

From Poincaré's Electro-Gravific Ether (1905) to Cosmological Background Radiation (3°K, 1965)

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Abstract

It is well known that Einstein published in June 1905 his theory of Special Relativity (SR) without entirely based on space-time Lorentz Transformation (LT) with invariance of Light Velocity. It is much less known that Poincaré published, practically at the same time, a SR also based entirely on LT with also an invariant velocity. However, according to Poincaré, the invariant is not only that of light wave but also that of Gravific Wave in Ether. Poincaré's Gravific ether exerts also a Gravific pressure, in the same paper, on *charged* (e) Electron (a "Hole in Ether" according to Poincaré). There are thus two SR: That of Einstein (ESR), without ether and without gravitation, and that of Poincaré (PSR), with Electro-Gravific-Ether. The crucial question arises then: Does "SPECIAL" Poincaré's (e)-G field fall in the framework of Einstein's GENERAL Relativity? Our answer is positive. On the basis of Einstein's equation of gravitation (1917) with Minkowskian Metric (MM) and Zero Constant Cosmological (CC) we rediscover usual Static Vacuum (without *charge* *e* of electron). On the other hand with MM and *Non-Zero* CC, we discover the gravific field of a Cosmological Black Hole (CBH) with density of dark energy compatible with expanding vacuum. Hawking's Stellar Black Hole (SBH) emits outgoing Black Radiation, whilst Poincaré's CBH emits (at time zero) incoming Black Radiation. We show that Poincaré's G-electron involves a (quantum) GRAVITON (on the model of Einstein's quantum photon) underlying a de Broglie's G-Wave. There is therefore a Gackground Cosmological model in Poincaré's basic paper which predicts a density and a temperature of CBR very close to the observed (COBE) values.

Keywords

Poincaré's Special Relativity (PSR) with Gravitation, PSR in Einstein's GR with CC, Poincaré's Cosmological Black Hole, Poincaré's Incoming

Cosmological Black Radiation versus Hawking's Outgoing Stellar Black Radiation, Poincaré's Gravitational Pressure on Electron ("Ge"), Vacuum without Charge e (ESR), Vacuum with Charge e (PSR), Lightlike Quantum Graviton

1. Introduction: Poincaré's Gravific Waves and Gravific Pressure on Electron in the Framework of SR (1905)

From a historical point of view, there was not only one theory but two theories of SPECIAL RELATIVITY SR ([1] [2]) quasi-simultaneous, 1905): that of Poincaré (July, [1]) and. that of Einstein (June, [2]). Both theories, "Electrodynamics of Moving Bodies" (ESR, [2]) and "Dynamic of electron" (PSR, [1]), are very close but not confused¹. Both theories are based on the same space-time LORENTZ TRANSFORMATION (LT, with invariance (limit) of light velocity c , but there exists a crucial difference that seems irreducible: Unlike Einstein which deletes ether, Poincaré claims the existence of a relativistic ether with "gravific waves" (§1-1) and gravific pressure on electron (§1-2). There is no polemical intention (struggle of priorities between Einstein and Poincaré) on our part because we are now led to rehabilitate Poincaré's "Very Special" Relativity in 1905 on the basis... of Einstein's General Relativity GR in 1916 and more precisely Einstein's Cosmological GR in 1917).

1.1. "Special" Poincaré's Gravific Waves in Ether with Lorentz Transformation (LT)

We purposely adopt the term "GRAVIFIC Wave" used by Poincaré in 1905 in introduction of "Dynamique de l'électron" ([1]: "*Quelles modifications elle [la transformation de Lorentz, LT] nous obligerait à apporter aux lois de la gravitation? C'est ce que j'ai cherché à déterminer. J'ai été conduit à supposer que la propagation de la gravitation n'est pas instantanée mais qu'elle [ONDE GRAVIFIQUE, GRAVIFIC WAVE, dicit Poincaré] se fait à la vitesse de la lumière*").

Laplace considered that the gravitation had a super-luminous velocity: "*La gravitation se déplace au moins 300 fois plus vite que la lumière (according to Laplace. about 300c)*". Laplace (Mitchell's) formula (1) for a Stellar Black Hole (SBH, "black" because the wavelight cannot escape from the SBH) is:

$$c^2 = \frac{2GM}{R} \quad (1)$$

Poincaré criticizes Laplace in 1905 by proposing that the speed of a GRAVIFIC WAVE must be the limit (singular) speed of light on the basis of LT.

At first sight It seems that it is impossible to "make relativistic" (1) because we have no gravitation field in standard Einstein's SR (ESR, 1905). Poincaré's attempt (PSR, 1905) to define gravific waves on the basis of a RELATIVISTIC SBH (with LT) seems to be fruitless (§2).

¹So there is a "Fine Structure" of SR in epistemological meaning (with quotes, see epilogue, §10).

1.2. "Special" Poincaré's Gravific Pressure, with LT, on a "Hole in the Ether" (Charged e Electron)

Poincaré shows also in the same paper (July, §6 Lorentz' Contraction), [1]) that the mass m_e of ELECTRON can be defined from its emitted ElectroMagnetic (EM) field provided to take into account a GRAVIFIC Pressure (also in the framework of LT. From Energy-Impulsion tensor $T_{\mu\nu}^{EM}$ Poincaré notes that energy and impulsion of a purely (EM) Electron are not transformed with LT as the components of a timelike 4-vector: it appears parasitic factors 1/3, 4/3 ($E_0 = mc^2$):

$$E_e = \gamma \left(1 + \frac{1}{3} \beta^2 \right) E_0, \quad P_e = \frac{4}{3} \gamma \beta E_0 \xrightarrow{\text{Gravific Pressure}} E_e = \gamma E_0, \quad P = \gamma \beta E_0 \quad (2)$$

Poincaré then adds to the EM tensor a Non-EM (Gravific origin) tensor (according to Poincaré: a Supplementary Potential):

$$T_{\mu\nu}^{\text{Electron}} = T_{\mu\nu}^{EM} + T_{\mu\nu}^{\text{Non-EM}} \quad (3)$$

in such a way that these parasitic thirds factors are eliminated. Mathematically it means that the diagonal terms of new tensor $T_{\mu\nu}^{\text{Electron}}$ are compensated, except the first one (00) $w_{em} = \frac{1}{8\pi} E_l^2 = \frac{1}{8\pi} \left(\frac{e}{r^2} \right)^2$ (Electric field E_l) in the system of electron at rest (see 28).

