Reply to " Machine Systematics in Dayton Miller's "Ether Drift" Interferometer Revealed by Analysis of Variance" by Simon WW Manley

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Abstract

A paper by Simon WW Manley has claimed that the data from Miller's ether drift experiments contains a component at the period of full rotation. Ether drift is expected to cause a component at half rotation because the Michelson interferometer is symmetrical on 180^0 rotation and no component is expected at full rotation. The author concludes that "unless the advocates of ether-drift theories can provide a satisfactory explanation for the signal component with the period of a full rotation, that component is fatal for any contention that Miller's heroic experiments were measuring meaningful physics." We will reveal the origin of that fundamental component based on a new theory of absolute motion. The problem is rooted in the universal presumption that absolute motion is motion relative to the (non-existent) ether which predicts 180^0 symmetry. Apparent Source Theory (AST) predicts that the Michelson interferometer is strictly symmetrical on full rotation, not on 180^0 rotation. However, AST also predicts null fringe shifts for absolute velocities parallel and anti-parallel to the longitudinal axis and this may cause stronger second harmonic component.

Introduction

A paper on Vixra by Simon WW Manley [1] entitled " *Machine Systematics in Dayton Miller's "Ether Drift" Interferometer Revealed by Analysis of Variance*" has claimed that the Miller ether drift experiments contained a component at full rotation. The author argues that:

"A Michelson interferometer is symmetrical on a 180 degree rotation and should therefore not produce any signal with the period of a full rotation ".

"Since a Michelson interferometer is symmetrical on 180-degree rotation, no signal at the fundamental of the rotation frequency is expected: only the second harmonic can be accommodated by any plausible theory of the machine's operation. "

He concludes that if the signals observed in the Miller's experiment are to be accepted as caused by ether drift at all, proponents of ether theory should first explain the origin of this fundamental component. In this paper, I will provide a qualitative explanation according to a new theory of absolute motion called Apparent Source Theory (AST) I have already proposed [2].

Animation of Apparent Source Theory has been uploaded on Youtube [4].

Experimental evidences of absolute motion

The outcome of the Michelson-Morley experiment (MMX) has always been interpreted as "null" by mainstream. The null result of the MMX is considered as one of the main experimental evidences of special relativity.

Unlike the beginning of the twentieth century, today we are at a time when experimental evidences of absolute motion have accumulated. To start with, we know that the original Michelson-Morley experiment did not give a null result and showed small fringe shifts. However, the argument was that if the ether existed, the MMX should have given the *expected* fringe shift. The observed fringe shifts which were much smaller than the expected value were dismissed as instrumental error.

This experiment was repeated by Dayton Miller over a period of thirty years and Miller reported a small but consistent fringe shift, always pointing to the same direction in space, with evidence of sidereal correlation. In 1976, Stephan Marinov devised a novel experiment based on time of flight and observed a first order effect. Then in 1986 Silvertooth invented a novel interferometer and measured the absolute velocity of the Earth to be 378 Km/s, towards constellation Leo. Profoundly, the NASA CMBR anisotropy experiment confirmed the Silvertooth experiment; it measured almost the same magnitude and direction, 390 Km/s, towards Leo constellation.

What is absolute motion

One of the obstacles that have prevented acceptance of positive "ether" drift experiments by the scientific community is the presumption of what absolute motion is. Absolute motion has always been presumed to be motion relative to the ether. This is the view held by proponents and opponents of ether theory alike. For example, one of the excuses presented by mainstream to ignore the Silvertooth experiment is that Silvertooth did not provide clear theoretical explanation for the absolute motion effect he observed because the Silvertooth effect cannot be explained by ether theory. However, any effect which varies with the change in orientation of the apparatus in space should be accepted as evidence of anisotropy of the speed of light, whatever the explanation. Another excuse is the fact that ether drift experiments differed on the direction the absolute velocity they measured.

My argument is this. The Michelson-Morley experiment was designed to detect the ether but failed to detect the ether. Therefore Michelson-Morley experiment has disproved the *ether*. But the Silvertooth experiment has proved *absolute motion*. It should be noted that the Silvertooth experiment did not prove the *ether* because the observed effect cannot be understood in terms of the ether. From this we reveal the mystery that has eluded physicists for more than a century: *absolute motion is not motion relative to the ether*.

