THE RELATIVISTIC CORRECTION ACCORDING TO THE DOUBLING THEORY [1]

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Abstract

The doubling theory [1] completes the basic principles of modern physics without throwing away existing laws. We will give the main point of this theory again. We will see that a new definition of the time flow gives the possibility to calculate and justify the relativistic correction :

$\gamma = (1-v^2/c^2)^{-1/2}$ c is the light speed, v is the velocity of a moving masse.

1 Introduction

This theory introduces a discontinuous flow of time which is defined by a succession of observation instants separated by non observation instants. Our usual lighting (50 Hz) is apparently continuous : switching off 50 times per second, this lighting is discontinuous or stroboscopic (a stroboscopic lighting alternates luminous flashes and dark times).
In the same way, we can define a stroboscopic time. This discontinuous time is apparently continuous for an observer which is moving in this time. The frequency of this temporal stroboscopy is the fundamental characteristic of the time flow into the horizon of the observation.
Used for the particles in quantum mechanics, this horizon notion is a physical reality in the whole Universe. An atom, a planet, a galaxy or any universe is an horizon of interactive particles but also an internal particle in an horizon.
In this theory, a particle in its horizon is always an horizon of particles : as Russian dolls, a particle can be the horizon of internal constituents and its horizon can be also a constituent of an external horizon (figure 1).

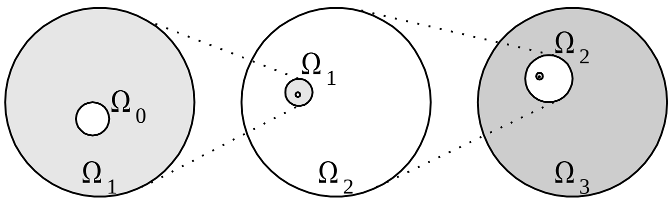

Figure 1

So, the proton or neutron particle can be the horizon of quarks which would constitute this particle. In the cosmos, an horizon is the surface which limits signals of its internal

particles towards the infinite. For a black hole, the horizon is the limit of its signals : nothing can go out of this limit.
A flow of time can be defined by a periodical motion of a space into the horizon of the observer. Different horizons can limit observations and interactions. They can define different time flows (figure 2).

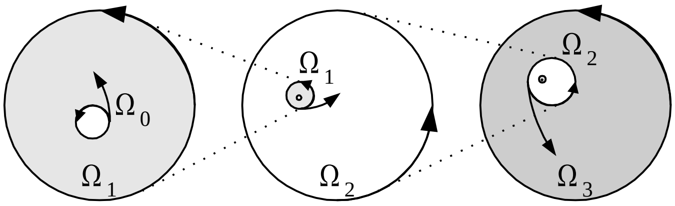

Figure 2

A particular periodical motion can differentiate time flows between an internal particle of an intermediate horizon and an external horizon where this intermediate horizon is a particle. The transformation of an internal horizon into a particle of an external horizon uses a constant number of intermediate horizons, embedded by this particular motion. This motion can be accelerated by this embedding. This acceleration is also the acceleration of the time flow, defined by this motion into each horizon.
So, a fundamental motion can define different time flows. In fact, this motion is defined by several periodical motions into a three-dimensional space. It is the fundamental basis of the doubling theory. With two different time flows, the initial external horizon can anticipate the result of an action or interaction which is made into an internal horizon where the time flow is accelerated.
This anticipation [2&3] could be the result of a doubling of space and time.
This doubling motion gives to an horizon a time flow which is not the time flow of its particles. This relativity of the time flow depends on the embedding of horizons (or particles). The constant number of the embedded horizons into each initial horizon (or particle) is the characteristic of this doubling transformation. This characteristic implies a quantification of the time flow which depends on the horizon of the observer.
With discontinuous energies and discontinuous masses into an discontinuous Universe, a discontinuous time seems to be logical. So, the Heisenberg's relation ($\Delta E \Delta t \geq h/4\pi$) and the Einstein's equation ($E=mC^2$) would use only discontinuous and quantifiable sizes. Einstein [4] has been talking about a time which would be a succession of moments but he never uses a time discontinuity which is the cause of the relativity [1].
The temporal discontinuity of the doubling theory is a succession of measurable moments which can define an accelerated time between two successive measurable moments. This accelerated time is virtual inside the horizon of the measurable time. Virtual particles exist in particles mechanics : using this notion, the doubling theory introduces virtual times. With this logic, a real observable time into an horizon can be a virtual accelerated time into a virtual horizon. The observable exchanges of interactions into any horizon could use the differences of times which depend on the systematical and dynamical embedding of each horizon. These exchanges would be accelerated or decelerated on the boarders of these horizons.

The doubling theory leads us [1] to conclude that the solar system is a system of horizons embedded into the same dynamical transformation : that explains the discontinuous and observed variations of the solar particles velocity (solar wind).
Each horizon corresponds to an initial real time. This time corresponds to a virtual internal time (where the initial time is accelerated) and to a virtual external time (where the initial time is decelerated). So, any particle can become an internal particle (accelerated time) or external particle (decelerated time). These exchanges of paths give to the particle the possibility to anticipate interactions into the initial horizon (initial time). They are not perceptible into the initial horizon of the particle because they take place in an accelerated time. The reverse exchange gives to the initial particle a virtual instantaneous potential in its real horizon. This virtual potential is the consequence of a real interaction in the accelerated time of a virtual internal horizon which, by definition, is not observable.
The principle of relativity of Einstein says that once the laws of physics have been derived in one initial reference frame, these laws can be applied without any modification in any other initial reference frame. In relativity, the electromagnetism's laws are true as well in one inertial reference frame as in any inertial reference frame.
The light speed (c=299 792 km/s in vacuum) is one of the constants which appears in the electromagnetism's laws. According to the principle of relativity, this experimental value must be the same in each of two inertial reference frames and in uniform relative motion. The principle of relativity says that the light speed, which is isotropic in one inertial frame, is also isotropic in all other inertial frames that share the same space-time area.
The discontinuous time does not appear in relativity. This new notion does not refute the principle of relativity but give us a fundamental complement.
The Lorentz transformations were used to account for the invariance of the light speed. The change from Galilean relativity to special relativity has immediate kinetical consequences for material objects moving with a velocity less than the light speed. The simplest and the most important is the time dilation of moving clocks. Today, these basic consequences still divide the scientific community [5].
The rectilinear uniform translation v of the reference frame xyz on the axis x gives us the Lorenzt transformations :

$$x' = (x - vt)\gamma \qquad y' = y \qquad z' = z \qquad t' = (t - vx/c^2)\gamma \qquad \text{with : } \gamma = (1 - v^2/c^2)^{-1/2}$$

