

Three major pieces of misinformation in Einstein's Theory of Relativity

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ABSTRACT. It is time to make the three major pieces of misinformation commonly taught in schools and universities all over the world clear: 1) The Michelson-Morley-Miller experiment has never given a “null result”, contrary to what is commonly stated in most physics textbooks. 2) The experimental results of the solar eclipse of 1919 never “proved” Einstein's theory of (General) Relativity. The “difference” between the Newtonian and the Einsteinian deflection of a beam of light was never “confirmed” after 1919. On the contrary in 1960 experimental results by Pound and Rebka showed that the energy (or mass) of light is subject to Newtonian gravitation in the same way as ordinary matter. 3) The “Big Bang” never occurred. Experimental evidence shown by Hubble and Nernst proved clearly that the Universe is not expanding. This result has always been confirmed by astrophysical data and elementary physics.

Key words: Theory of Relativity, speed of light, interferometric experiments, electric conductivity of the ether, cosmic background radiation, redshifts.

RESUMO. Os três maiores “equivocos” na Teoria da Relatividade de Einstein. É chegado o momento de esclarecer os três maiores “equivocos” comumente ensinados nas escolas e universidades em todo o mundo: 1. Os experimentos de Michelson-Morley-Miller nunca deram um “resultado nulo”, contrariamente ao que é estabelecido na maioria dos livros-textos de física. 2. Os resultados experimentais do eclipse solar de 1919 nunca “provaram” a teoria da Relatividade (Geral) de Einstein. A “diferença” entre a deflexão Newtoniana e a Einsteiniana de um feixe de luz nunca foram “confirmadas” após 1919. Pelo contrário, em 1960, resultados experimentais obtidos por Pound e Rebka mostraram que a energia (ou massa) da luz está sujeita à gravitação Newtoniana da mesma forma que a matéria comum. 3. O “Big Bang” nunca ocorreu. Evidências experimentais mostram que Hubble e Nernst provaram claramente que o Universo não está se expandindo. Este resultado tem sido sempre confirmado por dados astrofísicos e pela física elementar.

Palavras-chave: Teoria da Relatividade, velocidade da luz, experimentos de interferometria, condutividade elétrica do éter, radiação cósmica de fundo, desvios para o vermelho.

Roemer, in 1676, and Bradley, in 1728, had the first measurements of the speed of light (Monti, 1996).

In 1856, Weber and Kohlrausch had the first measurement of the ratio of electromagnetic and electrostatic units of charge, called the “v velocity” (Monti, 1996).

In 1857, Weber and Kirchoff obtained the equation of telegraphy, describing the propagation of electromagnetic signals along wires, with the “v velocity” (Assis, 1999).

In 1864, Maxwell was able to deduce from his equations the existence of electromagnetic waves in the ether with velocity of propagation: $v = (\epsilon_0 \mu_0)^{-1/2}$

Maxwell compared the values of the v velocity with those available of the kinematics velocity of light and, since they methodologically involved distinct measurements, he felt confident, on the basis of the substantial agreement of their order of magnitude, to advance his “electromagnetic theory of light” (Maxwell, 1954).

Consequently, since 1864 the existence of two distinct physical quantities:

$c_0 = (\epsilon_0 \mu_0)^{-1/2}$ and $c_M = 2 L / \Delta T$, which we call respectively: Electromagnetic (c_0) and: kinematics (c_M) speed of light, was clear.

“At the beginning of the century (1900) it seemed improbable that one should find them (c_0)

and c_M) identical... Michelson stated this clearly: ... a difference might almost certainly be predicted" (Monti, 1996).

Unfortunately Michelson had already made two mistakes.

In 1887, trying to test the orbital velocity of the Earth relative to the ether:

1) He was not able to write down the correct relation between the two quantities c_0 and c_M , which is: $c_M = c_0 (1 - \beta^2) / (1 - \beta^2 \sin^2\theta)^{1/2}$;

$\beta = v / c_0$, which means that: $c_M = f(c_0, v, \theta)$.