Usually 4-tensor Energy-Impulsion can be reduced to a 4-vector Energy-Impulsion only in the absence of a CHARGE e (usual Minkowskian Vacuum is without charge). Thanks to Poincaré's Gravific Pressure $T_{\mu\nu}^{\text{Non-EM}}$, 4-tensor Energy-Impulsion can be reduced to a 4-vector Energy-Impulsion also in presence of a (spherical) charge e . Poincaré does not write in 1905 any formula for its internal e -gravific density (or pressure). This formula w_e is explicitly written by Langevin (in 1913) on the basis of the implicit (for a hole) model of surface charge distribution in the *spherical* radius r_e of Poincaré's electron or "hole in ether" (in details we have after integration $\frac{4}{3} \pi r_e^3 w_e = \frac{1}{3} \frac{e^2}{2r_e}$) (1913):

Poincaré however specifies in 1905 (in the sentence where he claims gravitational origin, in the text "Newtonian attraction") that the density w_e is proportional to the "fourth power of experimental mass m_e of electron". With basic relation of "classical radius" r_e (4) of electron we find indeed the proportionality with m_e^4 announced by Poincaré (where r_e is "classical radius of electron"):

$$r_e = \frac{e^2}{m_e c^2} \Rightarrow w_e = \frac{1}{8\pi} \frac{e^2}{r_e^4} = \frac{1}{8\pi} \frac{m_e^4 c^8}{e^6} = \frac{1}{8\pi} \frac{m_e}{r_e^3} \quad (4)$$

Such a name "classical radius of electron" is inappropriate in Poincaré's theory because he designates his electron as a "(spherical) Hole in the (gravific) Ether" (a kind of singularity in a gravific field). We will show that "classical" theory is in truth a wave theory of electron in the meaning of de Broglie §6-7).

Poincaré's non orthodox point of view seems overthrown by quantum theory of electron: According to Einstein's famous quotation: "*electron* ('quantum of charge' e) is a *stranger in classical electrodynamics*" (Minkowskian usual Va-

cuum is without charge). “Classical” attempt to *integrate* the *concrete electron* (e, r_e, m_e) in the framework of SR was historically not followed because such a “*e-Gravific*” ether is obviously unthinkable from the dominant Einsteinian point of view on SR (1905, June, removal of ether). The few physicists who became interested in Poincaré’s Pressure (Langevin, von Laue, Born, Fermi) interpreted as a purely AD HOC (very Huge ANTI-electrostatic) internal pressure in the electronic hole”).

At first sight there is no connection between GRAVIFIC WAVE (1) and GRAVIFIC ELECTRON (4) except under the presidency of c this apparently artificial equality:

$$c^2 = \frac{2GM}{R} = \frac{e^2}{m_e r_e} \tag{1-4}$$

without any physical meaning (see 47). Poincaré never establishes any direct link between his GRAVIFIC Waves (introduction) and his *negative* (see §5-1) GRAVIFIC Pressure [1].

In this paper we propose a new physical synthesis between introduction and §6 of Poincaré’s paper on the basis of Einstein’s GR. This work could be also considered as a new unexpected approach of Einstein’s Unitary (eG or Ge) Field.

2. Poincaré’s Cosmological Black Hole: Expanding Universe and Density of Dark Energy

Let us no define Poincaré’s Gravific Waves on the basis of Einstein’s equation of General Relativity (GR) with Cosmological Constant (CC) Λ and Perfect Fluid

[1] $T_{\mu\nu} \equiv (p + \rho) \frac{u_\mu u_\nu}{c^2} - p g_{\mu\nu}$ (standard notations: energy density ρ , pressure p and 4-velocity $u_\mu u_\nu$) ([3]):

$$G_{\mu\nu} + \Lambda g_{\mu\nu} = \frac{8\pi G}{c^4} T_{\mu\nu} = \frac{8\pi G}{c^4} \left[(p + \rho) \frac{u_\mu u_\nu}{c^2} - p g_{\mu\nu} \right] \tag{5}$$

Let us introduce Minkowskian Metric (MM) $g_{\mu\nu} = \eta_{\mu\nu}$ in (1) with therefore cancellation of Einstein’s curvature tensor $G_{\mu\nu} = 0$. We obtain a non trivial NeoMinkowskian solution given by the tensor of Perfect (non-baryonic) Fluid $T_{\mu\nu}^{VACUUM}$:

$$p + \rho = 0 \Rightarrow T_{\mu\nu}^{VACUUM} = \rho \eta_{\mu\nu} = \frac{\Lambda c^4}{8\pi G} \eta_{\mu\nu} \tag{6}$$

Obviously with $\Lambda = 0$ ($\rho = 0, p = 0$) we rediscover ESR static vacuum space with permittivity ε , permeability μ , impedance Ω , WITHOUT CHARGE e):

With $\Lambda \neq 0$ ($\rho \neq 0, p \neq 0$) by developing ([3] & [4]) thermodynamic basic relation with (NeoMinkowskian) 3DSpherical Symmetry:

$$U(t) - \rho V(t) = 0 \Rightarrow M(t)c^2 = U(t) = \frac{4}{3} \pi \rho R^3(t) \tag{7}$$

and Newton’s classical law of gravitation (kinetic and potential energy):

$$\frac{1}{2} \dot{R}(t)^2 - \frac{GM(t)}{R(t)} = 0, \quad \dot{R}(t) = \sqrt{\frac{1}{3} \frac{8\pi G}{c^2} \rho R(t)} = c \sqrt{\frac{\Lambda}{3}} R(t) = H_\Lambda R(t) \tag{8}$$

Thermodynamics involves a new dynamic of an Expanding (Accelerating, [4]) universe with Hubble constant $R(t) = R(0)e^{H_\Lambda t}$, $\dot{R}(t) = \dot{R}(0)e^{H_\Lambda t}$. (with $H_\Lambda = 0$ we have obviously Static ESR)

$$T_{\mu\nu}^{VACUUM} = \frac{\Lambda c^4}{8\pi G} \eta_{\mu\nu} = \frac{3H_\Lambda^2 c^2}{8\pi G} \eta_{\mu\nu} \tag{9}$$

in Gauss cgs units of mass we have numerically

$\rho_\Lambda = \frac{3 (2.168 \times 10^{-18})^2}{8\pi \cdot 6.67428 \times 10^{-8}} = 8.6412 \times 10^{-30} \text{ g/cm}^3$. At singular time $t = 0$ (*no negative time, only Tachyon can escape...*):

$$\frac{1}{2} \dot{R}(t)^2 - \frac{GM(t)}{R(t)} = \frac{1}{2} \dot{R}(0)^2 - \frac{GM(0)}{R(0)} = \frac{1}{2} c^2 - \frac{GM_H}{R_H} = 0 \tag{10}$$

Initial conditions are $R(0) = R_H$, $\dot{R}(0) = c$ ($H_\Lambda R_H = c$).

