Falsification of the Special Relativity with the Observed Brightness of Type Ia Supernovae

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Abstract

The observations show that the apparent brightness of type Ia supernovae is about 25% lower than that expected, that is calculated with the formula supported by the Scientific Community.
The Scientific Community states that this fact shows that the speed of expansion of the Universe is accelerating.
But with this paper I will show that, instead, it shows that the formula is not correct, because it considers the cosmological redshift as a factor of expansion of space, while it is due to the recession speed of the location of the space where the Earth is located at the reception of photons, with respect to the location where they were emitted.
And since the cosmological redshift is considered as the factor of expansion of space, to respect what claim the Special Relativity, *said apparent brightness not only doesn't prove that the expansion of the Universe is accelerating, but also shows that the Special Relativity is not compatible with the observations and, therefore, is falsified.*

Keywords:
Falsification of Special Relativity, Reference Frame, expansion of the Universe, expansion of space, speed of light, cosmological redshift, photons, type Ia supernovae.

Demonstration of the Falsification

Below I will show that the fact that the observed apparent luminosity of type Ia supernovae, is less than the expected one, that is calculated with the formula supported by Scientific Community (SC), not only doesn't prove that the expansion of the Universe is accelerating, but also shows that the Special Relativity (SR) is not compatible with the observations and, therefore, is falsified.
A more detailed demonstration can be found in one of my papers that I published online (**1**).
The formula of SC for calculating the apparent brightness of celestial objects with high redshift, which I derived from a paper I found online (**2**), is as follows:

$$\mathbf{l} = \frac{\mathbf{L}}{\mathbf{4\pi} \cdot \mathbf{D}^2 \cdot (\mathbf{1} + \boldsymbol{z})^2}$$

Where:
"**l**" indicates the apparent brightness;

"**L**" indicates the absolute brightness;
"**D**" indicates the current distance;
"**z**" indicates the cosmological redshift.

To perform the demonstration I will use, by way of example, the data relating to the photons travel of a hypothetical celestial object (which could be a type Ia supernova or a galaxy) with a high redshift, which I obtained from a paper by the astronomer Vincenzo Zappalà (**3**) published online and that I presented below:

Initial distance (at the start of photons) = **5.46** billion light years;
Current distance (at the arrival of photons) = **8.68** billion light years;
F - distance traveled by photons = **7** billion light years;
(1 + z) - (final cosmological redshift, as space expansion factor) = **1.59**.

According to a graduation thesis published online (**4**), for this celestial object the apparent brightness observed is about 25% lower than that expected, that is to that resulting from the application of the formula above. This would indicate that this object is at a greater distance than that foreseen by matter-dominated Universe models, for which the evidence of an accelerated expansion of the Universe would be determined.

In other words, this would mean that the observed current distance of the celestial object would be greater than that resulting from the application of the apparent brightness formula, ie the expected one.
To better understand what it is, I set out below the calculation of the current distance knowing the initial one and the redshift.

$$\textbf{Current distance} = \textbf{Initial distance} \cdot (\mathbf{1} + \mathbf{z})$$
$$\textbf{Current distance} = \mathbf{5,46} \cdot (\mathbf{1} + \mathbf{0,59}) = \mathbf{8,68}$$

which corresponds to the value shown in the Zappalà paper (**3**) as the current distance.

But if the current distance observed was really greater, it would mean, of course, that even the expansion of space would have been greater than that resulting using the factor (1 + z).
But in this case also the redshift of the photons, and therefore the factor (1 + z) itself, would have been greater than that considered, because the greater expansion of the space would be reflected also on the wavelength of the photons and, therefore, on the factor (1 + z).
And so the current distance would have been greater.
But since the factor (1 + z) is the observed one and cannot increase, not even the current distance can increase.
So if the current distance is greater than expected, it can only mean that the factor (1 + z) does not represent the expansion of space occurred during the photons' journey.

The same considerations also apply to the apparent brightness, even if the reasoning to do is a bit more complex. There it is.

As explained above, if the current distance were really greater, it would mean that the expansion of the space would have been greater than that resulting using the factor (1 + z).
But in this case also the redshift of the photons would have been greater and therefore the factor (1 + z) itself would have been greater.
Therefore, the values of the factors in the denominator of the formula, corresponding both to the current distance (which, as explained above, depends on the factor (1 + z)) and to the expansion of space (1 + z), would also be greater, for which the total value of the denominator of the formula would be increased, reducing its result.
And so the expected apparent brightness would be less.
But since the factor (1 + z) is the observed one and cannot increase, not even the apparent brightness can decrease.
So if the observed apparent brightness is less than the expected one, it can only mean that the factor (1 + z) doesn’t represent the expansion of the space occurred during the photons' journey.

