally, each mass must be aging according to its own time, so
I introduce **for a complex mass** the **concept of complex time t***
$$t^* = t° + it'$$
with a **real time** for the **inertial real mass**   **t°**
     an **imaginary time** for the imaginary wavy mass   **t'**

and a time modulus $t = \sqrt{(t°^2 + t'^2)}$

 T**he time balance** gives
  with   **L = vt = ct'**

so $t = t° / \sqrt{(1 - v^2/c^2)}$

which yields the familiar relativist formula for time dilation
         but, again, without relativistic assumptions!

Time dilation can no longer be taken as a relativistic effect .
It can be understood as the fact that the motion of a dual particle
implies two masses , **each one "aging " along its own time.**
These two times do add up for the whole particleaccording to
complex algebra. Dual time grows with mass and velocity

Second Dual COMPLEX model

In my above model, as in relativity , the mass becomes infinite when the velocity v reaches the speed of light c.

At first sight, it might appear reassuring to retrieve all famous relativistic results. But new studies, led me to a major change

My first momentum balance for a dual wave/particle

$$\mathbf{p= m'c = mv} \quad \text{with} \quad m=\sqrt{(m^{\circ 2}+m'^{2})}$$

did actually imply that the imaginary mass m' is pulling, not only the inertial rest mass m°, but also part of its own moving mass, since **p** the momentum of the dual mass is equal to the momentum of the wavy mass. . In other words in my first model the wave is somewhat pulling itself, which is contradictory, since it seems obvious that the wave mass should move naturally, by itself and should not need any more energy fot its motion.

So I made an important improvement

In my new model, Dual motion is still ensured by an i-material moving mass pulling the inertial mass, I still have

$$\mathbf{m^*=m°+im'} \quad \textbf{(with i}^2\textbf{=-1)}$$

but I choose a new momentum balance:

$$\textcolor{blue}{\mathbf{p = m°v = m'c}} \quad \textcolor{black}{(\textbf{not}} \quad \textcolor{red}{\mathbf{p = mv = m'c)}}$$

$$\underline{\textbf{(stating that the wavemass is naturally pulling itself)}}$$

This apparently slight change has an enormous effect:

now the total moving mass modulus is expressed as :

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

Now the wave/particle can reach the speed of light with a finite mass!

At the speed of light the wave/particle mass remain finite:

$$m=m°\sqrt{(2)}$$

If futher imaginary mass is added, the velocity stays constant always equal to c.

Then, I extend my approach to introduce spin and helicity in the mechanics of elementary particles with quaternions.

SUCCINT INTRODUCTION, AT HIGH ENERGY
OF a 4 WAVES/PARTICLES

In order to account for the spin and the helicity of an electron
as a moving wave/particle, I extend my model with the use of
quaternion algebra:
instead of a single de Broglie's wave,
I associate 4 waves to a moving particle
thus opening a quaternal wave/particle physics

An inertial wave with a Compton wavelength
A translation wave with de Broglie wavelength
A spin wave with a   Spin wavelength
A helicity wave with a   Helicity wave length

To these 4 waves I associate 4 quaternal masses
the inertial mass $m°$
the translation mass m_T and translation velocity vT
the spin mass m_S and spin velocity   vS
the helicity mass m_H and helicity velocity   vH
with
$$m^* = m° + i\, m_T + j\, m_S + k m_H \text{ and } i^2 = j^2 = k^2 = -1$$
and $m^2 = m°^2 + m_T^2 + m_S^2 + m_H^2$
with
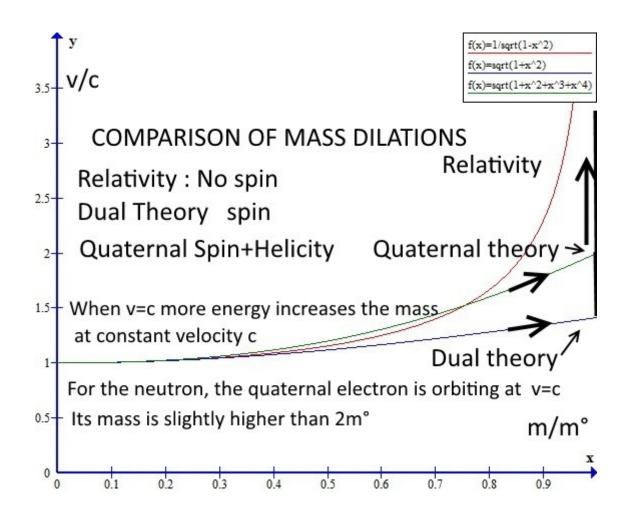
$$m = m° \sqrt{\left(1 + vT^2/c^2 + vS^2/c^2 + vH^2/c^2\right)}$$

Now, as a big change with respect to the first model :
when the three velocities equal c, the total mass is doubled

This is of great importance for the model of the nucleus in
which neutrons are not neutral elementary particles, but a
combination of proton and electron.