We deduce, with $M_H = \frac{4}{3} \pi \frac{\rho}{c^2} R_H^3$, the *threshold ESCAPE (only Tachyon can escape...)* invariant (light) speed:

$$c^2 = \frac{2GM_H}{R_H} \tag{11}$$

CC induces then a new formula of Laplace (1) that is now completely relativistic (in the meaning of SR and GR as well): *only Tachyon can escape*. We succeed then to transform non-relativistic (1) into (11). We suggest then to call this new formula (11) “Poincaré’s formula”.

A Hubble’s Horizon (*Schwarzshild*) from which light or photon) cannot escape. More precisely: A Cosmological Black Hole (CBH) whose Universal Schwarzshild’s Horizon is Hubble’s Horizon. Underlying Minkowskian Metric MM (Space-Like, only tachyon...) must be then written as follows:

$$ds^2 = dr^2 - c^2 dt^2 = dr^2 - \frac{2GM_H}{R_H} dt^2 \tag{12}$$

This is logically unstoppable. According to GR transformations of coordinates with MM are LINEAR LORENTZ TRANSFORMATION (LT). Enigmatic Neo-Minkowskian Poincaré’s Black Hole is no longer a SBH of Laplace (or Schwarzshild) but a COSMOLOGICAL (UNIVERSAL BLACK HOLE (CBH):

$$T_{\mu\nu}^{VACUUM} = \rho_\Lambda \eta_{\mu\nu} = \frac{3U_H}{4\pi R_H^3} \begin{pmatrix} -1 & 0 & 0 & 0 \\ 0 & 1 & 0 & 0 \\ 0 & 0 & 1 & 0 \\ 0 & 0 & 0 & 1 \end{pmatrix} \tag{13}$$

with $M_H c^2 = U_H$ (density of Dark Energy of Poincaré’s gravitational field in PSR). The searched POINCARE’S GRAVITATIONAL FIELD results immediately from (Minkowskian limit) of Einstein’s gravitational theory (with CC) and then DARK ENERGY becomes then a RELATIVISTIC EFFECT in PSR. Universal coupling between Radius and (R_H, c) involves NECESSARILY a *basic EMISSION* of WAVES (with constant invariant velocity c) from the cosmological spherical

Schwarzschild’s surface of radius R_H (at singular initial time $t = 0$).

Let us note that CBH is also the cosmological limit of Schwarzschild’s static metric (SBH).we have $SBH \xrightarrow{r \rightarrow \infty} CBH$ with $R_S \mapsto R_H$ ($M_S \mapsto M_H$).

$$ds^2 = \lim_{r \rightarrow \infty} \left[\left(1 - \frac{R_S}{r} \right) dr^2 - \frac{1}{1 - \frac{R_S}{r}} c^2 dt^2 \right] = dr^2 - \frac{2GM_H}{R_H} dt^2 \quad (14)$$

In order to be compatible with Expanding (Accelerating) Universe, Schwarzschild’s (Hubble’s) Radius have to be a true (hyperbolic) singularity in the meaning of Disc (Sphere) of Penrose-Escher ([3] & [6]).

We would be then, according this new Poincaré’s model, in an Expanding Universe ... within a Black Hole, without mathematical contradiction. We can also physically replace Maximal R_H with a Minimal Acceleration (Milgrom) $\alpha_M = H_\Lambda c = \frac{2GM_H}{R_H^2}$. Remark at this stage that Poincaré’s Ether is a purely G -Ether (no electron e). Let us now to follow the path of light.

3. Hawking’s Outgoing Black Radiation versus Poincaré’s Incoming Black Radiation

Let us remember that we have NECESSARILY (10) a basic EMISSION of waves (with constant velocity c) from the Horizon of CBH cosmological spherical surface of radius R_H . Let us also remember that Hawking’s Black Radiation ([5]), is emitted from Horizon of Events of SBH (30) to the outside. Hawking (1974) invokes quantum fluctuations in order to justify an emission of (outgoing) Black Radiation from event horizon of SBH.

Until now our theory seems to be a purely classical theory of black hole and then we cannot obtain such a “Hawking’s derogation” for Black Radiation: ONLY tachyons can escape to THE OUTSIDE.

In what Sense of Radial direction should this Black Radiation be emitted?

The only possible logical answer is that the photons can only be emitted to THE INSIDE from Hubble’s HORIZON R_H at $t = 0$.

After spacelike interval (9-10) we have LIGHTLIKE interval for the radiation from the Horizon R_H :

$$ds^2 = dr^2 - \frac{2GM_H}{R_H} dt^2 = 0 \Rightarrow \frac{dr}{dt} = \pm \sqrt{\frac{2GM_H}{R_H}} = c \quad (15)$$

In PSR we have Ligth-Wave or Gravific-Wave as well at velocity c . We suggest to use Minkowskian concept LIGHTLIKE 4-vector. Einstein’s photon or Poincaré’s (hypothetical) GRAVITON (like light) as well. So we have justify Poincaré’s concept of c -Gravific Wave!

Following Penrose (diagrams of Schwarzschild and Minkowski) we note that with $ds^2 = 0$ in Schwarzschild’s metric (14): $\left(1 - \frac{R_S}{r} \right)^2 dr^2 - c^2 dt^2 = 0$,

²This point of view of relativistic Milgrom’s α_M is developed in [3].

$$\frac{dr}{dt} = \lim_{r \rightarrow R_S} \frac{c}{1 - \frac{R_S}{r}} \mapsto \infty . \text{ We have a non singular speed as large as we wish for}$$

SBH. At the limit we have again (15) SBH $\xrightarrow{r \rightarrow \infty}$ CBH .

In summary for SBH we have Outgoing Black Radiation (Hawking) whilst for CBH we have Incoming Black Radiation. Poincaré’s CBH is not only consistent with a well-tempered “Big Bang” but also with an emission of the type of CBR (Cosmological Black (Background) Radiation (a CBR at the Horizon of the CBH?).

