DARK MATTER the new research direction

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Abstract: In the known description of light, we perceive unexplained inconsistencies. In the case of light wavelength measurements, two instruments that operate on different technological bases (diffraction grating, Fabry-Perot interferometer) measure different results when measuring the light from moving light source. Physics leaves the discrepancy unexplained.

On the other hand, the speed of light coming from space has not yet been measured. Some physicists are trying to show that this speed cannot be measured.

This article describes the measurement of the wavelength of light made by different types of instruments. It describes the reasons for the different measured results. The article also provides the method for measuring the speed of light from space.

A deeper insight into the properties of light, however, offers a new direction of research into dark matter and gives hope for its explanation.

Key-Words: dark matter, Fabry–Pérot interferometer, diffraction grating, light form space, speed of light, properties of light

1 Introduction

The speed of light coming from space seems so unequivocal that we do not pay attention to its confirmation, even though it has not yet been measuredⁱ.

Lecturers do not prove the speed of light coming from space to students with measurements. This speed is hypothetical. We rely on various phenomena showing us that the speed of light in a vacuum is always the same, but this can be misleading.

The speed of light from space can be measured. The measurements described below can be performed by any better equipped astronomical observatory. It needs just the existing equipment of the observatory. This measurement may change our view on the universe and may help us to explain the existence of dark matter. So far, actual dark matter research has not yielded noticeable results. This may mean that we are researching in the wrong direction. If we research in the wrong direction, we will not get the result despite great efforts.

The observed inconsistencies and also the speed of light from space can be explained by the measurements described below. The article consists of:

- Overview of the used measuring methods and instruments,
- Description of the measurement and
- Reflection on the measurement

2 Overview of the used measuring instruments

2.1 A rotating prism

A rotating prism (*Fig. 1*) can measure the speed of light from space. The light reaches the prism, where it is reflected to the mirror, returns to the



rotating prism, and is then reflected to the eye. The beam is noticeable if the prism turns to the next mirror on the prism during the beam's journey to the mirror and back. Based on the distance from the prism to the mirror and the speed of rotation of the prism, we can calculate the speed at which light travels between the prism and the mirror.

2.2 Measuring the speed of light from the Sun

If we measure the light coming from a stationary laser on such a way, the eye perceives light at a precisely defined speed of rotation of the prism. This is reflected in the width of the curve 'a' in Fig. 2. The narrow curve 'a' show always the same speed of light.



the diagram.

In the next measurement we measure the speed of light coming from the Sun.

Such a measurement shows whether all the photons coming from the Sun have the same speed. Such a measurement, despite that can explains a lot about the speed of light, has not yet been published.

The measurement shows that light reaches the eye at different speeds of prism rotation. We can conclude that photons from the Sun have different speeds. We observe a wider curve 'b' in Fig. 2. The curve 'b' shows the range of photon speeds in light from the Sun.

After completing the proposed measurements, we will be able to identify two postulates:

P1 - Light from the Sun has a range of different speeds and
P2 - The mirror (on the rotating prism) does not change the speed of light.

2.3 Diffraction grating

The next device we need to measure the speed of light is a diffraction grating. A diffraction grating (transparent) is a tile that has many, even hundreds of slits per millimeter.

In the next measurement, we place a diffraction grating between the light source and the rotating prism. In this way, the measured light travels through the diffraction grating before hitting the rotating prism.

When we add a grating in front of the rotating prism, we notice that only light with speed of c comes out of the grating, as for example shown in diagram 'a' in the Fig. 2.

When measuring the same light from the Sun, two different results are measured, depending on whether or not a diffraction grating is placed in front of the rotating prism.

Curve 'a' in Fig. 2 shows the speed of light behind the diffraction grating and curve 'b' shows the speed of light in front of the diffraction grating.

A summary of the measured results can be written in the form of the following postulate:

P3 – The diffraction grating adapts any speed of light arriving on the grating to the speed determined by the constant c.

3 Measuring the wavelength of light

3.1 Wavelength can be measured in different ways

Even when measuring the wavelength of light based on different measuring instruments, we measure different results. Let's pay attention to the following measuring instruments: Fabry– Pérot interferometer, or a diffraction grating.

In the case of measuring the wavelength of a spectral line in light from the Sun based on a diffraction grating, we observe a variety of wavelengths, depending on the speed of the particles in the Sun that emit light, as shown in diagram 'e' in the Fig. 3. The range of wavelengths obey Doppler's law.



In the case of measuring the wavelength of light from the Sun based on the Fabry–Pérot interferometer, we detect the very narrow band of wavelengths of light, which corresponds to a stationary light source and is shown by diagram 'd' in the Fig. 3.

The wavelengths on diagram 'd' are not exactly the same. The curve 'd' shows a narrow band, which is not created by different particle speeds. The curve has only minor deviations, which are the result of accelerations of particles in the Sun.

3.2 Selection of Fabry–Pérot interferometer

In these measurements, we compare the measurement results of measuring the wavelength, either measured with a diffraction grating or with an Fabry–Pérot interferometer. Therefore, the Fabry–Pérot interferometer <u>must</u> not contain any grating. Any grating even if installed by mistake or unknowingly in the Fabry–Pérot interferometer would corrupt the measurement results.