COMPARISON OF MASS DILATIONS

Legend:
$f(x)=1/\sqrt{1-x^2}$
$f(x)=\sqrt{1+x^2}$
$f(x)=\sqrt{1+x^2+x^3+x^4}$

COMPARISON OF MASS DILATIONS

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
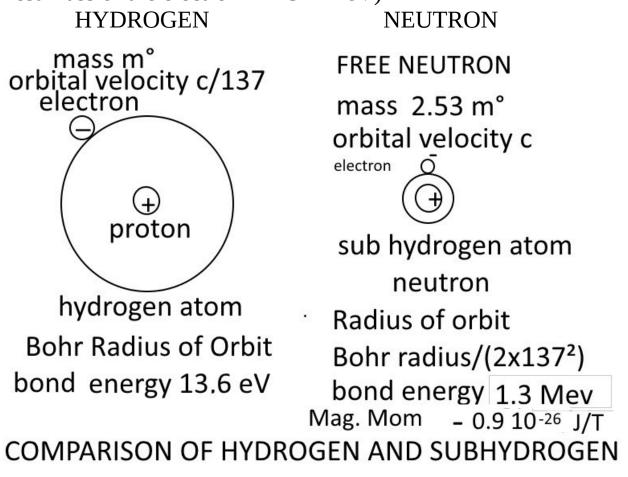Its mass is slightly higher than 2m°

m/m°

v/c

Relativity ignores the spin
The Dual Theory   applies at low energy
The Quaternal Theory includes both spin and helicity
and applies at high energy.
The velocity can reach the speed of light by doubling
the mass of the particle mass.
For larger energy the velocity stays equal to the speed of
light, but its mass keeps growing

It is the case for the neutron with the electron spinning
at the velocity of light on an unstable orbit

Application to the free-neutron model
The neutron is not an elementary particle.

I treat the **neutron as a sub hydrogen atom,** updating Rutherford Bohr's hydrogen model, that is, the neutron as a sub-atom with a electron orbiting at velocity c , around a proton on a low, unstable orbit of radius 1.3 femtometer with a mass of about 1.3 MeV.
(Rest mass of the electron m°=511 KeV)

HYDROGEN   NEUTRON

mass m°
orbital velocity c/137
electron

FREE NEUTRON

mass 2.53 m°
orbital velocity c
electron

proton

hydrogen atom

sub hydrogen atom

neutron

Bohr Radius of Orbit
bond energy 13.6 eV

Radius of orbit
Bohr radius/(2x137²)
bond energy 1.3 Mev
Mag. Mom   − 0.9 10⁻²⁶ J/T

COMPARISON OF HYDROGEN AND SUBHYDROGEN

Claude MASSOT   APS DNP 2020 Meeting   NOv 1st 2020

My model yields a good approximation of the mass of the neutron, and of its magnetic moment.
Applying Feyman's life time t= h/E for a particle yields a rather good order of the free neutron life time .
The electric dipole moment, is rigorously equal to zero,
since the proton and electron have the same center of mass.
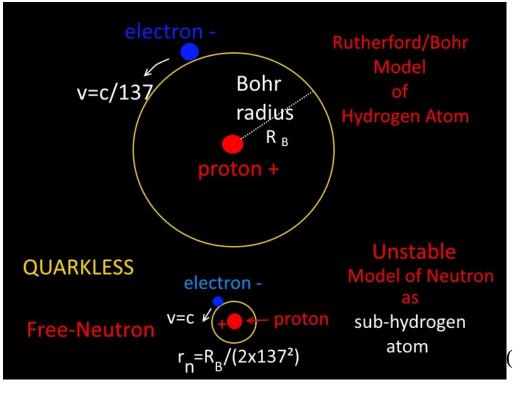A flux of free neutron is a flow of unstable gas subatoms
The neutron is Quarkless

Brief presentation of the model for the proton

I treat the proton as a positive charge of radius 0.2 fm spinning on an orbit of 0,2 fm at the speed of light.
This yields an total outside radius of the proton of 0.6 fm for a magnetic moment of $+ 1.4 \times 10^{-26}$ J/T.
The center of the proton is empty and quarkless

CONCLUSION
Nuclear Physics Needs a complete reappraisal

of the Standard Model hypothesis and conclusions.
It is of vital importance for the future of controlled fusion.
Present fusion reactors might be missing their goal.
New fusion reactor designs
should be, urgently, independently tested.

HYDROGEN

electron -
v=c/137
Bohr radius
R_B
proton +

Rutherford/Bohr Model of Hydrogen Atom

QUARKLESS

Free-Neutron
electron -
v=c
+ ← proton
$r_n = R_B/(2 \times 137^2)$

Unstable Model of Neutron as sub-hydrogen atom

FREE NEUTRON not at scale)