Poincaré’s CBH supposes a *radical change of perspective*. Unlike Hawking’s observers, Poincaré’s observers are within a Black hole.

From LightLike Gravific Wave to Quantum Graviton?

We suggest now a new hypothesis based on the concept of *LightLike* Radiation, valid with *c*-Waves for EM) Waves and *G*-Waves as well. Given that Planck’s constant \hbar naturally introduce for PHOTON in a Black Radiation (Hole):

$$\lambda = \frac{\hbar}{P}, \quad \nu = \frac{E}{\hbar}, \quad \lambda \nu = c, \quad E = Pc \tag{16}$$

on the same quantum model of (Quantum) PHOTON, we introduce for (Quantum) GRAVITON a constant A_G (ACTION) that is at this stage *unknown*:

$$\lambda_G = \frac{A_G}{P_G}, \quad \nu_G = \frac{E_G}{A_G}, \quad \lambda_G \nu_G = c, \quad E_G = P_G c \tag{17}$$

Let us begin first without Poincaré. We have now to introduce Electron in basic equation of Perfect Fluid in G(6) in order to determine A_G (ACTION). Poincaré’s electron is hidden in (17). We have to find it.

4. Hidden Electron in Cosmological Perfect Fluid and Black Radiation (without Poincaré)

Let us begin first without Poincaré. We absolutely need to introduce the light (emission of CBR in $t = 0, 10$) and therefore EM wave in Perfect Fluid (5):

$$p_{em} = \frac{1}{3} w_{em} \Rightarrow T_{\mu\nu}^{EM} = \frac{4}{3} w_{em} \frac{u_\mu u_\nu}{c^2} - \frac{1}{3} w_{em} g_{\mu\nu} \tag{18}$$

Remember that Cosmologists distinguish three different types of Fluid which corresponds to three periods of the universe

- 1) the dust or inconsistent matter ($p = 0$),
- 2) the dark energy $p + \rho = 0$ (first density)
- 3) the so-called “Radiation” $p_{em} = \frac{1}{3} w_{em}$ (generally reported, in cosmological literature to a “radiative period of Universe”).

Let us note that other fluids such as the ultra-relativistic electronic gas are not taken in consideration by cosmologists. So far no trace of any electron (charge e and mass m_e) in cosmological usual representations.

4.1. Hidden Electron in Cosmological NeoMinkowskian Perfect Fluid

In cosmological literature we have a perfect “Fluid of Radiation” always written in Riemannian metric $g_{\mu\nu}$ (18). In cosmological literature we have a perfect “Fluid of Radiation” always written in Riemannian metric $g_{\mu\nu}$ (18). It is generally claimed that, if we replace $g_{\mu\nu} = \eta_{\mu\nu}$ from a Riemannian Fluid to a Neo-Minkowskian Fluid (19) the gravitation (and then gravific waves) would be eliminated.

$$p_{em} = \frac{1}{3}w_{em} \Rightarrow T_{\mu\nu}^{EM} = \frac{4}{3}w_{em} \frac{u_\mu u_\nu}{c^2} - \frac{1}{3}w_{em}\eta_{\mu\nu} \tag{19}$$

This second Tensor of EM fluid (18) is compatible with the first Tensor (6) that is always valid *whatever the value of velocity* ($>c, =c$ and $<c$). Indeed the basic operation $\rho + p = 0$ makes disappear the factor $(\rho + p)\frac{u_\mu u_\nu}{c^2}$ and then the 4-velocities. Let us consider a “point of the fluid” (a non-baryonic particle) at rest in a given system \bar{K} . In this case, we have $u_\mu u_\nu = 0$ in proper system for all components except for purely temporal components $u_0 u_0 = c^2$:

$$T_{\mu\nu}^{EM} = \begin{pmatrix} w_{em} & 0 & 0 & 0 \\ 0 & p_{em} & 0 & 0 \\ 0 & 0 & p_{em} & 0 \\ 0 & 0 & 0 & p_{em} \end{pmatrix} = \begin{pmatrix} \frac{4}{3}w_{em} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 \end{pmatrix} - p_{em} \begin{pmatrix} 1 & 0 & 0 & 0 \\ 0 & -1 & 0 & 0 \\ 0 & 0 & -1 & 0 \\ 0 & 0 & 0 & -1 \end{pmatrix} \tag{20}$$

1) The first tensor (left member) is usual EM tensor of radiation with null trace $p_{em} = \frac{1}{3}w_{em}$. This is the reason why the perfect fluid is called “Radiation” in cosmological literature.

2) The second tensor looks like that of a “non-baryonic particle” at rest $u_i = 0$ which could be hidden behind density w_{em} .

3) The third tensor $p_{em}\eta_{\mu\nu}$ with now timelike MM (see spacelike MM, 13).

At this stage, if we admit that non-baryonic particle would be a lepton electron or rather an abstract electronic point, we are far (see 1-4) from a concrete electron (e, m_e, r_e) .

There is however a hidden electron in Cosmological tensor of “Radiation” (a cosmological electron?).

4.2. Hidden Electron (with Pressure) with Timelike Minkowskian Metric

Let us remark that we can put in the third tensor (the pressure) to the left:

$$T_{\mu\nu}^{EM} + p_{em}\eta_{\mu\nu} = \frac{4}{3}w_{em} \frac{u_\mu u_\nu}{c^2} \tag{21}$$

In details:

$$\begin{pmatrix} w_{em} & 0 & 0 & 0 \\ 0 & \frac{1}{3}w_{em} & 0 & 0 \\ 0 & 0 & \frac{1}{3}w_{em} & 0 \\ 0 & 0 & 0 & \frac{1}{3}w_{em} \end{pmatrix} + p_{em} \begin{pmatrix} 1 & 0 & 0 & 0 \\ 0 & -1 & 0 & 0 \\ 0 & 0 & -1 & 0 \\ 0 & 0 & 0 & -1 \end{pmatrix} = \begin{pmatrix} \frac{4}{3}w_{em} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 \end{pmatrix} \quad (22)$$

EM_FIELD + ENIGMATIC PRESSURE- \Rightarrow density of “ELECTRON”

Given that spacelike MM is connected to gravitation, timelike MM could be connected to electronic density $w_e = w_{em}$ if and only if the electron itself e is defined by its field (§1-2).