The time interval t'(x'y'z') is different than the time interval t(xyz).
We can consider that the time can be dilated or contracted. The notion of stroboscopic time gives us the possibility to explain this dilation or contraction. We will see that the fundamental motion which define different time flows is never rectilinear. The different reference frames are periodically observable on a rectilinear axis. That gives us the impression of an uniform translation. But it is only rotations.
However, we can find the Lorentz transformation again by using particular transformations (called pure Lorentz transformations) corresponding to rotations.

If ψ is the rotation of reference frame around its center, the old coordinates are connected with the new relations [6] :

$$x + i\theta = e^{i\psi}(x' + i\theta') \qquad x = x'\cos\psi - \theta'\sin\psi \qquad \theta = x'\sin\psi + \theta'\cos\psi$$

with : $\theta = ict$ $\quad x = vt \quad$ that implies : $tg\psi = i(v/c)$,

we obtain the Lorentz transformations:

$$x = (x' + t')\gamma \qquad y = y' \quad z = z' \quad t = (t' + (v/c^2)x')\,\gamma \qquad \text{with } \gamma = 1/(1-v^2/c^2)$$

But these relations don't explain the periodical reconstitutions on a radial axis which transform a non observable circular motion into a rectilinear observable motion. The fundamental doubling motion of embedded horizons produces apparent translations which are only the result of simultaneous different rotations.

2 Fundamental Doubling Motion [1]

2.1 Definition of « spinbacks ».

Three simultaneous rotations (into the horizon $\Omega_0 = 2\Omega_1$) compose the fundamental motion (figure 3) :

1) A rotation φ (center o_0) of the radius of Ω_0 (diameter de Ω_1).
2) A rotation φ of Ω_1 around this diameter.
3) A rotation 2φ de Ω_1 around itself.

When $\varphi=\pi$, this motion is called "spinback" of the particle (or horizon) Ω_0.

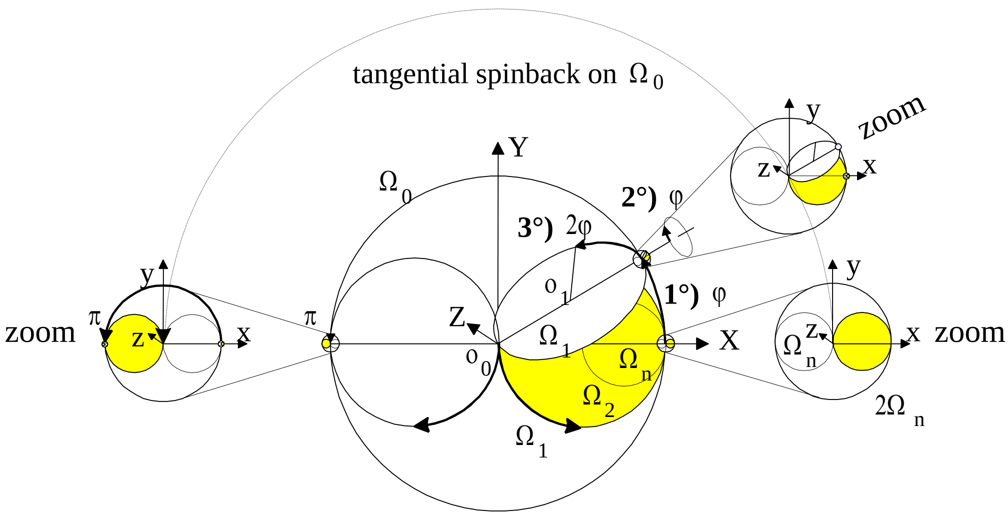

Figure 3 : fundamental motion or spinback.

Two spinbacks ($\varphi=2\pi$) of Ω_0 give again the initial conditions ($\varphi=0$).
The particle $\Omega_n=\Omega_0/2^n$ (with n whole ≥ 0) is also an horizon. It executes the same spinback into the horizon $2\Omega_n$ during the spinback of Ω_0.
This spinback of $2\Omega_n$ on Ω_0 is called "tangential spinback" (see zoom fig. 3).
The spinback of Ω_0 implies a dissociation of Ω_0, Ω_1, Ω_2,…, Ω_n in A and a reconstitution in A' (figure 4a). This reconstitution in the plane Ω_0 turns back the plane Ω_1 and put Ω_2, Ω_3, …,Ω_n in the same sense.

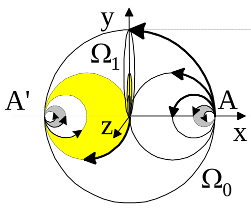

Figure 4a

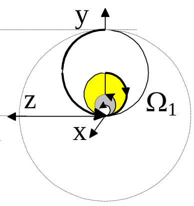

Figure 4b

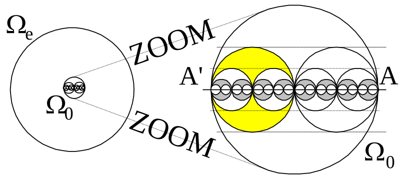

Figure 4c

During the spinback of Ω_0, Ω_n makes 2^n spinbacks. These spinbacks imply several intermediate reconstitution into Ω_0 and one reconstitution of Ω_1, Ω_2,..., Ω_n in the plane (yz) (figure 4b). So all the paths are "radial" into Ω_0.
These "radial spinbacks" are not observable in the external horizon Ω_e when Ω_0 is a particle (figure 4c). The paths of Ω_1, Ω_2,..., Ω_n are radial virtual paths into Ω_0 on the radial axis AA'. It is important to explain the charge C, the symmetry P and the time T of the transformation CPT of the antiparticles. The real motion of the internal tangential particle Ω_n on the horizon Ω_1 corresponds to the real radial path into Ω_0 (figure 5a).