2) He was not able to understand that Roemer's and Bradley's methods and the measurement of c_0 (that is: the electromagnetic measurement of the speed of light) could allow the test of the orbital velocity of the Earth:

$v = c_0 \Delta T / 2 T_0$; $v = \alpha c_0$ ($\alpha =$ aberration angle) (1).

Today, the measurement of the anisotropy of background radiation has completely solved the problem of the Earth's, the Solar System's, and also, the Galaxy's velocities through the ether, by being 390 and 600 km/s respectively (Monti, 1996).

Michelson and Morley made only one series of observations in 1887, and never repeated the ether drift experiment again notwithstanding many printed statements to the contrary (Monti, 1996).

Einstein's Theory of Relativity

Morley and Miller pointed out that the result of the Michelson-Morley's experiment did not have the anticipated magnitude, but the indicated effect was not zero (Monti, 1996).

Unfortunately, Albert Einstein, an employee of the patent office in Bern, knowing very little of experimental physics, understood only the "many printed statements to the contrary" and supposed that the experimental result of the Michelson-Morley experiment was exactly zero.

Consequently, he devised a theory to explain this "null result": the Theory of Relativity (Einstein, 1905).

"...Let us establish...that the quantity: $c = 2 L / \Delta T$ is a universal constant: the velocity of light in vacuum".

He was not able to distinguish between c_M and c_0 . As a consequence the relation between these two physical quantities: $c_M = c_0 (1 - \beta^2) / (1 - \beta^2 \sin^2\theta)^{1/2}$ became: $c = c (1 - \beta^2) / (1 - \beta^2 \sin^2\theta)^{1/2}$. A "paradox" which could be "true" only if: "In my Theory (of Relativity) the velocity of light plays physically the role of an infinite velocity...by definition...the time that light employs to go from a point A to a point B

is equal to the time employed by light to go from B to A:

$\Delta T_{AB} = L / (c - v) = \Delta T_{BA} = L / (c + v)$ [1], (Einstein, 1905).

With "the coming of Relativity" Michelson-Morley experiment assumes a new experimental significance: many different precision measurements - not possible at the time - are required to test the "stability" of Einstein's "universal constant": $c_M = 2L / \Delta T$ with a "single arm". But with "two arms" it is possible to make a comparison between kinematics velocities in different directions, without making measurements of c_M .

This is the "new" physical meaning of the Michelson-Morley experiment after 1905: Michelson-Morley's apparatus had to work as an Optical Gyroscope.

Today we know that an Optical Gyroscope is sensitive to 0.001 deg/h, but it is necessary to avoid the lock-in of the standing waves (Chow et al., 1985).

The Optical Gyroscope

In 1904, Michelson first devised the idea of the Optical Gyroscope, but he could not get the money to make it (Michelson, 1904).

In 1913, Michelson's idea was taken and developed by Sagnac.

Sagnac, like Michelson, considered two light pencils, one travelling counterclockwise (Δt_F) and the other clockwise (Δt_R).

We have: $\Delta t_F = L / (c_0 - v)$; $\Delta t_R = L / (c_0 + v)$.

The difference is $\Delta t_F - \Delta t_R = 2L v / c_0^2 (1 - \beta^2) = 2L \beta / c_0 (1 - \beta^2)$, and neglecting only terms in β^3 and higher order, $\Delta T = \Delta t_F - \Delta t_R = 2L \beta / c_0$.

The corresponding phase shift is $\Delta_L = (c_0 \Delta T) / \lambda = (2L \beta) / \lambda$.

Working with the difference we, consequently, have the possibility (taking as a reference the velocity relative to the cosmic background radiation) of searching for effects in $\beta = v / c_0 = 400 / 300.000 = 1.3 \times 10^{-3}$. (Monti, 1996)

Adding one mirror to the ideal Michelson-Morley experiment we have Sagnac's experiment (1).

Working with the difference $\Delta t_F - \Delta t_R$, in 1913 Sagnac proved the formula $\Delta_L = (4 \omega S) / c_0 \lambda$ and disproved the theory of Relativity.

