The Michelson-Morley Experiment, Moving Source Experiments and Emission Theory of Light

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Abstract

The most straight forward explanation of the Michelson-Morley experiment null result is the emission or ballistic theory of light, according to which the velocity of light is constant c relative to the source. In fact, the Michelson-Morley experiment may be seen as a compelling evidence for the emission hypothesis. The emission theory was abandoned mainly due to moving source experiments which proved the independence of the speed of light from the velocity of the source. It will be shown in this paper that physicists hastened to discard the emission theory which will be shown to be crucial to solve the light speed puzzle. The conventional emission theory is modified intuitively as follows. The speed of light emitted from a light source that is moving with absolute velocity V_{abs} is equal to c - V_{abs} *relative to the source* in the forward direction and $c + V_{abs}$ *relative to the source* in the backward direction. Therefore, relative an observer at absolute rest in front of the moving source, the speed of light is equal to the sum of the speed of light relative to the source and the speed of the source: $(c - V_{abs})+ V_{abs} = c$. Relative to an observer at absolute rest behind the source, the speed of light is equal to the difference between the speed of light relative to the source and the speed of the source : $(c + V_{abs}) - V_{abs} = c$. We can see that this model predicts that the speed of light is independent of the velocity of the source. This model also predicts the null result of the Michelson-Morley experiment because the speed of light is $c \pm V_{abs}$ *relative to the source*., in the forward and backward directions. Change of the speed of light *relative to the source* doesn't result in any fringe shift because , intuitively, both the transverse and longitudinal light beams will be delayed or advanced by equal amounts of time. This theory is a modified emission theory, a fusion between ' ether ' theory and emission theory.

Introduction

Light behaved in a confusing way according to ether theory in some experiments and according to emission theory in other experiments. Thomas young's double slit experiment supported the wave hypothesis. The Bradley stellar aberration experiment could easily be understood in terms of corpuscular theory. However, the Argo and the Airy stellar aberration experiments supported the wave theory. Yet part of Argo's stellar aberration experiment, which was observation of aberration angle of the same star during different times of the year, could be explained by neither theory because the speed of light seemed to be independent of the speed of the observer. In moving optical media, such as in the Fizeau experiment, light behaved according to Fresnel's ether dragging hypothesis.

The Michelson-Morley experiment (MMX) null result may be a compelling evidence supporting emission theory. The emission theory attracted scientists due to the null result of MMX. Einstein is known to have seriously considered emission theory of light before formulating the Special Theory of Relativity and this may be due to the Michelson-Morley experiment. Waltz Ritz is the scientist who pursued emission theory most aggressively.

The ether theory was abandoned due to the MMX null result. The emission theory was finally abandoned due to moving source experiments. This led (misled) scientists to illogical speculations, such as the Special Theory of Relativity.

The Michelson-Morley experiment null result is a compelling evidence for the emission theory. Physicists should not have discarded the emission theory simply because it disagreed with moving source experiments. This paper reveals this mistake by proposing a modified emission theory of light, which is a fusion of emission theory and ether theory.

Modified emission theory [1]

Conventional emission theory can be modified to agree both with the Michelson-Morley experiment and moving source experiments.

Relative to a light source that is moving with absolute velocity V_{abs} , the speed of light is equal to $c - V_{abs}$ *relative to the source* in the forward direction and $c + V_{abs}$ *relative to the source* in the backward direction.

Therefore, the speed of light relative to an observer that is at absolute rest in front of the moving source is:

$$\text{speed of light} = \text{speed of light relative to the source} + \text{the speed of the observer}$$

$$\text{speed of light} = (c - V_{abs}) + V_{abs} = c$$

The speed of light relative to an observer who is at absolute rest behind the moving source is:

$$\text{speed of light} = \text{speed of light relative to the source} - \text{the speed of the observer}$$

$$\text{speed of light} = (c + V_{abs}) - V_{abs} = c$$

We have shown that the speed of light is independent of the absolute velocity of the source.

$c + V_{abs}$ $c - V_{abs}$

V_{abs}
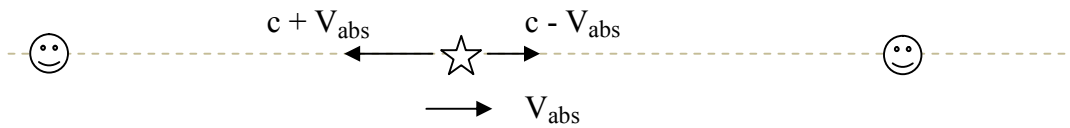
This model can readily explain the Michelson-Morley null result.

V_{abs}

S

detector
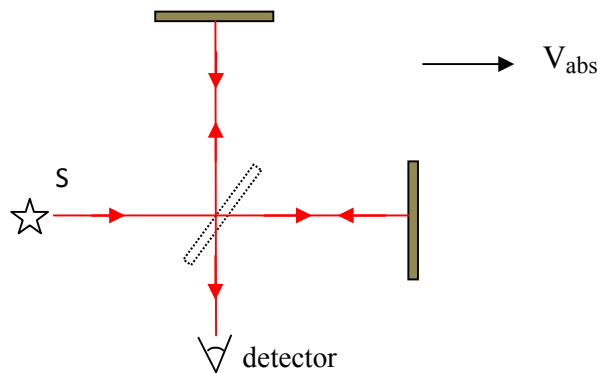
We know that conventional emission theory is the most straight forward explanation of the MMX null result. According to emission theory, the speed of light is equal to *c relative to the source.* The center of the wave fronts moves with the source. What if the speed of light has some other value than *c relative to the source*, this value depending on the direction with respect to the absolute velocity of the source? Will there be a fringe shift or not ? Obviously, there will not be any fringe shift because the center of the wave fronts still moves with the source. Both the transverse and longitudinal beams will be affected (delayed or advanced) by the same amount of time. The speed of light *relative to the source* in a given direction depends on the absolute velocity of the source. Only if the absolute velocity of the source is zero that the speed of light is equal to *c* in every direction.

The above theory is an intuitive one in which we have considered only the forward and backward light from the source, for simplicity.

Conclusion

The Michelson-Morley experiment and moving source experiments are perhaps the most important experiments that have affected the course of physics during the last century. The Michelson-Morley experiment was a strong evidence of emission theory of light. Scientists prematurely abandoned the emission theory mainly because of moving source experiments. This led (misled) scientists to abandon conventional thinking and start illogical, speculative theories such as the Special Theory of Relativity. An intuitive modified emission theory has been presented in this paper that agrees both with the Michelson-Morley experiment and moving source experiments. Intuitively, physically the effect of absolute velocity of a light source is to change the velocity of light *relative to the source* in such a way that the speed of light relative to an observer at absolute rest is independent of the absolute velocity of its source. Since absolute velocity only changes the velocity of light *relative to the source*, no fringe shift will occur in the Michelson-Morley experiment.

Thanks to God and Our Lady Saint Virgin Mary

References

1. *Absolute/Relative Motion and the Speed of Light, Electromagnetism, Inertia and Universal Speed Limit c - an Alternative Interpretation and Theoretical Framework*, Henok Tadesse, Vixra