AWARD FOR MEASURING THE SPEED OF LIGHT FROM A COMET

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A Michelson interferometer is sensitive to the wavelength of light. However, it does not detect changes in the wavelength of light at different speeds of the light source.

The speed of the light source affects the frequency of light according to Doppler's law. A Michelson interferometer does not detect this because it is not sensitive to the frequency of light.

Different speeds of the light source produce different frequencies of light (f), but the wavelength of light (λ) does not change. This means ($c=f.\lambda$) that the speed of light depends on the speed of the light source.

The speed of light from a comet has not been measured

Science gets its inspiration for scientific discoveries from measurements. Sometimes, however, we cannot measure something, for example the speed of light coming from a moving comet. In this case, we rely on the hypothesis that the speed of light does not depend on the speed of the light source.

A comprehensive knowledge of the speed of light is key to understanding physics. The question is whether science puts adequate effort into measuring the speed of light.

Science can show its seriousness about measuring the speed of light by offering a reward to whoever can measure the speed of light from a comet. Such a measurement is feasible. Let's take a look at the measurement concept.

The speed, wavelength and frequency of light

Light is an electromagnetic wave; it is one of the forms of waves.

Just as water waves follow each other on their way, so do electromagnetic waves. The length of a wave, that is the distance between two adjacent waves, is called wavelength. Different wavelengths of light are perceived as different colors of light.

The frequency of light tells how many waves reach the sink in one second.

We are therefore interested in three quantities connected by the equation $c = f.\lambda$. The speed of light is denoted by the letter c, the frequency of light is denoted by the letter f and the wavelength by the letter λ.

We have to measure the speed of light in known circumstances

Let's look for a light source that moves at a speed of a few km/s. The speed of the light source must be fully known. We must not speculate about it. We have to measure the speed of light in an environment where the influence of gravity is negligible.

Light from a comet, Jupiter or another moving light source in our solar system is therefore suitable for measurement.

We don't need to measure the frequency of light because we know it. The speed of a comet affects the frequency of the light from a comet, as it is determined by Doppler's law.

Measuring the wavelength of light

More ambiguity is seen when measuring the wavelength of light. Measuring instruments are of various designs. One type of instruments shows that the speed of a comet affects the wavelength of light. Another type of instruments shows the opposite, always showing the same wavelength of light, regardless of the speed of a comet.

When the instrument is sensitive on wavelength, but is not sensitive on the frequency of light, the instrument shows that the speed of a comet does not affect the wavelength of the light. At all velocities of a comet, the instrument shows the same wavelength of light as in the case of a stationary comet.

A Michelson interferometer is a type of instrument that is sensitive to the wavelength of light but not sensitive to the frequency of light. The Michelson interferometer always shows the same measurement result, regardless of the speed of the light source. This means that the speed of a light source does not affect the wavelength of the light. Also, the FPI interferometer and optical prism are only sensitive to the wavelength of light.

The instrument can also be designed so that the measurement result depends on the wavelength as well as the frequency of the light. Such an instrument does not show the wavelength of the light as it comes from the light source, but the measurement result is also affected by the frequency of the light.

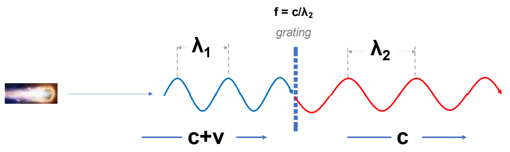
The objective measurement of the wavelength of light is made possible by an instrument that is not sensitive to the frequency of light. We use, for example, an FPI interferometer, an optical prism or a Michelson interferometer.

There is no record in the literature to show that the speed of the light source does not affect the wavelength of the light. But there are measurements from which it is evident (The Libre Texts libraries - The Shape of Spectral Lines, 6300 Large Aperture Photometry of Comet Hale-BOPP, Michelson interferometer).

Measuring the speed of light

The light we observe is guided through a dense grid, which in physics is called a diffraction grating.

When light comes from a moving source, a different wavelength of light is measured in front of the grid than behind the grid. We measure with an instrument that is not sensitive to the frequency of light. The wavelength of light changes on the grid.



The light from the comet arrives at a speed that differs from the constant c. The grating restores the speed of light to a value determined by the constant c. The speed of light behind the grid is measurable, it is measured between a stationary grid and a stationary sink.

The known speed of light c and the wavelength λ_2 make it possible to measure the frequency of light $f = c/\lambda_2$. The frequency of the light is the same even in front of the grid. The grating does not change the frequency of the light.

With this, we know the frequency of the light that enters the grid. We measure the wavelength of light λ_1 in front of the grid. This allows the measurement of the incoming speed of light from the comet, which is equal to $f.\lambda_1$.

Explanation of the differences between measuring instruments

When the light is intercepted by an instrument that does not contain a grid of this or that kind, the instrument shows the wavelength of the light as it arrives from the moving light source.

However, when an instrument contains any grid, it changes the wavelength of the light. We measure a wavelength that does not correspond to the wavelength with which the light hits the instrument.

Instruments often have various mechanical structures through which the light passes. Even such mechanical parts can change the characteristics of the light. Such instruments can offer varied measurement results, where it is difficult to clearly determine what the measured result represents.

Conclusion

So, we can measure the speed of light from a comet. The measurement shows that the speed of the comet affects the speed of light coming from it. So, the hypothesis about the speed of light will be replaced by a measurement.

Educators will not need to prove the speed of light with such and other hypotheses. The speed of light will be represented by a measurement.

A new view on light allows a more in-depth view at the structure of the universe. It explains many still unexplained phenomena in the universe.

The measured speed of light can embarrass us. Many of us are fascinated by the theory of relativity, the big bang or dark matter. These theories, however, are based on the constant speed of light.

This is where we come across emotions. Emotions are one of the most powerful guides in our lives in all areas. Emotions will have a significant impact on these measurements.

Award

Money and emotions are the most powerful guides in our lives. The general opinion is that money buys everything. However, emotions are stronger than money.

This measurement cannot be ordered with money. It is not possible to order, just as we can order other services from contractors. There are no providers, although:

- the measurement is technologically feasible based on the measuring equipment that many astronomical observatories have, although
- the measurement method is known and recognized, although
- no similar measurement is known in the literature, although
- we know there is a measurement gap in this area and
- although at least a part of the profession believes that this measurement eliminates the observed physical discrepancies.

So, before us is a measurement that is not technologically demanding. It can be performed by hundreds of astronomical observatories based on standard equipment. But the measurement will have to wait until we are emotionally ready for it.

A reward in a material sense is therefore not a way to achieve this measurement.

Epilogue

This is no reason to be pessimistic. Knowing and being aware of this measurement, that is, the measurement that allows the measurement of the speed of light from a moving light source, leads us closer and closer to making this measurement. I believe that the measurement will initially be carried out in circumstances closed to the public. However, nothing can stop the publication of the results of these measurements.