Einstein's bias blind spot: It is evident that the longitudinal Doppler effect contradicts the constancy of the velocity of light *c* in reference frames

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(Received 22 March 2022; accepted 2 July 2022; published online 5 August 2022)

Abstract The physical mystery behind the constancy of the velocity of light is solved after the bias blind spot of Einstein's relativistic physics was illuminated precisely. We have given the physical law $f = c/\lambda$. The relative frequency shifts of the longitudinal Doppler effect are calculated from the frequency ratio of the frequency f_r at the receiver and the frequency f_e at the emitter. The very small frequency shift of the so-called relativistic time dilation factor can be neglected for low velocities. Comparing electromagnetic radiation, when receiver and emitter are at rest, the wavelengths must be the same and are canceling, so that we obtain: $f_r/f_e = (c/\lambda_r)/c/\lambda_e) = c/c = 1/1$. If the relative velocity c of light were constant in any inertial frame, independent of the motion of the receiver and emitter, no shift of wavelength and frequency would be possible. Einstein's special relativity excludes the possibility of the longitudinal Doppler effect. The longitudinal Doppler effect is explained according to relativity in dependence of gravity (RG), by which Einstein's illogical relativity is replaced. Why do we always measure the constant velocity c on Earth is now physically understandable.
[http://dx.doi.org/10.4006/0836-1398-35.3.287]

Résumé: Le mystère physique derrière la constance de la vélocité de la lumière a été résolu après un éclairage précis du biais de la tache aveugle de la physique relativiste d'Einstein. Nous avons donné la loi physique $f = c/\lambda$. Les déplacements de fréquence relatifs de l'effet Doppler longitudinal sont calculés à partir du rapport de fréquences de la fréquence f_r au niveau du récepteur et de la fréquence f_e au niveau de l'émetteur. Le très faible déplacement de fréquence du facteur de dilatation du temps relativiste peut être négligé pour les vélocités basses. Lors de la comparaison des rayonnements électromagnétiques, quand le récepteur et l'émetteur sont au repos, les longueurs d'onde doivent être les mêmes et s'annulent, de manière à obtenir $f_r/f_e = (c/\lambda_r)/c/\lambda_e) = c/c = 1/1$. Si la vélocité relative c de la lumière était constante dans un cadre inertiel quelconque, indépendamment du mouvement du récepteur et de l'émetteur, aucun déplacement de la longueur d'onde et de la fréquence ne serait possible. La relativité spéciale d'Einstein exclut la possibilité d'effet Doppler longitudinal. L'effet Doppler longitudinal est expliqué en fonction de la relativité par rapport à la gravité (RG), par laquelle la relativité illogique d'Einstein est remplacée. Nous pouvons désormais comprendre physiquement pourquoi nous mesurons toujours la vélocité constante c sur la Terre.

Key words: Constant Velocity c of Light; Classical Longitudinal Doppler-Shift; Special Relativity; General Relativity; Relativity in Dependence of Gravity (RG); Longitudinal Blue Shift; Longitudinal Redshift; Kinematic Frequency Shift; Gravitational Frequency Shift; Pound–Rebka Experiment.

I. INTRODUCTION

The author already pointed out many conceptual contradictions of Einstein's theory of special and general relativity in his former articles.[1–3] The illogical aspects of Einstein's relativity are broadly accepted by today's physicists. But, already the simple classical longitudinal optical Doppler effect disproves Einstein's relativity, as demonstrated in this article. Therefore, a new theory of relativity of electromagnetic radiation is needed. The longitudinal Doppler-shift effect is explained according to relativity in dependence of gravity (RG).[4]

II. TODAY'S EXPLANATION OF THE LONGITUDINAL OPTICAL DOPPLER EFFECT IS WRONG

In physics, it is generally accepted today that only the relative speed between a light source (emitter) and an observer (receiver) is decisive for the longitudinal Doppler effect. Redshift: When an emitter and a receiver move away from each other, the receiver registers a shift of spectral lines toward longer wavelengths compared to a stationary source. Blue shift: When an emitter and a receiver approach each

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other, the receiver registers a shift in spectral lines toward smaller wavelengths compared to a stationary source.