$x=\cos^2\varphi(\cos\varphi-\sin^2\varphi)$
$y=\cos^2\varphi\sin\varphi(1+\cos\varphi)$
$z=\cos\varphi\sin^2\varphi$

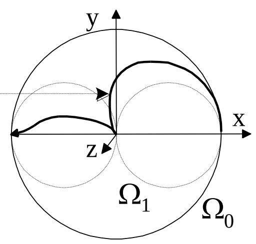

Figure 5a

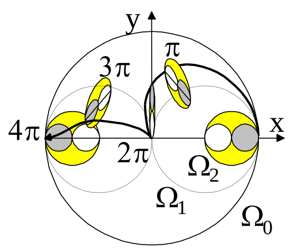

Figure 5b

The motion of Ω_n carries away the horizons Ω_2, Ω_3, …, Ω_{n-1}, which do respectively 2^2, 2^3, …, 2^{n-1} spinbacks during the spinback of Ω_0 (figure 5b).
By definition, the spinback of Ω_n takes place into the horizon $2\Omega_n$, $\forall$n.
It can be radial (figure 6a) or tangential (figure 6b).

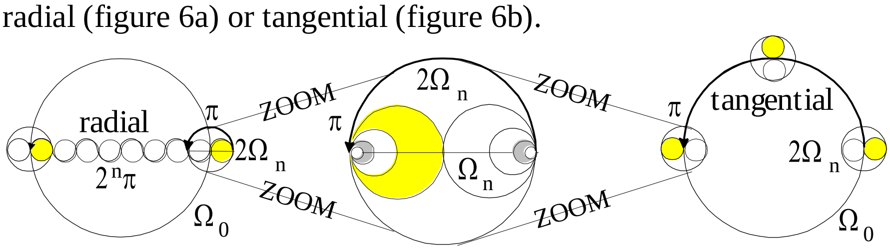

Figure 6a **Figure 6b**

The tangential spinback of $2\Omega_n$ on Ω_0 corresponds to 2 radial spinbacks of Ω_n into $2\Omega_n$. It corresponds to 2^n radial spinbacks of Ω_n into Ω_0 when Ω_0 is motionless.
But, by definition, horizons and particles are never motionless.

2.2 Relativity of the Stroboscopic Flow of Time.

$\forall n$, 2^n spinbacks of Ω_n (radius $R/2^n$) correspond in Ω_0 (radius R) to a radial path πR (figure 7). But, in the external horizon Ω_e (where Ω_0 is a particle), the radial diametrical path of Ω_n (with $n \rightarrow \infty$) seems to be rectilinear and equals to 2R. So, a scaling of time can transform an horizon of particles in a particle in an horizon if πR can become 2R (figure 8).

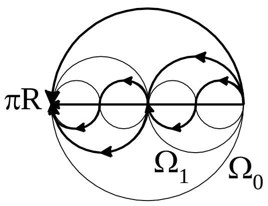

Figure 7

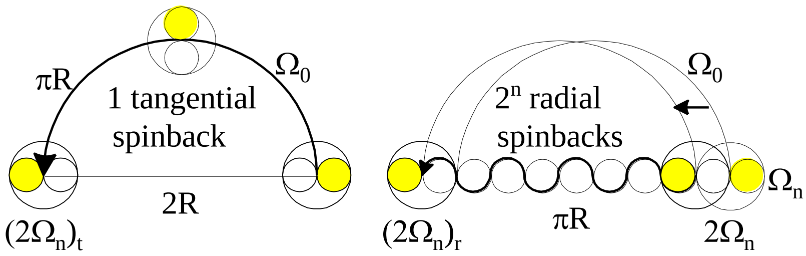

Figure 8

So, the radial path of Ω_n into the tangential horizon $(2\Omega_n)_t$ is 2^n slower than the radial path of Ω_n into the radial horizon $(2\Omega_n)_r$.
The clock in the tangential horizon $(2\Omega_n)_t$ and the clock in the radial horizon $(2\Omega_n)_r$ are the same but their hands have not the same velocity.

2.3 Anticipation of the Radial Particle

By definition, the tangential rotation $\pi-\pi/2^n$ of the horizon $(2\Omega_n)_t$ corresponds to 2^{n-1} radial spinbacks of Ω_n (figure 9a). The horizons $(2\Omega_n)_r$ and $(2\Omega_n)_t$ include the same particle Ω_n. This particle is tangential in $(2\Omega_n)_t$ where the spinback is not finished.
It is radial in $(2\Omega_n)_r$ where the spinback ends. This radial spinback is an anticipation of the tangential spinback. A virtual initial rotation $\pi/2^n$ of Ω_0 implies a tangential virtual (or anticipative) spinback of Ω_0 before its real spinback (figure 9a).
This virtual spinback implies a virtual radial path $2R/2^n$ of Ω_0 which corresponds to an anticipation of this initial horizon.

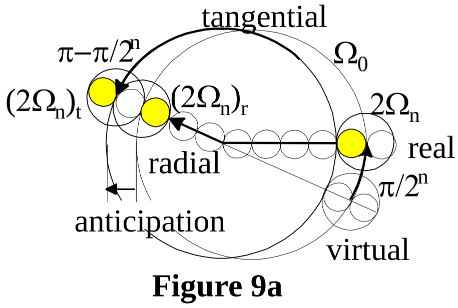

Figure 9a

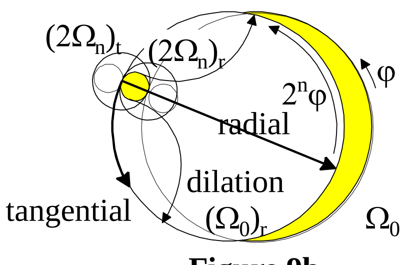

Figure 9b

2.4 Dilation (or Expansion) of the Radial Particle (or Horizon) : $2^n = 8$.

We assume that the radial particle $(\Omega_n)_r$ is dilated and becomes $(2^n\Omega_n)_r=(\Omega_0)_r$, similar to Ω_0, after the rotation $\pi-\pi/2^n$. In this case, $(2\Omega_n)_t$ becomes the initial particle of the initial horizon $(\Omega_0)_r$. After its real radial spinback, $(\Omega_0)_r$ seems to be an initial horizon which makes its spinback 2^n more quicky (figure 9b). In a three dimensional space, this dilation ($\times\ 2^n$) of the radial particle uses three successive dilations ($\times$ 2) : n=3.
When the initial particle o_0 (figure 10a) carries away by the motion of the first spinback of Ω_1, it is moving with its horizon Ω_0 (figure 10b).