Everything happens as if behind the EM density w_{em} , an electronic density w_e is hidden

For a concrete electron (e, m_e, r_e) we have anyway:

$$p_e < \frac{1}{3}w_e \quad (23)$$

incompatible with $p_e = \frac{1}{3}w_e$. For ultra-relativistic electronic gas we have

$$p_e \approx \frac{1}{3}w_e.$$

4.3. Hidden Electron in Sphere of Black Radiation in Isentropic Expanding (CBR)

The concrete radiation in our cosmological problematic is black radiation in CBR. Let us remark, in this respect, that the situation of concrete electron (e, m_e, r_e) is exactly the same in cosmological fluid of radiation and in black radiation. All formulas of Planck’s black body are with Planck’s constant h and without (e, m_e, r_e) .

For example in the formula of Stephan-Boltzmann:

$$w_{em} = \sigma_{Stephan} T^4 = w_{CBR} = \sigma_{Stephan} T^4 \quad (24)$$

$$\sigma_{Stephan} = \frac{8\pi^3 k_B^4}{15\hbar c^3} = 7.56564 \times 10^{-15} \text{ cgs}$$

The concrete electron (e, m_e, r_e) is hidden (behind or below h see 17) while the black radiation is emitted by electronic oscillators!

Everything happens as if concrete electron is a hidden background in the fluid and in the black body.

According cosmological usual “*Isentropic Expansion of Spherical CBR*”

$$p_{CBR} = \frac{1}{3}w_{CBR}$$

$$dU + \frac{1}{3}w_{CBR}dV = TdS = 0, \quad d\left(w_{CBR} \frac{4}{3}\pi R^3\right) + \frac{1}{3}w_{CBR}d\left(\frac{4}{3}\pi R^3\right) = 0 \quad (25)$$

On the same model isentropic model as first density (see 6-7):

$$TdS = dH = dU + \frac{1}{3} w_{CBR} dV = 0 \tag{6-7}$$

We usually obtain that variable density w_{CBR} depends on variable Radius (in $\frac{1}{R^4}$) connected with variable Temperature T (in degrees Kelvin K) with formula of Stephan-Boltzmann (see annex 1) for Black body:

$$w_{CBR} \sim \frac{1}{R^4} \tag{26}$$

reported to the black radiation (24):

$$T^4 \sim \frac{1}{R^4} \Rightarrow RT = cte \tag{27}$$

Remember that we have in PSR a fixed hyperbolic horizon R_H (directly induced by CC) which *could* correspond to a new basic constant Temperature T_K of our Universe filled by a Black Radiation (§6).

Everything happens as if Radiation Fluid and Black Radiation were the two sides of the same coin (electronic).

5. Integration of the Stranger (Charged) Electron (with Poincaré)

Poincaré’s historical deduction (see §1-2) with addition of two basic tensors (3) $T_{\mu\nu}^{EM} + T_{\mu\nu}^{Non-EM} = T_{\mu\nu}^{Electron}$ has apparently nothing to do with equation of Perfect fluid (22) (formulated by von Laue or Born about ten years after 1905).

5.1. Why Poincaré Does Insist on the Fact That Pressure Is NEGATIVE?

Poincaré’s basic idea (§1) is to define the electron (w_e) from its field (w_{em}) see (3 and 4) ($w_{em} = \frac{E_l^2 + H^2}{8\pi}$) with $H = 0$, Landau 31-5, p106, [7]):

$$w_{em} = w_e = \frac{1}{8\pi} \frac{e^2}{r_e^4} \tag{28}$$

Poincaré wonders in (3): “Which tensor should I add to the first in order to remove the parasitic diagonal terms” of $T_{\mu\nu}^{EM}$?

$$\begin{pmatrix} w_{em} & 0 & 0 & 0 \\ 0 & \frac{1}{3}w_{em} & 0 & 0 \\ 0 & 0 & \frac{1}{3}w_{em} & 0 \\ 0 & 0 & 0 & \frac{1}{3}w_{em} \end{pmatrix} + \begin{pmatrix} ?w_{em} & 0 & 0 & 0 \\ 0 & P_{em} ? & 0 & 0 \\ 0 & 0 & P_{em} ? & 0 \\ 0 & 0 & 0 & P_{em} ? \end{pmatrix} = \begin{pmatrix} ?w_{em} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 \end{pmatrix} \tag{29}$$

The first is classical EM with zero trace). Poincaré’s mathematical answer would be logically:

$$\begin{pmatrix} \frac{1}{3}w_{em} & 0 & 0 & 0 \\ 0 & p_{em} = -\frac{1}{3}w_{em} & 0 & 0 \\ 0 & 0 & p_{em} = -\frac{1}{3}w_{em} & 0 \\ 0 & 0 & 0 & p_{em} = -\frac{1}{3}w_{em} \end{pmatrix} \quad (30)$$

and therefore mathematically the gravific pressure according to Poincaré indeed must be *negative*:

$$p_{\text{Poincare}} = -\frac{1}{3}w_e \quad (31)$$

because it is then NOT an EM positive pressure $p = +\frac{1}{3}w_e$ (non zero trace $\frac{4}{3}w_e$) but a gravific pressure.

Let us remark that the basic law $p_e < \frac{1}{3}w_e$ is respected because the pressure p_e is negative. The density of the anti-electrostatic force is very huge 10^8 g/cm^3 is not very credible in the role of density of radiation, Reported to black radiation of CBR this first attempt involves $w_e = w_{\text{CBR}}$ (§8) the density involves a temperature) we obtain about 10^{15} K !

5.2. Poincaré’s Pressure on the Basis of Perfect Fluid: From Photon ($v = c$) to Electron ($v < c$)?

(we do a reconstitution as in a judicial investigation)

$$\begin{pmatrix} w_{em} & 0 & 0 & 0 \\ 0 & \frac{1}{3}w_{em} & 0 & 0 \\ 0 & 0 & \frac{1}{3}w_{em} & 0 \\ 0 & 0 & 0 & \frac{1}{3}w_{em} \end{pmatrix} + \frac{1}{3}w_{em} \begin{pmatrix} 1 & 0 & 0 & 0 \\ 0 & -1 & 0 & 0 \\ 0 & 0 & -1 & 0 \\ 0 & 0 & 0 & -1 \end{pmatrix} = \begin{pmatrix} \frac{4}{3}w_{em} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 \end{pmatrix} \quad (32)$$

This is exactly the perfect fluid (39) with an electron at rest (§5-1).