We want to check these assumptions for plausibility. For this we imagine a lighthouse whose lamp does not rotate. On one side of the lighthouse and on the exact opposite side of the lighthouse, lamps of the same sort emit electromagnetic waves with a specific wavelength. We also imagine two rockets that fly on Earth with the same velocity, one flying with an observer toward the lighthouse and the other rocket with an observer in the tail flying away from the light house. According to Einstein, the two light beams move with the constant velocity c away from the light house and also move with the velocity c toward the rockets, which is justified by the so-called relativistic velocity-addition formula. It is argued that an increase in the wavelength is possible because the lighthouse moves relatively in the direction of the rocket, which moves toward the lighthouse (blue shift), so that, because the light house relatively moves toward the rocket, the distance between a heading wave and a following wave can decrease. It is argued that an increase in the wavelength is possible because the light house moves relatively away from the rocket, which moves away from the lighthouse (red shift), so that, because the light house relatively moves away from the rocket, the distance between a heading wave and a following wave can increase. According to Einstein's relativity, we have to accept that the lighthouse moves relatively with respect to the rockets because absolute motion is not possible. But Einstein's explanation contradicts the constancy of the velocity c of light with respect to reference frames. The wave crests emitted have the same distance and move with the constant velocity c. Seen from an observer moving with respect to the wave crests, the distance between the wave crests shall be shortened or lengthened. To do this, the wave crests must either move toward one another or move away from one another. However, if the speed of the wave crests is always c and, therefore, constant in relation to each reference frame, this cannot happen. In order to be able to move toward or away from one another, the wave crests must have a velocity deviating from c, otherwise there cannot be a movement of the wave crests within the light beam. If the velocity c of light is constant with respect to the lighthouse and with respect to the two rockets, also each wave crest of an electromagnetic must have the velocity c with respect to the lighthouse and the rockets, which means that, thinking logically, we are able to recognize that no motion between the wave crests of an electromagnetic wave can happen. We know that in reality the lighthouse does not move on Earth, so that not a real physical movement can cause a change of wavelength. The change of wavelength is not caused by a real physical phenomenon but is caused by Einstein's relativity, because it is believed that this theory is correct. If the principle of relativity is valid for velocities, when an airplane flies in the direction of a mountain, according to today's theoretical physicists, only considering relative velocities, we can also claim that the mountain moves toward the airplane. Or, when we climb a mountain, according to the principle of relativity of velocities, it is also correct, claiming that the top of the mountain has come down to us. These assumptions are mathematically correct, but physically unreal. In addition, the energy of the light emitted from the light house would have to decrease because of the lengthening of the wavelength and increase because of the shortening of the wavelength, both caused by the relative movement of the lighthouse in two opposite directions, initiated by other observers, which relatively move with respect to the lighthouse. Accordingly, observers would determine the wavelength of a light beam and therefore also the energy of a light beam, where h is the Planck constant, c is the velocity of light, and λ is the wavelength

$$E = \frac{h \times c}{\lambda}. \tag{1}$$

According to that, for observers it would be possible to generate or destroy energy of electromagnetic radiation that is emitted with a certain wavelength by observing electromagnetic radiation from the distance. This contradicts the principle of energy conservation. Therefore, today's derivation of the classical longitudinal Doppler effect of electromagnetic radiation by a change of wavelength, caused by a relative movement between emitter and receiver, is mathematically correct, but physically wrong.

III. THE LONGITUDINAL OPTICAL DOPPLER EFFECT IS NOT POSSIBLE IF THE VELOCITY OF LIGHT WERE CONSTANT AND HAD THE VALUE *c* IN REFERENCE FRAMES