If absolute motion is not motion relative to the ether, then what is absolute motion relative to ? I propose briefly that absolute motion is basically motion of an object relative to all matter in the

universe. One may ask: how can motion of an object relative to other objects cause absolute motion ? What is the "mechanism" ? I will not attempt to answer this question here. We will not focus on what absolute motion *is*, which is the usual approach. We will rather focus on what is the *effect* of absolute motion.

Apparent Source Theory

We formulate Apparent Source Theory as follows, with respect to the Michelson-Morley experiment. Consider the Michelson-Morley experiment shown below.

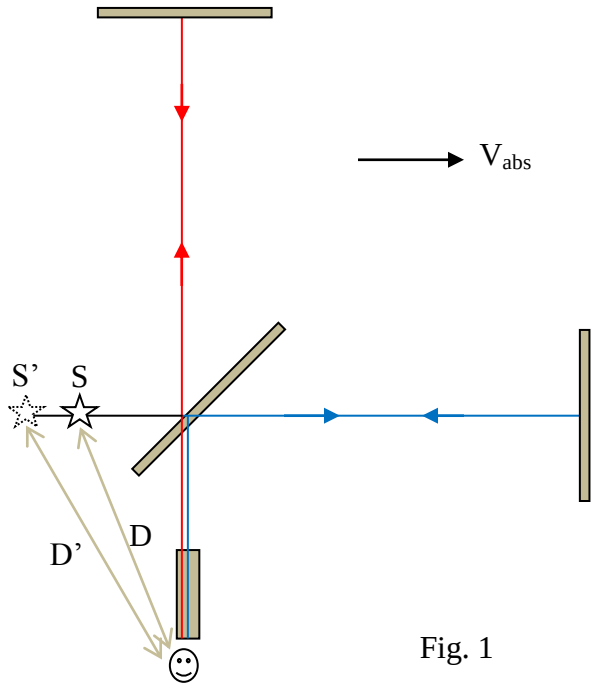

Fig. 1

The <u>effect</u> of absolute motion of the Michelson-Morley experiment is to create an apparent change of the position of the light source relative to the detector. This apparent change in source position will create a (small) fringe shift as if it is an actual, physical change of source position.

The procedure of analysis of the Michelson-Morley experiment is:

1. *Replace the real source with an apparent source. The apparent source position is determined by the magnitude and direction of absolute velocity, the direct source-observer distance and the orientation of source-observer line with respect to the absolute velocity direction.*
2. *Analyze the experiment by assuming that the speed of light is constant relative to the observer.*

The easiest and best way to present Apparent Source Theory is to ask the question: what is the effect of actually, physically changing the position of the light source (instead of setting it in absolute motion) slightly on the interference fringes ? For example, what is the effect of actually moving the light source slightly backwards (to the left), as shown above, on the interference fringes ? Obviously, there will not be any fringe shift because, intuitively, both the longitudinal and transverse light beams will be affected (delayed) identically. There will not be any fringe shift also if the source is slightly moved forward (to the right) because both light beams will be advanced equally. There will be a small fringe shift for other positions of the source, for example if the source is moved upwards or downwards, as shown below. This is because, in this case, the path lengths of the transverse beam (red) and the longitudinal beam will differ slightly.