In a Fabry–Pérot interferometer, a 'grid' sometimes cannot be completely avoided. Each bracket or gauge edge responds similarly to the grid. Therefore, we exclude the diffraction gratings as much as possible.

Based on the measurement results, we can identify the postulate:

P4 - The speed of the light source does not affect the wavelength of the light.

3.3 Similar known measurements

Different particles or areasⁱⁱ on the Sun have different velocitiesⁱⁱⁱ relative to the Earth.

The Fabry–Pérot interferometer does not detect different wavelengths of light in light from the Sun due to the different velocities^{iv}. This shortcoming is bridged by diffraction grating based measurements. The speed of the light source can be therefore measured by a diffraction grating^v.

Astronomers sometimes notice that they cannot measure the speed of objects in space with Fabry–Pérot interferometer, but they do not pay attention to this. They simply choose another measuring instrument. The velocities of bodies in space can be namely measured with a diffraction grating.

Comparison of measurements with a diffraction grating or Fabry–Pérot interferometer is not highlighted in the literature. We recognize it based on the study of other measurements.

Many examples of similar measurements show that diffraction grating changes the wavelength and velocity of light when the light comes from a moving light source^{vi}.

4 Measuring the speed of light from space

The described measurement results are derived from already known measurements, but it makes sense that the measurement results are confirmed once again with measurements carried out for this purpose.

4.1 Let's repeat the measurements

In the repetition of the measurement, we measure the wavelength of light coming from a moving light source in space. We direct the light into the diffraction grating so that it travels through it.



source through the diffraction grating to the target.

The wavelength of the light is measured for the first time before the light reaches the grid (λ_1) and for the second time after the diffraction grating, when the light has already passed the diffraction grating (λ_2) .

Physical science explains that the wavelength of light does not change when it passes through a diffraction grating, but known measurements do not confirm this opinion^{vii}. Such a measurement is simple, but has not yet been done.

4.2 Measuring the frequency of light

In physics, the frequency of light is not measured yet. There is even a belief that the frequency of light is not measurable. Let's take a look at measuring the frequency of light.

Regardless of what a speed of light is in front of the grid, the grid restores the speed to the constant c. The speed of light behind a stationary grating is measurable^{viii} and is determined by the constant c.

Behind the grating, the known speed of light c and the measured wavelength λ_2 enable the measurement of the frequency of light $f = c/\lambda_2$.

4.3 Measuring the speed of light

The frequency of the light in front of the grating is the same as the measured frequency of the light behind the grating.

In front of the grid, we can measure the wavelength of light λ_1 .

The speed of light in front of the grating is equal to the product of the measured frequency and the wavelength of light in front of the diffraction grating λ_1 . The speed of light in front of the grid is $f.\lambda_1$.

5 Reflection on the Measurement

5.1 Why this article?

The question arises, why write an article about the measurement before final measurements. It would make sense to do the measurement first and then publish the measured results.

When I think about it, I realize that only the measurement is undemanding, but it is not simple to write and publish an article about the results.

5.2 History of similar measurements

This measurement can be done simply. However, there are no records of such measurements.

What measurement result can we expect? The measurement either proves that the speed of light is always the same in a vacuum, or it denies the hypothesis of the speed of light. Deciding on such a basic question is too difficult for many of us.

Some authors have already encountered this issue. This was especially the case when one type of measuring instrument did not show the expected results and they had to change the measuring instrument^{ix} to confirm the expected measurement results.

Some measurement operators have been already close to such a measurement. They

avoided the interpretation of the results of their measurements.

5.3 Consequences of publication of measurement results

On the diffraction grating, the wavelength of light maybe changes, but its frequency does not. This means that the speed of light maybe changes on the diffraction grating. The measurement therefore shows that the speed of light in a vacuum is not always the same.

In physics, several theories are based on the assumption that the speed of light is always the same in a vacuum. The different speeds of light therefore cast doubt on the theory of relativity, the big bang, dark matter, and more.

5.4 A sociological-psychological view of measurement

Physical theories are not without emotional charge. Perhaps the measurement will require a change in today's views on physics. It may even require changes in the very foundations of physics. The measurement may be sobering.

The measurement is not technologically demanding, but it is stressful. We perceive the speed of light as the foundation of science. Any different thought excites us.

When we realize that the speed of light from space can be measured, we are tempted. Either

measure the speed of light, or insist on an agreed but unmeasured hypothesis.

If we finally decide to measure the speed of light, we encounter another problem. How to disseminate measurement results that are different from their expectations among physicists. How will they react to such news?

Therefore, for this measurement, a suitable time will have to come, which will be ripe for facing the results of the measurement.

6 Conclusion

The described measurement may not bring new insights, or it may deepen the understanding of light. A fresh perspective of understanding light can clear our view on the universe. Dark matter may no longer be necessary to understand the universe.

The paper encourages the wider physical environment to join the measurement.

We need to overcome the polarization of views. Some believe that the diffraction grating affects the wavelength of light coming from a moving light source. Others believe that the grating does not affect the wavelength of light.

In physics, not believe, measurements are the only way to judge views. This measurement is feasible in many places with a small investment.

7 References

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