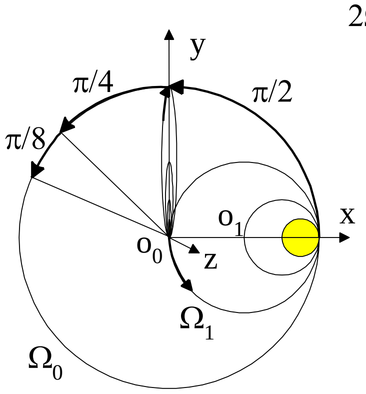

Figure 10a

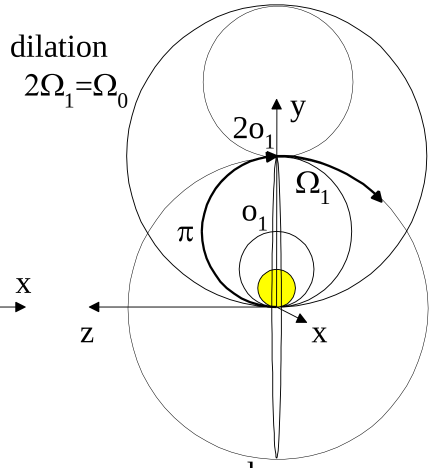

Figure 10b

After the rotation $\pi/2$ of Ω_0, the velocity of o_0 into the plane yz is double into a double space $2\Omega_1$. So, it becomes $2o_1$ at the center of $2\Omega_1$ (figure 10b). A rotation $\pi/2$ of $2\Omega_1$ into this new initial plane yz corresponds to the rotation $\pi/4$ de Ω_0 (figure 10a).
With the velocity of o_2 into the plane xz, the initial particle o_0 becomes $4o_2$ into the dilated horizon $4\Omega_2$. A rotation $\pi/2$ of $4\Omega_2$ into the plane zx corresponds to the rotation $\pi/8$ of Ω_0 (figure 10a). So, the initial particle o_0 becomes $8o_3$ into the dilated horizon $8\Omega_3$, which is the static initial horizon Ω_0 (figure 11a).

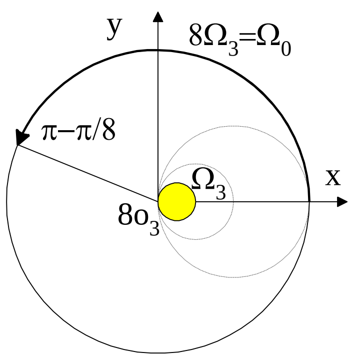

Figure 11a

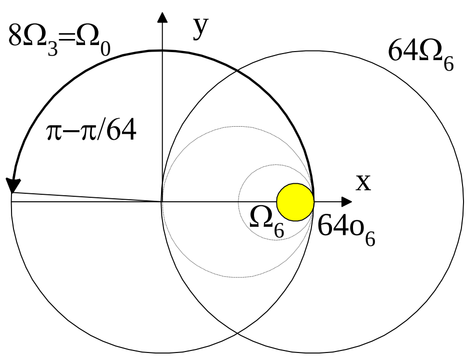

Figure 11b

In the same way, the rotation $\pi-\pi/8$ of $8\Omega_3$ corresponds to the rotation $(\pi-\pi/8)8$ of Ω_0. So, the particle $8o_3$ becomes the dilated particle $64o_6$ into the dilated horizon $d64\Omega_6$ (figure 11b). The horizon $64\Omega_6$ seems to be the initial position of Ω_0 before its two radial spinbacks into $2\Omega_0$, which correspond to the tangential spinback of Ω_6 on Ω_0 (figure 12a).

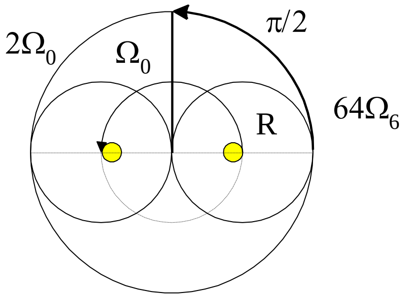

Figure 12a

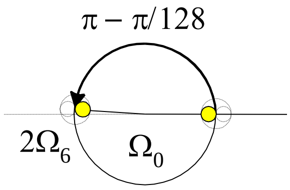

Figure 12b

The spinback of Ω_0 corresponds to the rotation $\pi/2$ de $2\Omega_0$. It is 64 times slower than the spinback of $64\Omega_6$. So, this dilated horizon $64\Omega_6$ makes its first spinback before the first spinback of Ω_0 and before the rotation $\pi-\pi/128$ of Ω_0. (figure 12b).

2.5 Exchange of Radial and Tangential Paths.

After the dilation $(\times 2^3)$ of Ω_3 (after the rotation $\pi-\pi/8$ de Ω_0) the dilated horizon $(\Omega_0)_r$ and the initial horizon Ω_0 are similar but the radial axis of $(\Omega_0)_r$ and the radial axis of Ω_0 are separated by a rotation $\pi/8$ (figure 14).

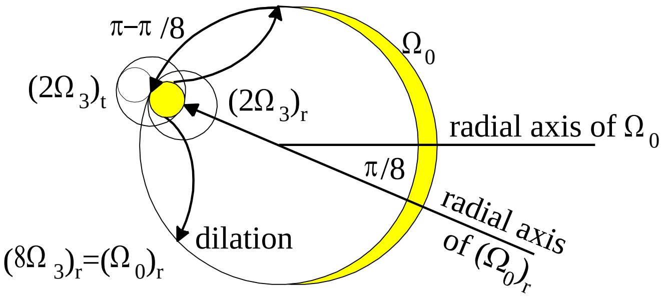

Figure 14

This internal dilation of the particle $(\Omega_3)_r$ in its horizon is not observable in the external horizon Ω_e where Ω_0 is a particle.