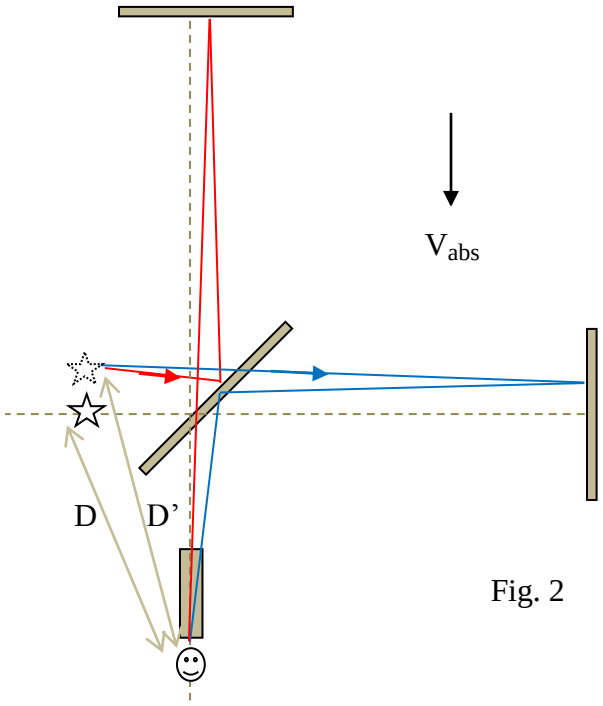

Fig. 2

The new interpretation of absolute motion of the Michelson interferometer is this. The effect of absolute motion is to create an apparent change in the position of the light source relative to the detector. This apparent change of source position (caused by absolute motion) will not create any significant fringe shift (no fringe shift or a small fringe shift) for the same reason that an actual/physical change of source position will not create any significant fringe shift. This explains the 'null' result of the Michelson-Morley experiment. This is the subtle nature of light that completely eluded physicists for centuries.

The procedure of analysis of the Michelson-Morley experiment is restated as :

1. Replace the real source by an apparent source

2. Analyze the experiment by assuming that light is emitted from the apparent source position, not from the real source position.

The real source is replaced by an apparent source in order to account for absolute velocity. Once this is done, the experiment is analyzed by assuming that light is emitted from the apparent source and by using elementary geometrical optics. Once we replace the real source with an apparent source, we can assume emission theory, i.e. the speed of light is constant relative to the apparent source.

We re-formulate Apparent Source Theory for the Michelson-Morley (MM)experiment as follows.

1. The effect of absolute motion of the Michelson-Morley interferometer is to create an APPARENT change in light source position relative to the detector
2. This apparent change of source position creates a (small) fringe shift AS IF it is an ACTUAL / physical change of source position.

Small fringe shifts can be produced in the Michelson-Morley experiment in two ways:

1. By setting the Michelson-Morley apparatus in absolute motion
   OR
2. By slightly changing the position of the light source (1mm for example) about its initial position.

The fringe shift for every absolute velocity of the MM apparatus is equal to the fringe shift for a *corresponding* ACTUAL change in source position. For every absolute velocity (magnitude and direction), there is a corresponding change in source position that will produce the same fringe shift.

The corresponding change in source position is determined according to the AST procedure. It is determined by the source detector distance, the magnitude and direction of absolute velocity and the orientation of the source detector line with respect to the direction of absolute velocity.

Apparent Source Theory can be seen as a seamless fusion of ether theory and emission theory.

Successes of Apparent Source Theory

Apparent Source Theory (AST) can explain not only why the Michelson-Morley experiment gave small or null fringe shifts, but also why modern Michelson-Morley experiments using cavity resonators give complete null results. AST can explain the Sagnac effect, the Silvertooth experiment, the Marinov experiment, moving source, moving observer and moving mirror experiments, such as the A.Michelson moving mirror experiment. AST can explain the "anomalous" Brian G Wallace experiment which contradicts not only special relativity but also ether theory.

Explanation of the fundamental component in the data of Miller experiments

In the following diagram of the Michelson-Morley interferometer, the corresponding apparent source positions are shown for each direction of absolute velocity. For example, absolute velocity 1 will cause an apparent change of the source to position 1, absolute velocity 2 will cause an apparent change of the source to position 2 , and so on.

For each direction of absolute velocity V_{abs} , hence for each apparent position of the source, we draw the transverse and longitudinal beams going from the source to the detector after reflection from the mirrors, using elementary geometrical optics, by assuming that the light starts from apparent source position and not from the actual/physical source position. We apply the familiar principle that the angle of incidence and the angle of reflection are equal at the mirrors, as we have already tried to show with the red beam and blue beam in Fig.2. Note that the diagram is meant only to describe the theory qualitatively and is not accurate enough.By calculating the difference between the path lengths of the two beams (which is somewhat involved) we determine the fringe shift. The whole procedure is described in my paper [3].