EM_RADIATION + POSITIVE GRAVIFIC PRESSURE- \Rightarrow

COSMOLOGICAL ELECTRON

Therefore Poincaré’s historical (long) deduction is the same as our deduction $g_{\mu\nu} = \eta_{\mu\nu}$ from Riemannian Fluid to NeoMinkowskian Fluid.

There is however a CRUCIAL CONTRAST because formulated with timelike MM:

$$p_e \eta_{\mu\nu} = \frac{1}{3}w_e \begin{pmatrix} 1 & 0 & 0 & 0 \\ 0 & -1 & 0 & 0 \\ 0 & 0 & -1 & 0 \\ 0 & 0 & 0 & -1 \end{pmatrix} \quad (33)$$

Poincaré's negative gravific pressure becomes, in NeoMinkowskian Fluid, a positive pressure with MM. Nothing prevents then to affirm (digit Born) that everything returns in a purely EM order with Electron $p_e = +\frac{1}{3}w_e$ aligned on Photon $p_{em} = \frac{1}{3}w_{em}$! Perfect fluid exerts a huge constraint that did not exist in Poincaré's historical calculation. The gravitational origin of Poincaré's pressure seems to have evaporated. Such an alignment of electron $p_e = \frac{1}{3}w_e$ on photon $p_{em} = \frac{1}{3}w_{em}$ is however impossible. Indeed if we follow the symmetry underlying NeoMinkowskian fluid (this is not the case of historical Poincaré's demonstration) we have for Electron $p_e = \frac{1}{3}w_e$ (33, Born's formula) while we should have for any Electron $p_e < \frac{1}{3}w_e$!

For photonic gas we have *rigorous* relationship $p_{ph} = \frac{1}{3}w_{ph}$ whilst for an Ultra-Relativistic (hot) electronic gas we have an *approximate* relationship $p_e \approx \frac{1}{3}w_e$ ($p_e < \frac{1}{3}w_e$). "Ultra-relativistic" usually means that the proper energy (mass at rest) $E_0 = m_0c^2$ of the electron becomes negligible (almost zero) compared to its kinetic energy $\gamma \gg 1$).

Perfect Ultra-Relativistic (" $v = c$ ") Electron (PURE) with zero mass seems impossible because leptonic electron has a (proper) mass. The situation seems desperate because (35) leads inexorably to a contradiction between $p_e \approx \frac{1}{3}w_e$ and the limit $p_e = \frac{1}{3}w_e$. In Summary, with underlying symmetry in "radiation" fluid (35) that: involves " $p = \frac{1}{3}w$ " for photon and for electron as well. Consequently we have " $E = Pc$ " for electron (with non zero proper mass) and photon (with zero proper mass) as well! In other words, Can an electron moving at the speed of light $v = c$ turn into ... photon? No (see conclusion)!

We have now to introduce between *Photon and Electron, the Graviton* (17).

Summary of the situation:

At this stage we have a purely gravific density (pressure) and a purely electronic density (pressure). But we have no longer an Electro-Gravific density (see the title).

6. Poincaré's Electro-Gravific Ether: de Broglie's Wave of Graviton

We have the same formula for photon and graviton as well (at this stage the gravific density w_G and gravific pressure p_G are not defined, A_G is unknown).

Given that Poincaré's concept of "Hole in ether" for Electron recalls de Broglie's

lie's Diffraction of an electronic wave trough in a "hole of a screen", let us associate with (17) to Poincaré's length r_e (1-4) a de Broglie's Wavelength λ_{Ge} :

$$\lambda_{Ge} = \frac{A}{P_{Ge}}, \quad v_{Ge} = \frac{E_{Ge}}{A}, \quad \lambda_{Ge}v_{Ge} = c, \quad E_{Ge} = P_{Ge}c \quad (34)$$

We have therefore a *de Broglie Wave* ([8]) associated to Poincaré's (lightlike) Graviton where (λ_{Ge}, v_{Ge}) are respectively wavelength and frequency³ and (P_{Ge}, E_{Ge}) respectively impulsions and energy of the graviton. We have now to determine the "Action" A with basic equation of electron (4):

$$r_e = \frac{e^2/c}{m_e c} = \frac{e^2/c}{P_{Ge}} \Rightarrow \frac{r_e}{c} = \frac{e^2/c}{m_e c^2} = \frac{e^2/c}{E_{Ge}} \quad (35)$$

with (usual, mass transformation into Energy) $E_{Ge} = m_e c^2$ and (unusual, mass transformation into Impulsion): $P_{Ge} = m_e c$:

$$\lambda_{Ge} = \frac{e^2/c}{P_{Ge}} = \frac{e^2/c}{m_e c} \Leftrightarrow v_{Ge} = \frac{E_{Ge}}{e^2/c} = \frac{m_e c^2}{e^2/c} \quad (36)$$

that defines logically" $\lambda_{Ge}v_{Ge} = c$ and $E_{Ge} = P_{Ge}c$:

$$P_{Ge} = \frac{e^2/c}{\lambda_{Ge}} \Leftrightarrow E_{Ge} = (e^2/c)v_{Ge} \quad (37)$$

Action A of Poincaré's Quantum Graviton is now determined as a PURE (§5 Perfect Ultra-Relativistic ("v = c") Electron (PURE)):

$$A_G = A_{Ge} = e^2/c \quad (38)$$

replaces \hbar in Einstein's Quantum Photon. (a "classical radius for electron" becomes a length that becomes a wave length and therefore a wavelength of graviton)

Let us remark that from (16 and 17)

$$p_{eG} = \frac{1}{3}w_{eG}, \quad T_{\mu\nu}^{GW} + p_{eG}\eta_{\mu\nu} = \frac{4}{3}w_{eG} \frac{u_\mu u_\nu}{c^2} \quad (39)$$

In summary Poincaré's special length of Electron r_e is finally de Broglie's wave of Graviton λ_{Ge} . This lightlike graviton is without proper mass. The mass of electron is in fact carried (Ge) by the eG-wave in (36-38): a COMOBILE mass of Graviton? de Broglie's G-wave is then logically a wave function of Schrödinger for a particle with zero proper mass.

6.1. G-WED (Photon-Graviton-Electron) VERSUS QED (Photon-Electron)

We suggest here to continue with relativistic mind of de Broglie ([8]) that distinguishes (in 1957) three basic levels in physics.

1) The first level is (macroscopic) according to de Broglie is classical physics (dynamic and thermodynamics).

³Frequency v_{Ge} will be connected with angular velocity of Thomas $\omega_r = 2\pi v_{Gefo}$ for galaxies and thus dark matter).