The longitudinal optical Doppler effect is taught in schools, but the obvious contradiction to the postulate of the constancy of the velocity c of light with respect to reference frames is not discussed. For the wavelength λ', respectively, for the frequency f', which is measured at the receiver the Doppler formula is

$$\lambda' = \gamma \times \left(1 - \frac{v}{c} \times \cos\theta\right) \times \lambda_0 = \frac{1 - \frac{v}{c} \times \cos\theta}{\sqrt{1 - \frac{v^2}{c^2}}} \times \lambda_0$$
$$\rightarrow f' = \frac{1}{\gamma} \times \frac{1}{1 - \frac{v}{c} \times \cos\theta} \times f_0 = \frac{\sqrt{1 - \frac{v^2}{c^2}}}{1 - \frac{v}{c} \times \cos\theta} \times f_0. \tag{2}$$

In Eq. (2), we have given the factor of the so-called relativistic Doppler-shift, which is also called "second order Doppler-shift," expressed by the Lorentz factor γ, the inverse Lorentz factor $1/\gamma$, where v is the relative velocity of the emitter with respect to the receiver and θ is the angle between the direction of this relative velocity v and the emission direction of the photon. The calculation based on Eq. (2) provides correct mathematical values but does not capture the complex origin of the longitudinal Doppler-shift, as we will see below. The longitudinal Doppler effect causes a redshift when observer (receiver) and light source (emitter) move away from each other and a blue shift when observer (receiver) and light source move toward each other can be calculated in Eq. (3), where f_r is the measured frequency at the receiver (observer) and the f_e is the frequency at the emitter (light source)

$$\frac{f_r}{f_e}=\frac{\sqrt{1-\frac{v^2}{c^2}}}{1-\frac{v}{c}\times\cos\theta},$$
$$\frac{1}{\sqrt{1-\frac{v^2}{c^2}}}\times\frac{f_r}{f_e}=\frac{1}{1-\frac{v}{c}\times\cos\theta},\tag{3}$$
$$\frac{1}{\sqrt{1-\frac{v^2}{c^2}}}\times f_r=\frac{1}{1-\frac{v}{c}\times\cos\theta}\times f_e.$$

To demonstrate that the longitudinal Doppler-shift contradicts Einstein's special relativity, we neglect the relativistic Doppler-shift expressed by the factor γ on the left side of Eq. (3) and only examine the longitudinal redshift and the longitudinal blue shift with the defined angles for the redshift $\theta=\pi$ and for the blue shift $\theta=0$, so that we obtain in the case of the redshift ($\theta=\pi$) with $\cos\pi=-1$ the simplified equation

$$\frac{f_r}{f_e}=\frac{1}{1+\frac{v}{c}},$$
$$f_r=\frac{1}{1+\frac{v}{c}}\times f_e=\left(1-\frac{v}{c}\right)\times f_e.\tag{4}$$

In the case of the blue shift, when an observer (receiver) and a light source (emitter) move toward each other ($\theta=0$), we obtain from Eq. (3) with $\cos\pi=1$ the simplified equation

$$\frac{f_r}{f_e}=\frac{1}{1-\frac{v}{c}},$$
$$f_r=\frac{1}{1-\frac{v}{c}}\times f_e=\left(1+\frac{v}{c}\right)\times f_e.\tag{5}$$

We have given the physical law

$$c=f\times\lambda,$$
$$f=\frac{c}{\lambda}.\tag{6}$$

As we see, frequency and wavelength are inversely proportional. While the wavelength is part of the definition of the energy of electromagnetic radiation at the location of emission, the frequency of electromagnetic radiation is only an indirect effect that is caused by the relative velocity of light with respect to the receiver or emitter and the emitted wavelength.[5] If only relative motion can be defined, it is not possible to distinct between "velocity of light" and "relative velocity of light." According to Eq. (6), a change of frequency or wavelength can only happen by a change of the relative velocity of light, whereas a change of frequency or a change of wavelength is proportional to the change of the relative velocity of light. Only by a change of the relative velocity of light with respect to the emitter (light source) or receiver (observer), the classical longitudinal Doppler effect can occur, and we can obtain either a relative redshift or a relative blue shift of the frequency of electromagnetic radiation at the receiver. Therefore, we obtain for the frequency f_r, at the receiver (observer) and the wavelength λ_e at the emitter (light source) in dependence of the relative velocity of light with respect to the emitted wavelength at the emitter or the relative velocity of light with respect to the frequency at the receiver, where λ_0 is the wavelength at the emitter and f_0 is the frequency, when light source and receiver are at rest with each other

$$\lambda_e=\frac{(c\pm v)}{c}\times\lambda_0\rightarrow f_r=\frac{c}{(c\pm v)}\times f_0=\frac{1}{\left(1\pm\frac{v}{c}\right)}\times f_0,$$
$$f_r=\frac{(c\pm v)}{c}\times f_0=\left(1\pm\frac{v}{c}\right)\times f_0.\tag{7}$$