Moreover, Sagnac suggested that a large "Sagnac circuit" fixed to a carrier (a ship in his example) would be sensitive to slow down generation small deviations around a fixed velocity, so that it could work as an optical gyroscope (Monti, 1996).

If the mechanical vibrations of Sagnac's apparatus could not allow the "unlocking" of the standing

waves, Sagnac's experiment would certainly have been considered further proof of special Relativity.

In the 1960s, the problem of the locking was discovered and solved technically because it was already known that a "Sagnac circuit" had to work (a null result could not be accepted). The first optical gyroscope was built in 1963 by Macek and Davis. Today a sensitive ring-laser gyroscope can fit into the palm of one's hand. Passenger carriers such as 757 or 767 Boeings series and a number of A 310 Airbus Industrie rely on ring-laser gyroscopes rather than on mechanical ones (Monti, 1996).

The second misinformation

Two years after Sagnac's experimental results Einstein produced the General Theory of Relativity (1916) (Monti, 1905).

Since it was "unexpected", one very important, "experimental proof" of the General Theory should have been a "difference" between the Newtonian and Einsteinian deflection of a beam of light passing near the sun (near a strong gravitational field).

The experimental results observed during the 1919 solar eclipsis were unable to prove something, but Eddington decided that they were "convincing in favour of Einsteinian Theory" and the Theory was quickly, widely and easily accepted (Marmet, 1997).

These results were no longer experimentally confirmed (Monti, 1996).

A lie and a swindle constituted the experimental basis of the theories of Relativity (Special and General).

Eddington also tried another swindle about the so called "gravitational redshift" of B Syrius together with J.Adams, but failed (Mamone Capria, 1999).

Finally, Pound and Rebka showed clearly that the energy (or mass) of light is subject to Newtonian gravitation in the same way as to ordinary matter:

$h \Delta v = mgz$; where: $m = h v / c_0^2$ (Weidner, 1967).

Langevin's "explanation" of Sagnac's experiment (1921)

After the "success" of the 1919 expeditions Langevin tried to "save" Special Relativity by means of General Relativity.

Langevin starts by saying that the Michelson-Morley experiment and Sagnac's experiment are "not comparable". But he only shows that he has not understood that the difference consists in one mirror (that is: they are perfectly comparable) (Monti, 1996).

Then he forms the hypothesis that the rotation of the platform causes, within the reference frame

connected with the rotating platform, exactly the space-time variations that can explain the experimental result: $\Delta_L = 4\omega S / c_0 \lambda$ if *General Relativity is true*. But:

1. There are no experimental proofs of the validity of General Relativity.
2. The platform of Sagnac's experiment can also work fixed to the earth, as shown by Michelson-Gale experiment four years later (1925).
3. In 1941, Dufour and Prunier showed that Langevin's argumentation was disproved if part of the optical circuit was fixed to the laboratory (Monti, 1996).
4. In 1999, E.J.Post has proved that Michelson-Morley's and Sagnac's experiments are equivalent (Post, 1999).

As a consequence, Langevin's argumentation is experimentally groundless, and Sagnac's experiment disproves Relativity.

The Miller experiments (1921 to 1925)

From 1921 to 1925 Miller had the opportunity to repeat the Michelson-Morley experiment at Mount Wilson.

The result was the following:

"All these observations show a positive periodic displacement of the interference fringes, as of an ether drift, of the same magnitude, about (10 ± 0.33) km/s, as has been obtained in previous trials...The effects were shown to be real and systematic, beyond any further question...Under the conditions of actual observations, the periodic displacements could not possibly be produced by temperature effects...These experiments had given conclusive evidence of a real effect which was systematic, but which was small in magnitude and unexplainable to his azimuth...The average of the curve on sidereal times, showed conclusively that the observed effect is a cosmical phenomenon" (Monti, 1996).