2) The second level is (microscopic) Quantum physics (baryonic or atomic matter $G_{\mu\nu} \neq 0$).

3) The third level (hypomicroscopic) is the deepest level (photonic-electronic, non baryonic $G_{\mu\nu} = 0$): “the deepest level is **Hypomicrophysics SubQuantum Substratum** constituted by this Vacuum a huge reservoir of underlying energy of which we still know almost nothing” (in French: *Le niveau le plus profond, hypomicrophysique ou subquantique pourrait-on dire, constitué par ce “vide” réservoir immense d’énergie sous-jacente dont nous ignorons encore presque tout*).

The third level “Hypomicrophysics SubQuantum Substratum” is particularly suitable for our problematic (see equation 16-17 for photon and graviton).

According to de Broglie, relativistic Wave Mechanics or Wave ElectroDynamic (WED) (§5) should preside over the destiny of Quantum Mechanics or Quantum ElectroDynamic (QED). We know a little more today with NeoMinkovskian CONTINUUM which adds a decisive gravitational component (G-WED) to de Broglie’s subquantum substratum. The only difference is that we use both SR and GR.

The most fundamental principle of QED (microphysics) is that the LEAST ACTION) corresponds to h (or \hbar). In G-WED (Hypomicrophysics) we have the following LEAST action (52):

$$\left(\frac{e^2}{c}\right)_{WED} \ll \hbar_{QED} \tag{40}$$

the subquantum “continuum” of action $\left(\frac{e^2}{c}\right)_{WED}$, in harmony with continuous spectrum of CBR, is smaller ‘SUB) than the “quantum” of action.

In order to treat of (the density of) non-baryonic SUBquantum VACUUM G-WED is then better adapted:

$$G\text{-WED}_{\text{Poincare-deBroglie-Schrödinger}} \gg QED_{\text{Dirac-Feynman}} \tag{41}$$

The fine structure constant [9]) wbecomes then a decisive factor between G-WED and QED in its two forms (Sommerfeld or Planck Einstein):

$$\frac{\hbar c}{e^2} \approx 137\dots, \quad \frac{hc}{e^2} \approx 860\dots \tag{42}$$

The wavelength associated with the Graviton λ_{Ge} is not the wavelength λ_e (Compton) of a (quantum) electron:

$$P_e = \frac{\hbar}{\lambda_e} \iff E_e = \hbar \nu_e \tag{43}$$

Let us specify also the ratio with wavelength of Compton and radius of Bohr (with fine structure constant):

$$\frac{\lambda_e}{\lambda_{Ge}} = \frac{\hbar}{e^2/c}, \quad \frac{\lambda_{Bohr}}{\lambda_{Ge}} = \left(\frac{\lambda_e}{\lambda_{Ge}}\right)^2 = \left(\frac{\hbar c}{e^2}\right)^2 \tag{44}$$

the *concrete electron* (e, λ_{Ge}, m_e) seems to be completely *integrated*⁴.

6.2. Poincaré’s Background Density of e-Gravific Wave

In previous paragraph let us note that the constant G is hidden. Constant G is however NOT hidden in the third formula of gravific density. Remember (§4) that there are usually three densities:

$$\rho_\Lambda = \frac{\Lambda c^4}{8\pi G} \quad (1) \quad w_e = \frac{1}{8\pi} \frac{e^2}{r_e^4} \quad (2) \quad w_{Ge} = \frac{G}{8\pi} \frac{m_e^2}{r_e^4} \quad (3) \quad (45)$$

- 1) The first (tachyonic) density is the density of Dark Energy (13).
- 2) The second (electronic) density is an INTERNAL density of electron (Poincaré’s formula, 4 & 28).
- 3) The third enigmatic (Ge) Gravifico-electronic (very tiny) density (45-3), with very weak gravitational long range force, is then an EXTERNAL density. Remark that if (32) is a purely internal pressure or density there is no longer contradiction with ultrarelativistic gas (PURE). Indeed this could be an explanation for the fact that Lorentz’ electron has remained perfectly unperturbed (*stable and elementary*, no quark) for more than a century.

Most physicists think that the gravitational (density of) force between 2 electrons (separated with λ_{Ge}) is perfectly negligible. This verdict was true before 1965 and it’s still true after 1965. The steps of the deduction here ($e \mapsto \lambda_{Ge} \mapsto m_e$) leads to adopt the third formula (45-3) (comme avocat de Poincaré (45-2), nous l’appellerons provisoirement “la formule de Cicéron”):

$$(e \mapsto \lambda_{Ge} \mapsto m_e) \Rightarrow w_{Ge} = \frac{G}{8\pi} \frac{m_e^2}{\lambda_{Ge}^4} \quad (46)$$

Cosmological concrete “*G-electron*”, a *stranger in classical electrodynamics*, is now completely integrated in perfect fluid and thus also in CBR.

$$ds_{\text{tachyon}}^2 = \frac{2GM_H}{R_H} dr^2 - dt^2 \Rightarrow ds_{\text{electron}}^2 = \frac{e^2}{m_e \lambda_{Ge}} dt^2 - dr^2 \quad (47)$$

(for kinematic of accelerating galaxies $ds_{\text{bradyon}}^2 = c^2 dr^2 - dt^2$, see [3]). We could then proceed to an original electro-gravific (1-4) synthesis under the presidency of c :

$$c = \frac{2GM_H}{R_H} = \frac{e^2}{m_e r_e} \Rightarrow w_{Ge} = \frac{G}{8\pi} \frac{m_e^2}{\lambda_{Ge}^4} \quad (48)$$

⁴For the evaluation of the cosmic substratum density our WED error is of the order 10 to the power -1. It must be compared (see Unruh) with that of QED that is of the order of 10 to the power 120: “The cosmological constant problem arises because the magnitude of vacuum energy density predicted by quantum mechanics is about 120 orders of magnitude larger than the value implied by observations of accelerating cosmic expansion. This CC problem reported by Unruh disappears with WED.” (Can the fluctuations of the quantum vacuum solve the cosmological constant problem? <https://arxiv.org/abs/1805.12293>). We prove that his monstrous error comes from the misuse (extrapolation) of baryonic quantum theory to a radically non-baryonic subquantum vacuum (confusion between level 2 and 3 according to de Broglie). Note also that this last ratio (55) is also very

close to (53) $\left(\frac{\lambda_{Ge}}{\lambda_e}\right)^2 \approx \left(\frac{1}{137}\right)^2$.

and therefore in Black Radiation.