As Einstein's relativity postulates a constant velocity c of light that cannot change, a change of wavelength or frequency is not possible, that is why a new theory of relativity must be defined.

IV. THE THEORY OF RELATIVITY OF LIGHT IN DEPENDENCE OF GRAVITY (RG) IS ABLE TO EXPLAIN THE LONGITUDINAL DOPPLER EFFECT AND CAN REPLACE EINSTEIN'S RELATIVITY OF INERTIAL FRAMES

Arguing with the physical laws $E=(h\times c)/\lambda$ and $f=c/\lambda$, a frequency change of electromagnetic radiation cannot result between moving inertial frames (longitudinal optical Doppler effect) if the velocity c of light is constant with respect to any reference frame. Klinaku indirectly came to the same conclusion, considering the well-known relationship between frequency and time. He used the correlation between frequency and time to show that also in Galilean relativity there exists the relativity of time, as well as the relativity of distance. By comparing frequencies with time, he demonstrated that, if Einstein's postulate that the proper time is the same in any inertial frame ($t=t'$) was right, no relativity and no Doppler effect would be possible.[6] Therefore, the postulate of Einstein and today's physics that the velocity of light must have the constant value c with respect to any reference frame must be wrong and a new theory of relativity of electromagnetic radiation is needed. In my former articles, I could demonstrate that. for empirical reasons, we have to postulate that electromagnetic radiation is influenced by gravitational potentials.[4,7,8] A realistic physics must acknowledge that the local gravitational potentials of predominant gravitational fields are relevant for the energy and motion of "photons" and that the kinematic time (frequency) shifts are caused by motion against gravitational potentials of predominant gravitational fields and gravitational time (frequency) shifts are caused by different strengths of gravitational potentials within predominant gravitational fields, as demonstrated by my theory of relativity in dependence of gravity (RG).[4]

If the velocity of light is constant and has always the velocity c with respect to gravitational potentials of predominant gravitational fields, which is on Earth the gravitational field of Earth, velocities that differ from the value c are allowed for electromagnetic radiation, when inertial frames move within predominant gravitational fields, e.g., on Earth or other celestial bodies (like galaxies), or if celestial bodies with own predominant gravitational fields move against each other, without violating the empirical fact that on Earth we always measure the constant velocity c of light. According to the theory of relativity of light in dependence of gravity (RG), compared to the gravitational potentials of the non-rotating gravitational field of the Earth, the velocity of light always has always the value c because of the principle of energy minimum and principle of energy conservation. Therefore, there are three situations that can cause a longitudinal Doppler effect, where the rotation of Earth against the non-rotating gravitational field of Earth is neglected and not taken into account.

1(a) The emitter (light source) rests on the ground ($\lambda_e = \lambda_{Earth}$ and $f_e = f_{Earth}$), while the receiver (observer) moves away from the emitter. As the emitter does not move on Earth, the wavelength of the emitted electromagnetic radiation cannot change, but as the relative velocity of light (vl) at the location of the receiver changes from c to $c - v$ because the receiver moves ahead of the light beam, the frequency at the receiver must change. In this case, we have to assign the relative velocity of light c to the frequency at the emitter and the relative speed of light $c - v$ to the frequency at the receiver, as the velocity of the receiver is subtracting from the relative velocity c of light on Earth. In comparison to a light beam that is emitted by an emitter and measured by a receiver that are both resting on the ground, we obtain a red shift that differs somewhat from Eq. (4)

$$
\begin{aligned}
f_r &= \frac{\mathrm{vl}_r}{\mathrm{vl}_e} \times f_{Earth}, \\
f_r &= \frac{c - v}{c} \times f_{Earth}, \\
f_r &= \left(1 - \frac{v}{c}\right) \times f_{Earth}.
\end{aligned} \tag{8}
$$