Initially (figure 15a), the horizon $2\Omega_3$ on Ω_0 is virtual on the radial axis of $(\Omega_0)_r$.

The dilation of the particle $(\Omega_3)_r$, which becomes $(\Omega_0)_r$, seems produce a real particle $(\Omega_6)_r$, which becomes the dilated particle $(8\Omega_6)_r=(\Omega_3)_r$ (figure 15b). The anticipation of $(\Omega_0)_r$ on the radial axis of $(\Omega_0)_r$ gives to the tangential rotation $\pi-\pi/8$ de $(2\Omega_3)_t$ a supplementary real rotation $\pi/8$. So, $(2\Omega_3)_t$ ends its spinback before the spinback of Ω_0.

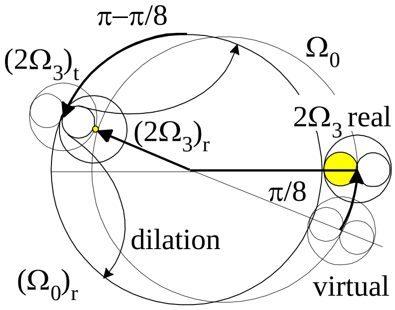

Figure 15a

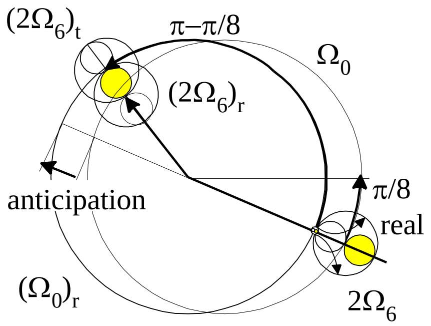

Figure 15b

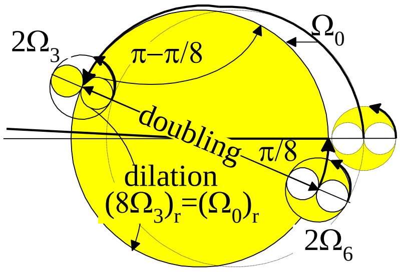

Figure 16a

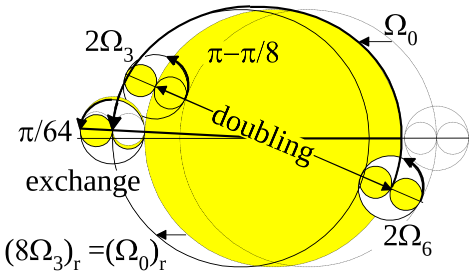

Figure 16b

This end of the spinback of $(\Omega_0)_r$ implies a doubling of the initial particle and the possibility to exchange the radial and the tangential before the end of the spinback of Ω_0. This end is the end of this doubling (figure 16). Because of this exchange, the particle moves around its horizon with another flow of time.

2.6 Acceleration of the Time Flow

In the external horizon Ω_e of the particle Ω_0, the internal dilations of Ω_3 and Ω_6 into Ω_0 are not perceptible. Because of the radial motion of Ω_0, the exchange of radial and tangential is not perceptible. This exchange is made during the 9^{th} radial spinback of Ω_3 (figure 17a). It is into the horizon Ω_0 which contains 9 radial spinbacks of Ω_3. This horizon corresponds to a limit of perception within Ω_e (figure 17b).

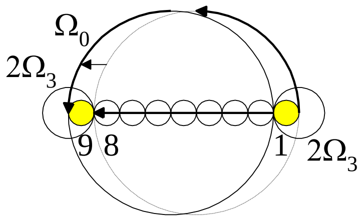

Figure 17a

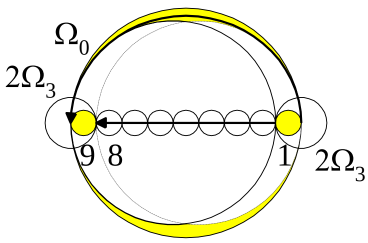

Figure 17b

This exchange is not perceptible out of Ω_0. It corresponds to an accelerated time in Ω_3. Because of the dilation of Ω_3 within $8\Omega_3$, the motion of Ω_3 is similar to the motion of Ω_0 but it is 8 times faster (figure 18a).

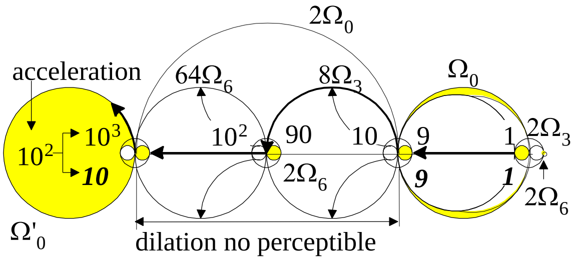

Figure 18a

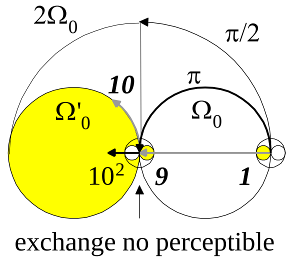

Figure 18b

In the same way in $8\Omega_3$, a no perceptible exchange begins after the 9^{th} spinback of Ω_6. The time is accelerated in Ω_6 because of the dilation of Ω_6 (which becomes $64\Omega_6$).
The motion of Ω_6 and Ω_0 are the same but the motion of Ω_6 is 64 time faster than the motion of Ω_0. So, the 10^{th} radial spinback is the first tangential spinback when Ω_3 becomes $8\Omega_3$ or Ω_6 becomes $64\Omega_6$.
To exchange radial and tangential the time flow is accelerated from 1 to 10.
That implies an acceleration from 1 à 10^3, during the two exchanges into $8\Omega_3$ and $64\Omega_6$.
In the same time, the acceleration in Ω_0 comes from 1 to 10. At the end of the spinback of $8\Omega_3$ or $64\Omega_6$, the difference is always 10^2 (figure 18b).
At the end of the spinback of Ω_0, the radial (=10) and the tangential (=1) in Ω_0 become the radial (=10^2) and the tangential (=10) in Ω'_0.
The exchange of radial and tangential is made with a time acceleration from 1 to 10 . This acceleration is the same for the radial and the tangential paths.

