LETTERS TO PROGRESS IN PHYSICS

On the Earthly Origin of the Penzias-Wilson Microwave Background

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According to the experimental analysis conducted by P.-M. Robitaille, the 2.7 K microwave background, first detected by Penzias and Wilson, is not of cosmic origin, but originates from the Earth, and is generated by oceanic water. In examining this problem two fields must be considered: (1) the Earth Microwave Background, the EMB, present with the 2.7 K monopole and 3.35 mK dipole components; (2) the weak Intergalactic Microwave Background, the IMB, which is connected to the entire Metagalaxy. This conclusion meets our theoretical considerations. First, the field density of the EMB, being inversely proportional to the field volume, should decrease with the cube of the distance from the Earth's surface, while its dipole anisotropy, which is due to the motion of the entire field in common with the Earth, is independent from altitude. Therefore, the EMB monopole should not be found at the 2nd Lagrange point (1.5 mln km from the Earth), while the dipole anisotropy should remain the same as near the Earth. Second, according to General Relativity, the motion through the IMB in a referred direction manifests the three-dimensional rotation of the entire space of the Metagalaxy.

According to the experimental and observational analysis conducted by Pierre-Marie Robitaille, an expert in magnetic resonance imaging (MRI) [1], the 2.7 K monopole microwave background, first detected by Penzias and Wilson [2], is not of cosmic origin, but of the Earth, and is generated by the hydrogen bonds* in oceanic water.

Robitaille first advanced his concept in an open letter published in *The New York Times* in 2002 [3]. In the years which followed, he provided a detailed explanation in a series of journal publications [4–10].

Rabounski [11] then showed that the anisotropy of the Penzias-Wilson microwave background, observed through the 3.35 mK dipole component†, is due to the rapid motion of the whole field in common with its source, the Earth, with a velocity of 365 ± 18 km/sec through a weak intergalactic foreground, which is assignated to the Metagalaxy as a whole. So the anisotropy of the observed microwave background has a purely relativistic origin.

This conclusion is based on developments in the Special Theory of Relativity [12, 13]. Given a local (moving) inertial reference frame, the clocks of which are synchronized to the "preferred" (resting) intertial reference frame assigned to the Universe as a whole‡, an observer located in this local (moving) reference frame, should register an inverse $\left(1+\frac{\mathrm{v}}{c}\cos\theta\right)$ effect on the *physically observed velocity* of the light signals (photons) assigned to his (moving) reference frame, while the world-invariant of the velocity of light remains unchanged. This effect, directed toward the velocity v of the observer's (moving) reference frame, is manifested in the Tangherlini transformations in the Special Theory of Relativity [12, 13].

We assume that the photon source of an earthly microwave background moves in common the field's source, the Earth, with the velocity $\mathrm{v}=365\pm18$ km/sec relative to the weak intergalactic microwave background, assigned to the Metagalaxy. In this case, according to the Tangherlini transformations, the spherical distribution of the velocities of the earthly origin microwave signals, being registered from the Earth or in an Earth-connected reference frame (such as the reference frame of a space mission moving in common with the Earth) should experience an anisotropy in the direction of the motion with respect to the weak intergalactic background. At the same time, the world-invariant of the velocity of light remains unchanged. Also, the distribution is still spherical if observed from the vewpoint of an observer connected to the Metagalaxy's background (i.e. in the "preferred" reference frame, which is resting with respect to the Metagalaxy as a whole). This anisotropic effect has the same formulation in temperature, $T=T_0/\left(1+\frac{\mathrm{v}}{c}\cos\theta\right)$, as the Doppler-effect, despite being generated by a different cause. We therefore refer to this effect as the *Doppler-like anisotropy*. Assume that the source of the earthly origin microwave photons, the Earth, moves through the weak intergalactic background with

*The vibration of a hydrogen atom in water weakly linked to an oxygen atom on another molecule.

†The 3.35 mK dipole (anisotropic) component of the Penzias-Wilson microwave background was first observed in 1969 by Conklin [14] in a ground-based observation. Then it was studied by Henry [15], Corey [16], and also Smoot, Gorenstein, and Muller (the latest team organized a stratosphere observation on board of a U2 aeroplane [17]). The history of the discovery and all the observations is given in detail in Lineweaver's paper of 1996 [18]. The weak anisotropic intergalactic field was found later, in the COBE space mission then verified by the WMAP space mission [19–23].