We can see that, unlike ether theory, the fringe shifts will repeat only after full rotation of the ether theory. This is because all the apparent source positions will result in different fringe shifts, except apparent sources 1 and 5 which will both give null fringe shift. Note that the fact that the fringe shift will be zero for absolute velocities 1 and 5 does not mean that the Michelson interferometer is symmetrical on 180^0 rotation. In the case of ether theory, unlike Apparent Source Theory, the fringe shifts will be equal for absolute velocities 1 and 5, 2 and 6, 3 and 7, 4 and 8. Note that the locus of the apparent source is not a circle but an " irregular ellipse " with

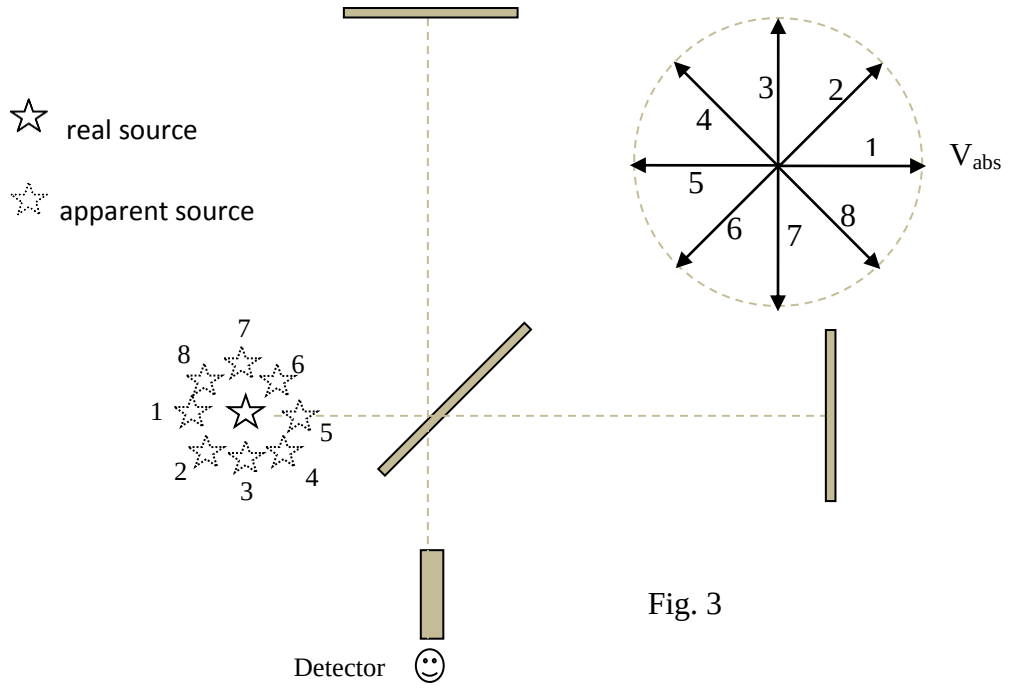

Fig. 3

the major axis along the line connecting the source and the detector.

According to Apparent Source Theory (AST), therefore, the Michelson interferometer is symmetrical on 360^0 rotation and strictly not symmetrical on 180^0 rotation. However, AST predicts that for absolute velocities parallel and anti-parallel to the longitudinal axis (absolute velocities 1 and 5) the fringe shift is zero, and this may cause stronger second harmonic. But this second harmonic component is not in phase with the second harmonic according to ether theory which predicts null fringe shift for absolute velocities 2 and 6. The angle between the null directions for AST and ether theory, that is the angle between absolute velocities 1 and 2, is 45^0 .

To restate the distinction, the Michelson interferometer is symmetrical on 180^0 rotation according to ether theory and symmetrical on full rotation according to Apparent Source Theory.

Therefore, the argument that

"A Michelson interferometer is symmetrical on a 180 degree rotation and should therefore not produce any signal with the period of a full rotation ".

only applies to the (non-existent) ether and not to absolute motion as interpreted by Apparent Source Theory. In fact, I consider the fundamental component in the Miller's data as one additional evidence of Apparent Source Theory.

Conclusion

We have seen that the presence of a fundamental component in the Miller ether drift experiments disproves only the (non-existent) *ether*, but does not disprove *absolute motion*. The two have always been wrongly presumed to be the same by proponents and opponents of ether theory alike. Apparent Source Theory (AST) predicts that the Michelson interferometer is strictly symmetrical on full rotation and not on 180^0 rotation. This is one additional evidence for an already successful theory (AST).

Thanks to God and His Mother, Our Lady Saint Virgin Mary

References

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