2.7 The Necessary Seven Stroboscopic times of the Doubling.

These exchanges of particles are made in a no perceptible time outside the horizon. They use six intermediate stroboscopic times, defined by seven embedded horizons from Ω_0 to Ω_6.
The external particle Ω_0 is the first horizon, the intermediate particle Ω_3 is the 4^{th}, and the internal particle Ω_6 is the 7^{th}.
The anticipation and the first exchange are made into the 8^{th} one
The 9^{th} corresponds to the reverse exchange.
The 10^{th} gives the initial conditions again.
When the doubling transformation ends, the seven horizons are juxtaposed.
The exchanges of particles are possible.
The next doubling transformation is beginning : the 7^{th} and last horizon $2(64\Omega_6)$ of the first doubling becomes the first horizon $\Omega_{-1}=2\Omega_0$ of the second doubling.

3 Conditions and Exchange Equation [1]

We use a new formalism : R_0 and Ω_0 are respectively the radius R_0 and the horizon Ω_0 "*observable inside the horizon* Ω_0". So, $(R_0)_1$ or $(\Omega_0)_1$ are R_0 or Ω_0 "*observable inside the horizon* Ω_1".

The exchange of radial and tangential implies a condition :

The tangential path $(\pi R)_0$, observable inside Ω_0 is made during the time of one spinback of Ω_0. This time is measured by the rotation $(\pi)_0$ (figure 19a). It is the time $(\pi)_0$ of the doubling (radial and tangential) into Ω_0 between two reconstitution.

So, $(\pi R)_0/(\pi)_0=(R)_0$ is the tangential velocity on Ω_0 during the doubling time $(\pi)_0$.

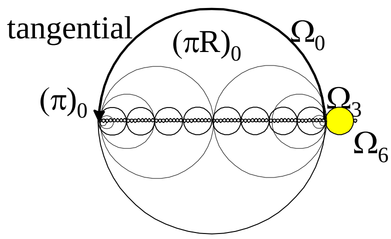

Figure 19a

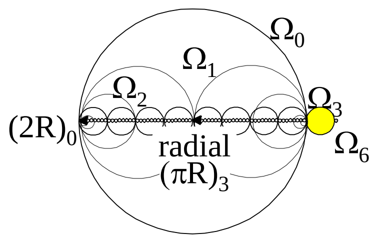

Figure 19b

The radial path $(\pi R)_3$ observable inside Ω_3 (figure 19b) is made during the time measured by the distance $(2R)_3$ which separates two reconstitution on Ω_0.

With the intermediate reconstitution at the center of Ω_0 (after the rotation $\pi/2$ of Ω_0 and the dilation of Ω_1 into $2\Omega_1$), this time corresponds to two doubling of Ω_3 (radial and tangential).

So, $(\pi)_3=(2\pi R)_3/(2R)_3$ is the radial velocity into Ω_0 during the doubling time $(R)_3$.

The exchange of radial and tangential is possible if the radial velocity $(R)_0$ can become the tangential velocity $(\pi)_0$. It is the same condition for $(R)_3$ and $(\pi)_3$.

However, the diameter $(2R)_0$ of Ω_0 must be the radial path $(\pi R)_3$ (see paragraph 2.2. figure 8). So, the tangential path $(\pi R)_0$ must be equal to $(\pi^2 R/2)_3$ (figure 20b).

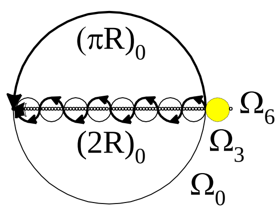

Figure 20a

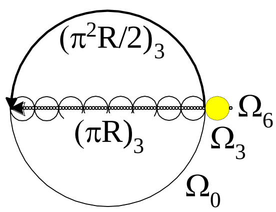

Figure 20b

The exchange of π and R in $(\pi R)_0$ gives $(\pi R)_0$ again.

The exchange of π and R in $(\pi^2 R/2)_3$ gives $(\pi R^2/4)_3$.

So, the exchange condition (noted $\rightleftarrows$) must be : $(\pi R^2)_3 \rightleftarrows (4\pi R)_0$ (1)

This fundamental condition implies a correspondence between a surface and a length.
In fact, the end of the doubling corresponds to the end of the spinback of Ω_0 when Ω_0 is dilated into $2\Omega_0$. This dilation needs a reference with a unitary radius ρ at the beginning and the end of the doubling, so that the rotation π corresponds to the path $\pi\rho$.
So, the exchange condition (4) becomes the exchange equation :

$$(\pi R^2)_3 = (4\pi\rho R)_0 \qquad (1')$$

The equation (1) needs scaling of time and space of spinback between the intermediate horizon Ω_3 and the external horizon Ω_0. These scaling (e_d) and (e_t) are so that :

$$e_t = 1/e_d = 2\pi^{1/2} \qquad (2)$$
$$4R_0 = e_d\pi R_3 = \pi^{1/2}R_3/2 \qquad (2')$$
$$\theta_0^2 = e_t\theta_3 = 2\pi^{1/2}\theta_3 \qquad (2'')$$

θ_0 and θ_3 are respectively the rotation of Ω_0 and Ω_3. At the moment of the final reconstitution ($\theta_0=\theta_3=\pi$), the relations (2') and (2") imply the final juxtaposition :

$$\pi^2 R_0 = \pi^2 R_3$$

According to (2') and (2") : e_d transforms the radial path R_0 into the tangential path πR_3 and e_t transforms θ_3 into θ_0^2, or $(8\pi)_3$ into $(64\pi^2)_0$ during the spinbacks.
It corresponds to the embedding of the seven horizons which are necessary for the doubling and for the respective dilatation of Ω_0, Ω_3, Ω_6 so that ($2^0= 1$, $2^3=8$ and $2^6= 64$).