‡Such a synchronization can be done due to the "light-spot synchronization", which is by means of a phase-speed light spot, or due to the so-called "external synchronization". See [12, 13] or any encyclopaedic source, explaining the Tangherlini trasformations, for detail.

$\mathrm{v} = 365 \pm 18$ km/sec. We calculate the relative deviation of the temperature in the Earth's microwave background which is expected, due to the anisotropy, to be observed by an Earth-connected observer

$$\frac{\Delta T_{cal}}{T_{cal}} = \frac{\mathrm{v}}{c} = 0.122\% \pm 0.006\% .$$

According to the observations on board of the COBE satellite, the temperature of the Penzias-Wilson microwave background measured from the monopole component of it, is $T_{exp} = 2.730 \pm 0.001$ K. The dipole anisotropy, registered by the COBE satellite, is 3.353 ± 0.024 mK. The WMAP satellite gives approximately the same: 3.346 ± 0.017 mK. The anisotropic direction, in the Galactic longitude l and latitude b, is: $l = 264.26^\circ \pm 0.33^\circ$, $b = 48.22^\circ \pm 0.13^\circ$ as measured by COBE, a result confirmed by WMAP, $l = 263.85^\circ \pm 0.1^\circ$, $b = 48.25^\circ \pm 0.04^\circ$ [23]. So, the experimentally registered relative deviation of the temperature of the microwave background in the direction of the anisotropy is

$$\frac{\Delta T_{exp}}{T_{exp}} = 0.123\% \pm 0.001\% ,$$

which is small number, but is significantly not zero due to the high precision of measurement. This is a systematic deviation with many years of observation.

In addition to this result, COBE initially registered a systematical deviation between the temperature of the monopole component of the microwave background, 2.730 ± 0.001 K, obtained by the direct measurements, and the temperature of the monopole 2.717 ± 0.003 K obtained from the 1st derivative of the monopole [24] (the 1st derivative was interpreted as the actual dipole component of the field). The average deviation $\Delta T_{exp} = 0.013 \pm 0.003$ K between these two results is a small number but is significantly not zero (this is due to the high precision of measurement). Thus, we obtain a minimal relative deviation between the temperature of the Penzias-Wilson microwave background from the monopole and from the 1st derivative of the monopole

$$\frac{\Delta T_{exp}}{T_{exp}} = 0.33\% \text{ at } 1\sigma, \qquad \frac{\Delta T_{exp}}{T_{exp}} = 0.18\% \text{ at } 2\sigma.$$

The aforementioned experimental results meet our theoretical calculation, $0.122\% \pm 0.006\%$. Therefore, our suggestion of the relativistic lowering of the temperature of the Penzias-Wilson microwave background due to the Doppler-like anisotropic effect on it [11], is in good agreement with that observed in the COBE and WMAP space missions.

With these, we have to suggest a model, in the framework of which two fields are under consideration (this classification meets the scenario suggested by Robitaille in [7]):

1. The Earth Microwave Background, the EMB, present with the 2.7 K monopole component and 3.35 mK dipole component. The EMB dipole anisotropy is explained due to the Tangherlini transformations in the Special Theory of Relativity: the spherical distribution of the earthly origin photons assigned to the EMB experiences the Doppler-like anisotropy toward the rapid motion of the Earth, with a velocity of 365 ± 18 km/sec, through the weak intergalactic background associated to the Metagalaxy as a whole (so the weak intergalactic background manifests the "preferred" reference frame connected to the entire Metagalaxy, and resting with respect to it). Such an anisotropy can be observed by an Earth-bound observer and any observer whose reference frame is connected to the Earth (for instance the observers located on board of the COBE satellite or the WMAP satellite), but the distribution of the earthly origin photons remains spherical being registered by an observer whose location is the reference frame resting with respect to the Metagalaxy as a whole;
2. A weak Intergalactic Microwave Background (IMB) exists. It is associated to the entire Metagalaxy, and is present with its monopole and dipole components. The dipole anisotropy of the IMB is explained due to the Doppler-effect on the IMB photons: the Earth moves through the IMB with a velocity of 365 ± 18 km/sec, so the IMB photons registered by an Earth-bound observer (or any observer who is connected to the reference frame of the Earth such as the observers on board of the COBE satellite or the WMAP satellite) bear different energies/frequencies toward and backward this motion that is manifest as the IMB anisotropy in this direction.