7. Deduction of the Temperature of Cosmological Black Radiation (CBR)

Given that Planck’s formulas are the same for Gravific Black Radiation (Black Body), after the first attempt ($w_e = w_{em}$), let us now introduce (second attempt):

$$w_{Ge} = w_{CBR} \tag{49}$$

the density of Gravific Waves (46) and then also that of CBR:

$$w_{Ge} = \frac{G}{8\pi} \frac{m_e^2}{\lambda_{Ge}^4} = w_{CBR} \approx 3.8 \times 10^{-34} \text{ g/cm}^3 \tag{50}$$

Given that nothing is changed with Planck’s formulas, with Stefan-Boltzman’s formula (24) we suggest a theoretical deduction of the background absolute temperature of CBR ($R_H T_K = cte$):

$$T_K \approx 2.6 \text{ K} \tag{51}$$

very close to COBE observation.

$$p_{Ge} \eta_{\mu\nu} = \frac{1}{3} w_{Ge} \eta_{\mu\nu} = \frac{1}{3} \frac{G}{8\pi} \frac{m_e^2}{\lambda_{Ge}^4} \begin{pmatrix} 1 & 0 & 0 & 0 \\ 0 & -1 & 0 & 0 \\ 0 & 0 & -1 & 0 \\ 0 & 0 & 0 & -1 \end{pmatrix} \tag{52}$$

THE PERFECT FLUID (the ETHER) BECOMES THEN A BLACK BODY (Black Radiation with free Electron): A CONTINUUM SPECTRUM (with a continuous spectrum). We can now complete with respectively spacelike and time-like $\eta_{\mu\nu}^- : \eta_{\mu\nu}^+$:

$$\rho_{\Lambda} \eta_{\mu\nu}^- = \rho_{\Lambda} \begin{pmatrix} -1 & 0 & 0 & 0 \\ 0 & 1 & 0 & 0 \\ 0 & 0 & 1 & 0 \\ 0 & 0 & 0 & 1 \end{pmatrix} \text{ (dark Energy)} \tag{53}$$

$$w_{Ge} \eta_{\mu\nu}^+ = w_{Ge} \begin{pmatrix} 1 & 0 & 0 & 0 \\ 0 & -1 & 0 & 0 \\ 0 & 0 & -1 & 0 \\ 0 & 0 & 0 & -1 \end{pmatrix} \text{ (CBR)}$$

We have not only the density of CBR but also the basic ratio:

$$\frac{\rho_{\Lambda}}{w_{CBR}} = \frac{8.6412 \times 10^{-30}}{4.5908 \times 10^{-34}} = 18823 \tag{54}$$

or inverted:

$$\Omega_{CBR} = \frac{w_{CBR}}{\rho_{\Lambda}} = 5.38 \times 10^{-5} \tag{55}$$

very close to observation (see also 44, [3] 5.38×10^{-5}). Observers located inside the universe (a Black Hole filled with a Black Radiation) can be happy they have “light” and “electricity”.

8. Conclusions: Einstein's Classical Theory of Unified Field versus Poincaré's (Wave) Quantum Theory of Unified Field (Ge)

Most physicists have gone too quickly “to the quantum whole”. A re-reading of Poincaré's work on Unified Field (Ge) is clearly needed (beyond the cosmological question, [10]).

The irony of the story is that the return of the neoclassical finally allows a perfectly natural introduction of wave-quanta in gravitation's theory. Rather than the Quantization of GR (main stream) we choose here rather a GR-ization (with *Wave-Quantum-Graviton*) of Quantum (electron).

9. Conjecture about Our (Relative) Velocity with Respect to Poincaré's Ether

The fine structure (without quotes, [9]) constant is thus hidden in the synthesis between the two SR (“Poinstein”):

$$\frac{h}{e^2/c} \approx 860 \quad (56)$$

this factor called by Einstein “factor 900”. We have the right to formulate a Conjecture of “Big Boost” (Cosmological Poincaré's “Light Elongated ellipsoid”): Poincaré's (relative) speed with respect to the gravific ether is given in (56). This is very close of the observed COBE value. A dipolar effect on 3 K. of the order of $3 \text{ mK} (10^{-3} \approx \frac{1}{900})$.

10. Historical Epilogue: Einstein's LichtKomplex and Poincaré's Velocity Qwith Respect to the Gravific Ether

Theo quarrell over priorities (1905) is no longer relevant. The two theories are radically different and that on the basis of Einstein's theory of Gravitation.

Indeed both they use LT of a spherical volume but Poincaré considers (1905 §1) a sphere driven with an electronic point (invariance of charge and action e^2/c) whilst Einstein's considers (1905 §8) a sphere driven with a photonic point (LichtKomplex).

BY MAKING $v = c$ (SIC) in Poincaré's spherical Electron. Einstein deduces the existence of spherical particles “whose energy transforms proportionally the frequency”. The coefficient of proportionality is then not \hbar but e^2/c . LichtKomplex are introduced by Einstein in June basic paper §8 [5] three months after his famous LichtQuant (1905). The latter became (with impulsions) the photon for which Einstein got in 1922 the Nobel Prize. Einstein's LichtKomplex were considered as horrors (or terrors) by Lorentz, and Planck (and most of physicists) were rejected by the community of physicists because they presuppose that a certain amount of electronic fluid travels at the speed of light. Einstein eliminated them in all subsequent presentations of his SR (already in 1907...). Their radical elimination will persist even after 1922. They were ejected from

both History of Physics and Physics itself.

Thanks to GR (Einstein 1915) with CC (Einstein 1917) with Poincaré's (Neo-Minkowskian) Limit, we now know that when (the young) Einstein makes $v := c$ in Poincaré's electron (Perfect Ultra-Relativistic Electron (PURE) §5), he determines not a photon but a graviton. The history of physics is highly nonlinear⁵.

The concept of e -Graviton comes from a true dialectic historical synthesis between Poincaré and Einstein ([1] & [2]) which can "materialized" by the concept "Poinstein"? see [9]).

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Conflicts of Interest

The author declares no conflicts of interest regarding the publication of this paper.

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⁵Einstein had suppressed in his SR (1905) the ether (with the possibility of measuring a speed with respect to it). Poincaré did not remove the ether because it was a (gravitational) source of the mass of the electron. Note that Einstein reset an ether in 1922 (see L. Kostro) but he could not make the connection with CBR discovered (1965) after his death (1955, [8]).