Einstein's relativity, calculating in this case the redshift of the longitudinal Doppler effect according to Eq. (4), obtains the same numerical result

$$
\begin{aligned}
f_r &= \frac{1}{1 + \frac{v}{c}} \times f_e, \\
f_r &= \left(1 - \frac{v}{c}\right) \times f_e.
\end{aligned} \tag{9}
$$

Therefore, mathematically Einstein's relativity is correct, but physically wrong, as physically the moving receiver cannot change the wavelength that is emitted by the resting emitter. Today's physicists, mostly thinking rather mathematically than physically, are satisfied with the result of Einstein's relativity.

1(b) The emitter (light source) rests on the ground ($\lambda_e = \lambda_{Earth}$ and $f_e = f_{Earth}$), while the receiver (observer) moves toward the emitter (light source). As the emitter does not move on Earth, the wavelength of the emitted electromagnetic radiation cannot change, but as the relative velocity of light (vl) at the location of the receiver changes from c to $c + v$ because the receiver moves in the direction of the light beam, the frequency at the receiver must change. In this case, we have to assign the relative velocity of light c to the frequency at the emitter and the relative speed of light $c + v$ to the frequency at the receiver, as the velocity of the receiver is adding to the relative velocity of light with the value c on Earth. In comparison to a light beam that is emitted by an emitter and measured by a receiver that are both resting on the ground, we obtain a red shift that differs somewhat from Eq. (5)

$$
\begin{aligned}
f_r &= \frac{\mathrm{vl}_r}{\mathrm{vl}_e} \times f_{Earth}, \\
f_r &= \frac{c + v}{c} \times f_{Earth}, \\
f_r &= \left(1 + \frac{v}{c}\right) \times f_{Earth}.
\end{aligned} \tag{10}
$$

Einstein's relativity, calculating in this case the redshift of the longitudinal Doppler Effect according to Eq. (5), obtains the same numerical result

$$
\begin{aligned}
f_r &= \frac{1}{1 - \frac{v}{c}} \times f_e, \\
f_r &= \left(1 + \frac{v}{c}\right) \times f_e.
\end{aligned} \tag{11}
$$

Therefore, mathematically Einstein's relativity is correct, but physically wrong, as physically the moving receiver cannot change the wavelength that is emitted by the resting emitter. Today's physicists, mostly thinking rather mathematically than physically, are satisfied with the result of Einstein's relativity.

2(a) The receiver (observer) rests on the ground, while the emitter (light source) moves away from the receiver. Because the velocity c is constant with respect to the predominant gravitational field of Earth at the location of the emitter a change of the wavelength of the emitted electromagnetic radiation must occur, because the velocity of the emitter is adding to the relative velocity of light with the value c on Earth. Therefore, we have to assign the wavelength at the receiver the relative velocity c of light and to the emitter the relative speed of light $c + v$, as to the relative velocity of light on Earth with the value c the velocity of the emitter is added. In comparison to a light beam that is emitted by an emitter and measured by a receiver that are both resting on the ground, we obtain a red shift that corresponds with Eq. (4)

$$f_r = \frac{\lambda_r}{\lambda_e} \times f_{Earth}, \quad f_r = \frac{vl_r}{vl_e} \times f_{Earth}, \quad f_r = \frac{c}{c+v} \times f_{Earth}, \quad f_r = \frac{1}{1+\frac{v}{c}} \times f_{Earth} = \left(1 - \frac{v}{c}\right) \times f_{Earth}. \tag{12}$$

2(b) The receiver (observer) rests on the ground, while the emitter (light source) moves toward the receiver. Because the velocity c is constant with respect to the predominant gravitational field of Earth, at the location of the emitter a change of the wavelength of the emitted electromagnetic radiation must occur, because the velocity of the emitter is subtracting from to the relative velocity of light with the value c on Earth. Therefore, we have to assign the wavelength at the receiver the relative velocity c of light and to the emitter the relative velocity of light $c - v$, as the velocity of the emitter is subtracting from the relative velocity of light with the value c on Earth.