Finally (1933), commenting on the other ether drift experiments by Kennedy, Joos, Michelson, Pease and Pearson, Miller pointed out that:

"In none of these experiments the observations have been of such extent and of such continuity as to determine the exact nature of the diurnal and seasonal variations" (Monti, 1996).

Albert Einstein was aware of the danger constituted by Miller's experiment.

He decided, at first, to ignore Miller's results (Mamone Capria, 1999).

Miller was at the time the President of the American Physical Society: his power was too strong, like his experimental data. Einstein "got

flooded with telegrams and letters asking him to make comments" (Pais, 1982), but he kept silent.

In 1927, he "suggested the idea of possible "systematic errors" in Miller's experiment (Mamone Capria, 1999).

Miller died in 1941 and, after the war, Shankland was convinced to play a new piece of misinformation: "A new analysis of the interferometric observations of Dayton C. Miller" (Shankland *et al.*, 1955).

But, in front of the experimental evidence shown by Miller, he decided "not to embark himself on a sound recomputation " of Miller's results (Shankland *et al.*, 1955).

Shankland's paper appeared in the same year and month of Einstein's death.

Einstein's "scientific career" started with a piece of misinformation (Eddington, 1919) and ended with a piece of misinformation (Shankland *et al.* 1955).

In 1997, Maurice Allais made finally the "sound recomputation of the cosmic solution data" shown by Miller, confirming the correctness of Miller's results (Allais, 1998).

The Kennedy - Thorndike experiment (1929)

In 1929, Kennedy and Thorndike supposed that, according to their theoretical calculations a Michelson-Morley interferometer with unequal arms could show experimental evidence not only of the longitudinal contraction, but also of the time dilation.

Consequently, they built an interferometer with unequal arms.

But they had an astonishing surprise: the interferometer worked as an Optical Gyroscope, showing a "daily effect" due to the rotation of the earth around some kind of fixed velocity.

The daily effect was a real one: it could be clearly observed in the photographic plates.

Again they tried to "save Relativity" saying that "the effect did not have the anticipated magnitude according to ether theories" (Monti, 1996).

But, as a matter of fact, the daily effect of the Kennedy-Thorndike experiment definitely disproves Relativity because the daily effect itself means that the kinematics speed of light is not constant during the day, while the "anticipated theoretical magnitude" according to Relativity is: no daily effects.

The Kennedy-Thorndike experiment was never repeated.

I suggested some years ago (Monti, 1996) that it should be repeated, but I have got no answer.

The third misinformation

Usually, in the electromagnetic wave equation:

$$\epsilon_0 \mu_0 (\delta^2 F / \delta t^2) + \sigma_0 \mu_0 (\delta F / \delta t) = \Delta F [1]$$

the term $\sigma_0 \mu_0 (\delta F / \delta t)$, which represents the damping effect of the interaction of the electromagnetic wave with the medium in which it propagates (ether), is very small and is often omitted as negligible (Monti, 1996).

Obviously the electric conductivity of the ether: σ_0 is not null, otherwise there should be no damping, and an electromagnetic wave should be an example of perpetual motion (Monti, 1996).

But, Albert Einstein was unaware of this elementary conclusion.

For him, the "electromagnetic wave equation" had always been:

$$(1/c^2) (\delta^2 F / \delta t^2) = \Delta F.$$

The ether and its physical properties, like σ_0 , simply "did not exist" (Einstein, 1905).

But since 1925, the redshift of galaxies have showed clearly that an electromagnetic wave is *not* an example of perpetual motion. That is:

σ_0 is not null (Monti, 1996), and knowing that the energy of an electromagnetic wave is directly proportional to its frequency, the solution of equation [1] allows one to determine the relation: $r = (1/ R_0 \sigma_0) \ln (1+z)$ between the distance of a galaxy and its redshift: $z = \Delta \lambda / \lambda_0$ (Monti, 1996).