4 Three Doubling Velocities [1]

Three radial velocities C_0, C_1, and C_2 are necessary between two reconstitution of three embedded horizons. The exchange radial and tangential between Ω_0 and Ω_3, dilated into $(\Omega_0)_r$, uses a radial velocity C_0 during the tangential spinback of Ω_0. This tangential spinback corresponds to 7 radial spinbacks of Ω_3 which use a radial velocity C_1, so that (figure 21a) :

$$C_0= 7C_1. \qquad (3)$$

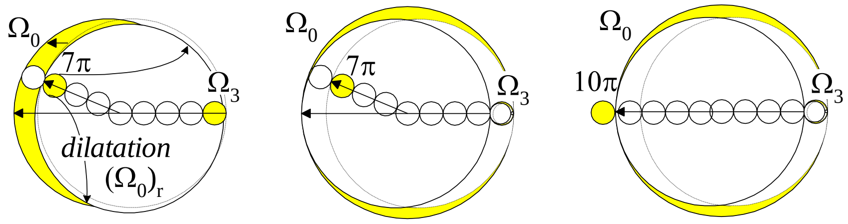

Figure 21a **Figure 21b** **Figure 21c**

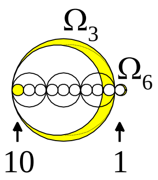

Figure 21d

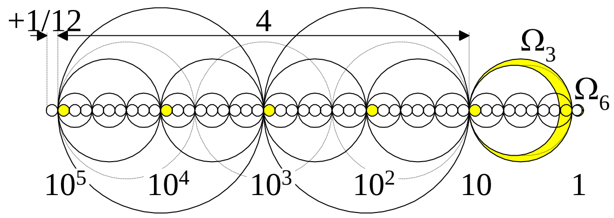

Figure 21e

The radial motion of the horizon Ω_0 includes 9 radial spinbacks of the internal particle Ω_3 (figure 21b).
The first spinback of Ω_0 (or Ω_3) corresponds to the 10^{th} radial spinback of Ω_3 (or Ω_6) (figure 21c).
The 4^{th} spinback of Ω_3 into $2\Omega_3$ corresponds to an acceleration of spinbacks of Ω_3 from 1 to 10^5).
In fact, Ω_3 makes $4+1/12=7^2/12$ radial spinbacks into Ω_0 (figure 21e).
If the radial velocity of Ω_6 is C_2, the radial velocity C_1 is so that :

$$C_0 = 7C_1 = (7^3/12)10^5C_2. \qquad (4)$$

C_2 is the radial maximum velocity of the internal horizon Ω_6 during the doubling.
During the time τ of 4×54 spinbacks ($\pi\rho$) of the particle Ω_6, the acceleration of the motion of this particle comes from 1 to 10^6. In the same time, the acceleration of the motion of the horizon Ω_0 comes from 1 to 10^2 (figure 22). So :

$$C_2 = (216\pi\rho/\tau)10^4 \qquad (5)$$

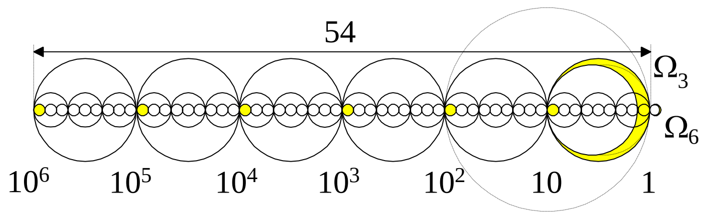

Figure 22

We consider that the radius of the Earth corresponds to the unity of length and one rotation of the Earth around itself corresponds to unity of time. With these unities, the solar system give us this velocity which is in fact the speed of light [1] :

$$C_2 = (216\pi\rho/\tau)10^4 = 54\pi^{5/2}(\pi R_T/4\tau)10^6 = 299\,796 \text{ km./sec.} \qquad (5')$$

with : 2ρ = diameter of Sun = $(100/16)(\pi^{5/2})(2R_T)$
$2R_T$ = diameter of Earth = 12752 km
$2\tau = 365{,}25\times24\times3600$ sec. = one year (2 spinbacks)

The light speed is the velocity limit of any particle (masse m) observable in the horizon of the observer. Since Einstein's relativity, $c = C_2$ must to be (and seems to be) the universal constant [6] which connects the energy and the masse, according to the relation :

$$E=mc^2$$

The theory of relativity introduces the constant γ where the time changes, so that :

$$(t/t')^2 = 1 - (v/c)^2$$

t' is the time associated with the moving reference frame (velocity v) ,
t is the time associated with the inertial reference frame.
$c = C_2$ is the light speed. Measured by many experiments in the solar system, this constant can be deduced in the approximate way from Maxwell's equations [7]:

$\varepsilon_0\mu_0 c^2 = 1$ with electric permittivity of vacuum ε_0,
and magnetic permeability of vacuum μ_0 ,

$\varepsilon_0=10^{-9}/36\pi$ $\mu_0=4\pi 10^{-7}$ $c^2 = 1/\varepsilon_0\mu_0 = 9.10^{16}$ in MKSA.

Calculated from a doubling motion, the light speed is in fact the doubling velocity of the faster particle observable inside the intermediate horizon. This calculation uses different times. So, it includes the relativistic correction.

5 The Relativistic Correction [1]

5.1 Tangential and Radial Embedded Velocities.

Each horizon, Ω_0 (external), Ω_3 (intermediate) and Ω_6 (internal), embedded in the same doubling transformation has a radial velocity (respectively V_0, V_3, V_6) and a tangential velocity (respectively, U_0, U_3, U_6) (figure 23).