In comparison to a light beam that is emitted by an emitter and measured by a receiver that are both resting on the ground, we obtain a blue shift that corresponds with Eq. (5)

$$f_r = \frac{\lambda_r}{\lambda_e} \times f_{Earth}, \quad f_r = \frac{vl_r}{vl_e} \times f_{Earth}, \quad f_r = \frac{c}{c-v} \times f_{Earth}, \quad f_r = \frac{1}{1-\frac{v}{c}} \times f_{Earth} = \left(1 + \frac{v}{c}\right) \times f_{Earth}. \tag{13}$$

3(a) The receiver (observer) rests on Earth, while the emitter (light source) in another predominant gravitational field, e.g., a star, moves away from the receiver on Earth. As at first the relative velocity of light has the value c with respect to the predominant gravitational field of the star, the wavelength does not change at the location of emission. But when the electromagnetic radiation enters the predominant gravitational field of Earth, the electromagnetic radiation must take over the relative velocity of light with the value c within the predominant gravitational field of Earth. Because of the slower velocity $c - v$ of the electromagnetic radiation emitted by the star that moves away from us, each wave of the electromagnetic radiation takes over the speed c of light a little bit later than when the star and Earth were at rest with each other. Therefore, when electromagnetic radiation is entering the predominant gravitational field of Earth, the wavelength is lengthened and increases by the factor $c + v$, so that we have to assign the relative velocity of light $c + v$ to the wavelength at the receiver and the relative velocity of light with the value c to the wavelength at the emitter and a redshift occurs with respect to the receiver on Earth, although we measure the speed c for starlight on Earth. In this case, the energy of the electromagnetic radiation decreases at the receiver compared to the energy at the emitter. In comparison to a light beam that is emitted by an emitter and measured by a receiver that are both resting on the ground, we obtain a red shift that corresponds with Eq. (4)

$$f_r = \frac{\lambda_e}{\lambda_r} \times f_e, \quad f_r = \frac{c}{c+v} \times f_e, \quad f_r = \frac{1}{1+\frac{v}{c}} \times f_e = \left(1 - \frac{v}{c}\right) \times f_e. \tag{14}$$

3(b) The receiver (observer) rests on the Earth, while the emitter (light source) in another predominant gravitational field, e.g., a star, moves toward the receiver on Earth. As at first, the relative velocity of light has the value c with respect to the predominant gravitational field of the star, the wavelength does not change at the location of emission. But when the electromagnetic radiation enters the predominant gravitational field of Earth, the electromagnetic radiation must take over the relative velocity of light with the value c within the predominant gravitational field of Earth. Because of the faster velocity $c + v$ of the electromagnetic radiation emitted by the star that moves toward us, each wave of the electromagnetic radiation takes over the speed c of light a little earlier than when the star and Earth were at rest with respect to each other. Therefore, the wavelength is shortened and decreases by the factor $c - v$, so that we have to assign the relative velocity of light $c - v$ to the wavelength at the receiver and the relative velocity of light with the value c to the wavelength at the emitter and a blue shift occurs with respect to the receiver on Earth, although we measure the speed c for starlight on Earth.

In this case, the energy of the electromagnetic radiation increases at the receiver compared to the energy at the emitter. In comparison to a light beam that is emitted by an emitter and measured by a receiver that are both resting on the ground, we obtain a blue shift that corresponds with Eq. (5)

$$f_r = \frac{\lambda_e}{\lambda_r} \times f_e, \quad f_r = \frac{c}{c-v} \times f_e, \quad f_r = \frac{1}{1-\frac{v}{c}} \times f_e = \left(1 + \frac{v}{c}\right) \times f_e. \tag{15}$$