The existence of the "energy effect": $h\nu_0 / h\nu = 1 + z = \exp (R_0 \sigma_0 r)$ shows that, in addition to ϵ_0 and μ_0 , a third "special property" of the ether exists:

the electric conductivity: $\sigma_0 = (2.85 \pm 0.15) 10^{-29} (\Omega \text{ m})^{-1} (1)$.

In 1938, W. Nernst was the first one to underline that the redshift corresponded exactly to the hypothesis he had formed in 1912 and 1921 about the conductivity of the ether and the existence of a background radiation at 2.8°K.

Known since 1896 and has well-measured by Regener in 1933 (Monti, 1988; Assis and Neves, 1995).

The danger constituted by Hubble's experimental results and Nernst's hypothesis was finally understood by Einstein, who changed, in 1931, his first "unhappy idea" of 1917 about a stationary universe, in favour of the "expanding universe" hypothesis advanced by Friedmann in 1922 (Mamone Capria, 1999) and supposed a Doppler effect to explain the redshift (Monti, 1996).

The hypothesis of the expanding universe was consequently adopted by Einstein and his followers just to "save Relativity".

The price requested was a further overdose of contradictions and misinformation, though

1) The existence of a Doppler effect is in contradiction to the postulates of Relativity: the Doppler effect for sound waves exists because the speed of sound is a constant depending only on some specific physical properties of the medium.

Without a medium, there are no sound waves and no sound Doppler effect.

By analogy, the Doppler effect for light depends on the fact that the speed of light is a constant depending only on some physical properties of the ether: ϵ_0 and μ_0 .

Without the ether there are no EM waves and no Doppler effect for EM waves.

Relativity can reproduce well-known formulas obtained by classical electromagnetism (it is sufficient to state "c is constant").

But the real constant of the Doppler effect for light is: $c_0 = (\epsilon_0\mu_0)^{-1/2}$ and not:

$$c_M = 2L / \Delta T = \lambda v \text{ (Monti, 1996)}$$

2) Hubble always refused, on the basis of his experimental data, to accept the forced relativistic interpretation of the redshifts as a Doppler effect.

After the construction of the new 200-inch telescope of Monte Palomar, in August of 1947, he stated that: "the problem (of the redshifts) is essentially one for the 200-inch...it is well-known that a rapid receding light appears fainter than a similar, but stationary, light at the same momentary distance...the receding light appears abnormally faint...if redshifts are evidence of actual recession, the reduction of apparent brightness should become appreciable near the limits of measurement with the 100-inch and should be conspicuous near the limit of the 200-inch. At the very limit of direct photographs with the 200-inch, the factor should approach the order of 40 to 50 percent, and should be unmistakable (Monti, 1988).

Four years later, the first experimental results confirmed his opinion contrary to the expansion of the universe.

In 1953 he decided, consequently, a new research program. But a few months later, on 28 September, 1953, he died in San Marino, California and his "antirelativistic" research program was buried with him.

Then, a few years later, Hubble's work became the butt of rough and superficial epitaphs such as the following:

"More than ten years had passed (after the expansion hypothesis had been put forward by De Sitter) before the observations made by the American astronomer Edwin Hubble established beyond all the

reasonable doubts that the universe was expanding" (Monti, 1988).

"Hubble's law... The most serious blow to the stationary state of the universe...came from Hubble's measurements of the velocity of the galaxies... after a series of painstaking measurements, Hubble discovered that, on average a galaxy recedes from us at a velocity proportional to the distance... Hubble's discovery immediately destroys the idea of a stationary, unchanging universe...so, as indicated by Hubble's law, 20 thousand million years ago the galaxies were presumably all amassed at the same point" (Monti, 1988).

Today's observations of the apparent magnitudes and redshifts of quasars and galaxies clearly show that an "extraordinary luminosity" is associated to these "celestial objects" if a linear (relativistic) law is adopted.

These "extraordinary luminosities" (and velocities) are just - as Hubble predicted - the "unmistakable evidence" against the hypothesis of the expanding universe (Monti, 1996; 1988).