In conclusion, the above considerations demonstrate that the model of the Universe adopted, namely the fact that the Universe is or is not dominated by matter, has nothing to do with the fact that the apparent brightness observed is lower than the expected one, because these considerations apply to any model of the Universe.
Hence the reasoning that the fact that the apparent brightness observed is lower than the expected one, would show that the correct model of the Universe has not been adopted, is not valid.
Therefore the consequence of this reasoning is not valid either, that is, it is not true that the expansion of the Universe is in acceleration.

In support of my statement, I report what Professor Alberto Franceschini of the University of Padua has written about in one of his cosmology courses (**5**), where he rightly didn’t justify this difference with the expansion of the Universe in acceleration: “A result not comprehensible with the physics we have used so far in our description of the Universe. We must probably resort to a new physics.".

In my opinion to justify the difference between the expected and observed brightness, it is necessary to find what is the factor that really represents the expansion of space during the trip, thing that I will do below.

As I demonstrated through a tabular simulation of the photons travel of the celestial object in example (I considered it as a galaxy), which I developed in one of my papers (**1**), the cosmological redshift is due to the recession speed of the location where the Earth is located at the reception of photons, in relation to the location where the photons were emitted, and must be used as a factor to calculate a speed and not as a factor to calculate an expansion of space.
In fact, in this simulation, which is based on a model of the Universe that I have exposed in two of my papers (**1, 6**), I used the cosmological redshifts of the various travel periods (with which I calculated the various recession speed), to calculate the current distance of the location where the Earth is located, from the location where the celestial object was located when it has emitted the photons.

And then, taking into account the reduction in brightness due to the distance really traveled by the photons, I used the apparent brightness observed to calculate the factor of expansion of space occurred during the journey, a factor that has helped me to calculate the distance at the beginning of the journey.
And, as can be seen from the simulation results shown at the end of this paper, it has been found that the value of the space expansion factor is greater than the final value of the cosmological redshift, that the SC considers as the space expansion factor.
To calculate these speeds I applied the formula of the Doppler effect with the issuer stationary and the receiver in motion (as it is realistic to hypothesize based on the simulation), namely:

$$\mathbf{v}_\mathrm{r} = \boldsymbol{c} - \frac{\boldsymbol{c}}{\mathbf{1} + \boldsymbol{z}}$$

whereby the value 0.59 of z corresponds to a speed of move away of the receiver with respect to the issuer, of 111.321 km/s.

While according to the SR, for which each Reference Frame (RF) sees every other RF in motion with respect to itself (hence with a Ptolemaic and therefore unrealistic view of the Universe), it should be applied the formula with the receiver stationary and the issuer in motion, namely:

speed of source = z x **c**

so the value 0.59 of z corresponds to a speed of move away of the issuer with respect to the receiver, of 177,000 km/s.
However, this formula presents a big problem, because the observations show that photons coming from very distant celestial objects, have redshifts with values much higher than 1 (up to more than 8).
Which would mean that their speed of move away would be much higher than that of light, phenomenon that is in contrast with SR (for which the speed of light cannot be overcome), and also impossible because in this case their light would not be able to get to Earth (this problem doesn't exist if we apply the formula with the issuer stationary and the receiver in motion, because the speed of the receiver is always lower than that of the light, whatever the value of the redshift is).

Therefore, if we want to respect the SR, we cannot consider the redshift as due to the speed of move away of the issuer from the Earth.
In fact, the SC considered it as due directly to the expansion of space.
But so it turns out that the observed apparent brightness is lower than the expected one.
So since only if the cosmological redshift is considered as a factor of expansion of space, it is respected what claim the SR, the proof that it is not, falsifies the SR.

In conclusion, everything shows that the SR is falsified by the fact that the observed apparent brightness of the type Ia supernovae, is lower than the expected one.

For the sake of completeness, with regard to the simulation mentioned above, in which I used the redshifts shown in the paper by Zappalà (**3**), I report below the results, which are somewhat different from those shown above.

Initial distance = **5.04** billion light years;
Current distance = **8.54** billion light years;
F - distance traveled by photons = **7** billion light years;
(1 + z) - (final cosmological redshift, that the SC considers as space expansion factor) = **1.59**;
Space **E**xpansion Factor = 1 + (8.54 - 5.04) : 5.04 = **1.69**.

The speed of expansion of space results in deceleration.

Formula used for the calculation of apparent brightness:

$$\mathbf{l} = \frac{\mathbf{L}}{\mathbf{4\pi \cdot F^2 \cdot E^3}}$$

Reference

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