V. THE PHYSICAL MYSTERY BEHIND THE CONSTANCY OF THE VELOCITY *c* OF LIGHT ON EARTH IS SOLVED

When a light beam moves to and fro in an interferometer that is moved on Earth (emitter and receiver are moving with the same velocity against the gravitational potentials of the predominant gravitational field of Earth), the velocity of light (vl) of this electromagnetic radiation, which moves in the direction of the movement of the interferometer, and afterwards in the opposite direction of the movement of the interferometer, only seemingly has the constant velocity c, which simulates a constant frequency

$$\frac{(\mathrm{vl}_1)+(\mathrm{vl}_2)}{2}=\frac{(c-v)+(c+v)}{2}=\frac{2c}{2}=c$$
$$\rightarrow f_\mathrm{r}=\frac{\frac{c}{c}\times f_\mathrm{e}+\frac{c}{c}\times f_\mathrm{e}}{2}=\frac{c}{c}\times f_\mathrm{e}=f_\mathrm{e}. \tag{16}$$

When a light beam moves back and forth in a moving interferometer, on the way to the mirror the mirror must be defined as the receiver and on the way back to the emitter must be defined as the receiver. According to the theory of relativity in dependence of gravity (RG), the relative velocity of light must always have the value c with respect to the gravitational potentials of the predominant gravitational field of Earth. Under this condition the physical mystery why we always measure a seemingly constant velocity c for light beams that move to and fro in moving interferometers is solved.

When the emitter (light source) in the interferometer moves on Earth in the direction of the emitted light beam, the light beam has only the relative velocity of light $c-v$ with respect to the emitter and the wavelength gets compressed, thus the wavelength is shortened by the factor $1-v/c$ and we expect a blue shift at the receiver

$$f_\mathrm{r}=\frac{\lambda_\mathrm{Earth}}{\lambda_\mathrm{r}}\times f_\mathrm{Earth},$$
$$f_\mathrm{r}=\frac{c}{c-v}\times f_\mathrm{Earth}, \tag{17}$$
$$f_\mathrm{r}=\frac{1}{1-\frac{v}{c}}\times f_\mathrm{Earth}.$$

As the light beam has also the relative velocity of light $c-v$ with respect to the mirror (receiver), which moves ahead of the light beam, because of the slower velocity than c, the frequency at the receiver must decrease by the factor $1-v/c$ and we expect a redshift at the receiver

$$f_\mathrm{r}=\frac{\mathrm{vl}_\mathrm{r}}{\mathrm{vl}_\mathrm{Earth}}\times f_\mathrm{Earth},$$
$$f_\mathrm{r}=\frac{c-v}{c}\times f_\mathrm{Earth}, \tag{18}$$
$$f_\mathrm{r}=\left(1-\frac{v}{c}\right)\times f_\mathrm{Earth}.$$

For the path of the light beam from the emitter (light source) to the mirror (receiver), we obtain on the whole

$$f_\mathrm{r}=\left(\frac{1}{1-\frac{v}{c}}\times\frac{1-\frac{v}{c}}{1}\right)\times f_\mathrm{Earth}, \tag{19}$$
$$f_\mathrm{r}=f_\mathrm{Earth}.$$

In this case, the wavelength and the frequency change by the same factor, but as wavelength and frequency behave inversely proportional, the factors are cancelling and the result is a seemingly constant velocity c of light. A constant velocity of light c is hereby only simulated and Einstein's relativity of inertial frames seems to be experimental verified, although it is physically wrong. With other words, the velocity $c-v$ with respect to the emitter (light source) causes a smaller wavelength and the velocity $c-v$ with respect to the receiver (mirror) causes a lower frequency, thus both effects are canceling at the receiver (mirror). Calculating the frequency shift at the receiver (mirror) only by Eq. (4) and referring the relative velocity c to the emitter (light source) in the interferometer, instead of to an emitter that rests on Earth at the position on Earth, at which the light source in the interferometer emits the light beam, the physicists must think that Einstein's postulate of a constant velocity c with respects to inertial frames must be right, as they cannot measure the redshift they calculate for the receiver (mirror). That is why physicists are misled in judging Einstein's relativity.