Our further considerations are focused on the additional theoretical proof in support to this conclusion.

Briefly, our theoretical considerations first suggest that, if the Penzias-Wilson microwave background is of earthly origin, it is approximated as a spherical field, distributed from the Earth into the outer space. In such a case, according to both classical and relativistic theory of fields, the density of the EMB is inversely proportional to the field volume

$$\rho \sim \frac{1}{V} \sim \frac{1}{R^3} ,$$

so it should decrease with the cube of the distance R from the field's sources, which are located on the surface of the Earth. In other word, the density of the EMB should decrease with the cube of the altitude from the Earth's surface. On the other hand, the dipole anisotropy of the EMB, being a purely relativistic effect due to the rapid motion of the field's source, the Earth, through the weak intergalactic field, is independent from altitude.

This conclusion provides an opportunity to simply verify the aforementioned theoretical suggestions. Naturally, if the Penzias-Wilson microwave background is the earthly origin, the monopole component should not be found at large distances from the Earth, while the dipole anisotropy remains the same as near the Earth.

The ground-bound measurements of the Penzias-Wilson microwave background and the orbital measurements made with the COBE satellite, whose orbit is located at an altitude of 900 km, were obtained very near the oceans which are not point-like sources. Consequently, these observations were unable to manifest changes of the field density with altitude. However the 2nd Lagrange point is located 1.5 mln km from the Earth. It is the position of the WMAP satellite and the planned PLANCK satellite. Unfortunately, WMAP has only differential instruments on board: such an instrument registers only the difference between the number of photons in the channels. WMAP can therefore target measurements of the anisotropy of the field, but is unable to measure the field density. PLANCK is equipped with absolute instruments. Hence PLANCK will be able to measure the field density.

WMAP showed that the anisotropy of the Penzias-Wilson microwave background at the 2nd Lagrange point is the same as that measured by COBE, near the Earth. This agrees with our theory, but can occur if the background is of cosmic origin. Therefore the key probe, *experimentum crucis*, will be PLANCK, which targets the density of the field at the 2nd Lagrange point.

According to our theory, when PLANCK will arrive at the 2nd Lagrange point and start measurements, it shall manifest almost no photons associated to the Penzias-Wilson microwave background (at least a very small number of the photons), which is in very contrast to that was registered in the ground-based observations and in the COBE observations. This result should manifest the earthly origin of the Penzias-Wilson microwave background, and verify both Robitaille's phenomenological analysis and our theoretical considerations.

The second portion of our theory is specific to the General Theory of Relativity. Assume that the space of the Metagalaxy is a pseudo-Riemannian space with spherical geometry. Such a space is the surface of a hypersphere with the radius r (the curvature radius of the space). Now, suppose all the bodies located in the hyperspere's surface, have to travel, commonly, somewhere in a three-dimensional direction on the surface. This refers to the average common motion, because they all experience different motions with resect to each one, having however to travel on the average in the direction. Such an average "drift" of all bodies located in the hypersphere's surface manifests the three-dimensional rotation of the hypersphere. Therefore, in the framework of the views specific to the General Theory of Relativity, the presence of the weak Intergalactic Microwave Background, the IMB, which is associated to the Metagalaxy as a whole, through which the Earth moves, in common with the other space bodies (at different velocities, having however the average common velocity and direction in the space), manifests the three-dimensional rotation of the entire space of the Metagalaxy. The linear velocity of the rotation — the average velocity of all space bodies in the preferred direction, which is obviously different from the velocity 365 ± 18 km/sec specific to the Earth only — should arrive from observational astronomy, and be a world-invariant in the entire space (space-time) of the Metagalaxy.

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