3) In 1942, Walther Nernst passed away, and Albert Einstein tried to bury the meaning of his scientific work, saying that "after 1930" - when Nernst wrote his paper against Relativity and the expanding universe - "he (Nernst) was overwhelmed by egocentric weakness" (Monti, 1988).

Nernst was consequently forgotten, so much that when, in 1964, Penzias and Wilson rediscovered the background radiation at 2.7°K, Gamow played a ridiculous swindle trying to convince everybody that he had predicted correctly, and before everyone, the "right" temperature of the Cosmic Background radiation on the basis of the Big Bang hypothesis (Assis and Neves, 1995).

General conclusions

Einsteinian Relativity proves to be a physical theory experimentally groundless on the basis of, at least 12 different experimental tests, which disprove its two postulates (Monti, 1996).

Further tests that may disprove the theory of Relativity are conceivable (new electromagnetic measurements of the speed of light, a modified Kennedy-Thorndike experiment) (Monti, 1996).

The difficulty in dealing with the scientific matter of "the coming of Relativity" is not due to lack of scientific argumentation or experiment.

These, in my opinion, already indicate that the theory is experimentally groundless.

The real difficulty seems to be that Relativity is not a scientific question, but an academic subject.

Many scientists work in research programs concerned with relativistic astronomy and astrophysics, relativistic cosmology, relativistic gravitational antennas, relativistic scientific and popular literature. And many scientists work in elementary particle physics to study the 10^{-37} s after an event (the Big Bang) which never occurred.

Against this background the best sound scientific argumentation do not have much of an impact.

But notwithstanding the present difficulties the scientific should prevail.

References

- Allais, M.M.; Morley, M. The coverup. 21th Century. *Spring*, 11(1):26, 1998.
- Assis, A.K.T.; Neves, M.C.D. History of the 2.7° K temperature prior to Penzias and Wilson. *Apeiron*, 2(3):79, 1995.
- Assis, A.K.T. The meaning of the constant c in Weber's electrodynamics. In: INTERNATIONAL CONFERENCE "GALILEO BACK IN ITALY, 2, 1999, Bologna. *Proceedings...* Bologna: Società Editrice Andromeda, 1999. p.23.
- Chow, W.W.; Gea-Banacloche, J.; Pedrotti, L.M. The ring Laser Gyro. *Rev. Modern Phys.*, 57(1):61, 1985.
- Einstein, A. Zur Elektrodynamik bewegter korper. *Annalen der Physik*, 17:891, 1905.
- Mamone Capria, M. *La costruzione dell'immagine scientifica del mondo*. Napoli: La città del sole, 1999.
- Marmet. P. *Einstein's theory of relativity versus classical mechanics*. Canada: Newton Physics Books, 1997.
- Maxwell, J.C. *A Treatise on electricity and magnetism*. London: Dover 1954.
- Michelson, A.A. Relative motion of earth and ether. *Philosoph. Magaz.*, 8(6):48, 1904.
- Monti, R.A. Albert Einstein and Walther Nernst: comparative cosmology. In: NATIONAL CONGRESS OF HISTORY OF PHYSICS, 8, 1988, Milano. *Proceedings...* Milano: Overseas S.R.L., 1988. p.331.
- Monti, R.A. Theory of Relativity: a critical analysis. *Physics Essays*, 9(2):238, 1996..
- Pais, A. *Subtle is the Lord*. London: Oxford University Press 1982.
- Post, E.J. A Joint description of the Michelson-Morley and the Sagnac experiments. In: INTERNATIONAL CONFERENCE "GALILEO BACK IN ITALY, 2, 1999, Bologna. *Proceedings...* Bologna: Società Editrice Andromeda, 1999. p.62.
- Shankland, R.S.; Mc Cuskey, S.W.; Leone, F.C.; Kuerti, G. A new analysis of the interferometric observations of Dayton C.Miller. *Rev. Modern Phys.*, 27:167, 1955.
- Weidner, R.T. On weighing photons. *Amer. J. Phys.*, 35:443, 1967.

Received on September 24, 1999.

Accepted on November 04, 1999.