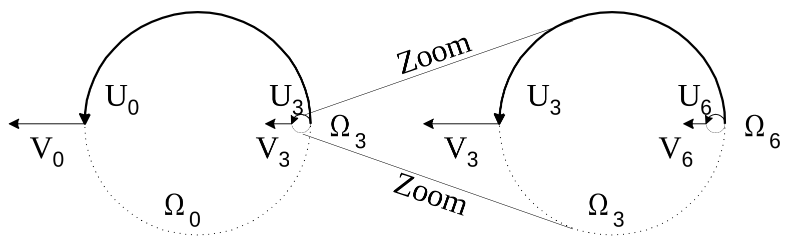

Figure 23

The intermediate horizon Ω_3 ends its spinback when the internal horizon Ω_6 ends its radial path into Ω_3.
The relation (2") transforms θ_6 en θ^2_3, or 8π en $64\pi^2$ during the spinbacks.

In the particle Ω_3 (horizon of Ω_6), the radial path R_6 is made during the time T_6 of one internal spinback π of Ω_6 (figure 24).
This radial path must be equal to the radial path $(R_6^2)_3$, observable in Ω_3. It is made during the time $(T_6^2)_3$ of one intermediate spinback $(\pi^2)_3$ of Ω_6. So, the tangential velocity $U_6=(\pi R/T)_6$, observable in Ω_6, becomes $(U_6^2)_3$, observable in Ω_3.

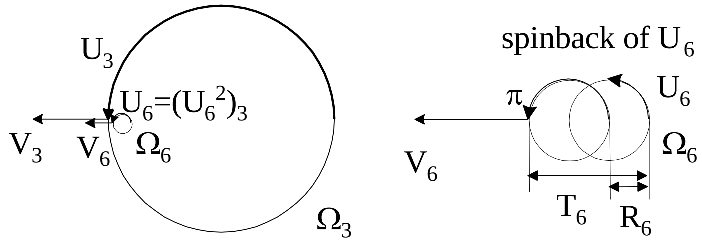

Figure 24

In the same time, the scaling (2') transforms $(\pi R)_6$ (tangential path) into R_3 (radial path).
The instantaneous scaling (e_t and e_d) don't modify observations because of $e_t\, e_d=1$.
The tangential velocity $U_6= (\pi R/T)_6$ becomes the radial velocity $(R_3/T_6)_3{}^2$.

5.2 Relativity of time between three embedded horizons Ω_0, Ω_3, Ω_6.

The time T_6 corresponds to the spinback of Ω_6 during its radial path. According to the above conditions, it will be the time T_0 of spinback of Ω_0 when :

$$V_0 = 8U_0 = (V_3)_0 = (U_3^2)_0 = (U_3)_3 = (1/8)(V_3)_3 = (1/8)(U_6^2)_3.$$

$$V_0/8 = (1/8^2)(U_6^2)_3 = (U_6/8)_6$$

Because of the possibility to exchange radial and tangential in Ω_3, the radial velocity V_0 is equal to the tangential velocity U_6 which becomes $(U_6^2)_3$ in Ω_6.
But the radial velocity V_0 is also $(U_3^2)_0$. That implies :

$$(T_6^2)_3(U_6^2)_3 = (T_0^2)_3[(U_6^2)_3 - (U_3^2)_3]. \qquad (6)$$

Inside the intermediate particle Ω_3, this equation gives us the relativity of time between the external particle Ω_0 and the internal particle Ω_6.
We have the relations :

$$V_3 = 8U_3 \text{ and } V_6 = 8U_6,$$

So, the equation becomes in Ω_3 :

$$T_6^2U_6^2 = T_0^2(U_6^2 - U_3^2) = 64T_6^2V_6^2 = 64T_0^2(V_6^2 - V_3^2)$$

That gives us the change of time (relativity) :

$$(T_6/T_0)^2 = 1 - (V_3/V_6)^2 \qquad (7)$$

In Ω_3, $(T_6)_3$ is the measure of time T in Ω_3 and $(V_6)_3$ is the maximum velocity $c=C_2$ observable inside Ω_3.
$(V_3)_3$ is the radial velocity v of the particle which evolves in the time t.
The relation (7) becomes the well-known relation :

$$t^2/T^2 = 1 - v^2/c^2 = \gamma^{-2} \qquad (7')$$

6 Conclusion

In 1964, the Danish physicist Lüders was talking about the proprieties of particles and antiparticles through the fundamental symmetry : the symmetry CPT.
We suppose that we film in a mirror the reflection of a world where the particles would be antiparticles. Back to front, the movie shows the similar processes of particles. These very general assumptions imply a theorem where the physical laws must be invariant :
- Invariance of charge C : the processes are the same when the particles (charge C) become the antiparticles (charge –C).
- Invariance of parity P : the symmetry of a physical process is invariant when the space coordinates are inverted.
- Invariance of inversion of the direction of time T : all the reactions between the elementary particles are also possible with a reversed time.
So, all the physical interactions must be invariant with CPT transformations.
The fundamental motion (figure 3) shows that the particle Ω_n ($\varphi=0$) is always connected with another particle Ω_n ($\varphi=\pi$) or antiparticle with a similar nature (mass, spin, life time) into the plane of Ω_1. The rotation of this plane (when $\varphi=0$) corresponds to the image of the rotation (when $\varphi=\pi$) in a mirror (inversion = spinback). We must observe the Fresnel's triangle which is connected to the path of Ω_n on Ω_1 into Ω_0.
The exchange of radial and tangential gives to a particle the possibility to evolve with an accelerated time (temporal openings). This particle seems to go back in the past. Its accelerated evolution gives only a virtual time of evolution to the particle. A notice of F. Selleri shows us the impossibility of an antiparticle to increase energy through a sheet of plumb (experiment of A. Anderson for the positron). This notice implies the same conclusion : a direction of time is a reality. With the fundamental motion and the temporal openings, the comeback to the past is always a comeback to a virtual past which depends on an acceleration of time.
Without using Lorentz' transformations, it is possible to find the relativistic correction γ with a fundamental doubling motion. This motion is composed of three simultaneous rotations. Periodical reconstitution on a radial axis give an apparent motion of translation. In fact, all translations are discrete circular motions. The fundamental

doubling motion defines imperceptible times called "temporal openings" in which the time flow can be accelerated. Conversely, any time flow can be the consequence of "temporal openings" of a decelerated time flow. The relativity of time is important because of these "temporal openings" in which another time flow exists with another doubling velocity. Because of these different embedded times and spaces, each particle is always in three different times and three different spaces.

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