When the light beam moves back from the mirror to the light source of the moving interferometer, the mirror must be considered as emitter and the light source as receiver. Now the light beam in the interferometer moves in the opposite direction than the moving interferometer and in the opposite direction than the emitter (mirror), so that the emitter (mirror) moves away from the reflected light beam, thus the light beam has the relative velocity of light $c+v$ with respect to the emitter (mirror) and the wavelength is stretched, thus the wavelength is lengthened by the factor $1+v/c$ and we expect a redshift at the receiver:

$$f_\mathrm{r}=\frac{\lambda_\mathrm{Earth}}{\lambda_\mathrm{r}}\times f_\mathrm{Earth},$$
$$f_\mathrm{r}=\frac{c}{c+v}\times f_\mathrm{Earth}, \tag{20}$$
$$f_\mathrm{r}=\frac{1}{1+\frac{v}{c}}\times f_\mathrm{Earth}.$$

As the light beam moves now in the direction of the receiver (light source), the light beam has the relative velocity of light $c+v$ with respect to the receiver (light source), as the receiver (light source) moves toward the light beam and the velocity of light increases, thus the frequency at the receiver must increase by the factor $1+v/c$ and we expect a blue shift at the receiver

$$f_\mathrm{r}=\frac{v_\mathrm{r}}{v_\mathrm{Earth}}\times f_\mathrm{Earth},$$
$$f_\mathrm{r}=\frac{c+v}{c}\times f_\mathrm{Earth}, \tag{21}$$
$$f_\mathrm{r}=\left(1+\frac{v}{c}\right)\times f_\mathrm{Earth}.$$

For the path of the light beam from the emitter (mirror) to the receiver (at the position of the original light source), we obtain on the whole

$$f_\mathrm{r}=\left(\frac{1}{1+\frac{v}{c}}\times\frac{1+\frac{v}{c}}{1}\right)\times f_\mathrm{Earth}, \tag{22}$$
$$f_\mathrm{r}=f_\mathrm{Earth}.$$

In this case, the wavelength and the frequency change by the same factor, but as wavelength and frequency behave inversely proportional, the factors are cancelling and the result is a seemingly constant velocity c of light. A constant velocity of light c is hereby only simulated and Einstein's relativity of inertial frames seems to be experimental verified, although it is physically wrong. With other words, the velocity $c + v$ with respect to the emitter (mirror) causes a longer wavelength and the velocity $c + v$ with respect to the receiver (at the position of the original light source) causes a higher frequency, thus both effects are canceling at the receiver. Calculating the frequency shift at the receiver (mirror) only by Eq. (5) and referring the relative velocity c to the emitter (mirror) in the interferometer, instead of to an emitter that rests on Earth at the position on Earth, at which the light beam is reflected back at the mirror in the interferometer, the physicists must think that Einstein's postulate of a constant velocity c with respects to inertial frames must be right, as they cannot measure the blue shift they calculate for the receiver (at the position of the original light source). That is why physicists are misled in judging Einstein's relativity.

VI. CONCLUSIONS

Arguing with the physical laws $E = (h \times c)/\lambda$ and $f = c/\lambda$, it was demonstrated that a frequency change of electromagnetic radiation cannot result between moving inertial frames (classical longitudinal optical Doppler Effect) if the velocity c of light is constant with respect to any reference frame. According to Einstein's special and general relativity, frequencies (time) of electromagnetic radiation are influenced by motion of reference frames, that is why he cannot allow gravity to influence the frequency of electromagnetic radiation. Also the so-called gravitational time shift shall, according to general relativity, be caused by different reference frames, but not by gravitational potentials because independent of the gravitational potential in each reference frame there shall be measured the same proper time t_0. That a photon has with respect to gravitational potentials of predominant gravitational fields always the velocity c is caused by two natural laws, the principle of energy conservation and the principle of energy minimum, as already explained in my former articles.[4,8–11] Although Einstein's special and general relativity is in many cases mathematically correct, from a logical and empirical point of view, Einstein's relativity represents an unrealistic description of the physical behavior of electromagnetic radiation, which could again be proved by demonstrating that the constancy of the velocity of light with respect to inertial frames is not compatible with the classical longitudinal Doppler effect. The classical longitudinal Doppler effect was conclusively derived by the theory of relativity in dependence of gravity (RG).[4,9]

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