Absolute motion/space is intrinsic, analogous with consciousness; absolute motion does not require absolute space

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Abstract

According to the paradigm that existed for centuries, all thoughts and arguments in favor of (and against) absolute motion have always been associated with absolute space (or the ether) and, in fact, these two concepts have always been inseparable in our thoughts, i.e. 'absolute motion is relative to an objective absolute space'. Reconciliation of the Sagnac effect with Michelson-Morley (MM) experiment null result has always been a daunting task. The Sagnac experiments remained 'impossible' to be reconciled with all theories of relativity. This paper discloses the reason why solving this paradox remained a daunting task for almost a century: it required a paradigm shift!!! In this paper a new paradigm about motion and space is proposed: Absolute motion/ absolute space is intrinsic. Absolute motion is intrinsic to a physical object, just as consciousness is intrinsic to a conscious being. This paradigm may take us a long way, but this paper gives only a hint and much remains to be explored.

Introduction

Even though the notion of absolute motion existed for centuries, the meaning of absolute motion remains unintelligible to this date. The majority of the scientific community rejected its validity/ existence during the last century; however, experiments gave hint on its existence. The Sagnac experiments remained 'impossible' to be reconciled with all theories of relativity. This paper discloses the reason why solving this paradox remained a daunting task for almost a century: it required a paradigm shift !!!

The new theory in this paper has been developed in an attempt to reconcile Sagnac effect with relativity theories (Galileo's invariance principle, Einstein's two postulates and the ' Relativity of EM Fields/ Waves' already proposed by this author.)

Discussion

According to the paradigm that existed for centuries, all thoughts and arguments in favor of (and against) absolute motion have always been associated with absolute space and, in fact, these two concepts have always been inseparable in our thoughts i.e. 'absolute motion is relative to an objective absolute space'. In this paper a new paradigm about motion and space is proposed : Absolute motion/ absolute space is intrinsic. Absolute motion does not require (is not related to) an objectively existing absolute space or medium (the ether). Space is empty. An objective absolute space or medium does not exist. Although absolute space doesn't exist, we imagine an objective absolute space to understand and analyze the effects of intrinsic absolute motion/space. .

We will start from a brief review of previous theories proposed by this author and then discuss the new paradigm. The intention in reviewing previous theories is to bring all about relative and absolute motion and the speed of light to the same point.

1. Relativity of EM Fields/ Waves (and General Relativity of EM Fields/ Waves)

Motion of an observer directly towards or away from a light source will result in an apparent contraction of the light (EM) wave towards the source or its expansion away from the source, respectively, resulting in Doppler frequency/wavelength shift. This theory can solve the paradox ' how can two observers moving relative to each other measure the same speed of light ?'. This theory has been proposed [1] as an alternative to the 'length contraction, time dilation' hypothesis in Special Relativity. The speed of light remains unaffected by the relative speed of the observer. Motion of an observer in the lateral direction (relative to a light source) will result in

- Transverse Doppler shift
- A need for modification in the analysis of stellar aberration

2. Proposed experiment to test the ' Relativity of EM Fields/Waves ' theory.

The theory of Relativity of EM Fields/ Waves can be explained as follows:
Imagine a lights source S with a stationary observer A at some distance from the light source S. Imagine another observer B moving with velocity V towards the source. Assume that at t = 0 the light source is emitting (the peak point of) a light pulse. And at this same instant of time (t = 0) observer B is at the same point as observer A, but moving with velocity V towards the source.
The postulate in this theory is that both observers will detect the light pulse after the same time delay! Observer B will not detect the light pulse earlier than observer A (as one would normally expect because B is moving towards the source). This is due to an apparent spacial compression (contraction) or expansion of EM fields/ waves, due to the motion of the observer relative to the source. If the envelope of the light pulse (a video pulse detected by a light detector) was saved and displayed on screens, the pulse received at observer B would be a temporally compressed (Doppler shifted) form of the pulse received at observer A. But both observers would observe the peak of the pulse envelope after the same time delay, but with the width of the pulse received at observer B narrower than the width of the pulse received at observer A.

This theory just follows from emptiness of space. If space is empty, then all observers should measure the speed of light to be equal to C, irrespective of their velocity relative to the source (The second postulate of Special Relativity). (Assuming that the observer and the source have independent motions. This will be discussed later).

Thus an experiment can be performed to prove (or disprove) this theory. If both observers A and B detect the peak of the light pulse after equal delays (at exactly the same instant of time), then this theory proves to be correct. However, the source should be far enough away from the observers, to get a conclusive result.

If the light pulse is emitted from a source (laser light source) located on the moon, the delay will be about one second. Within one second, an aircraft with a velocity of 500 m/s would travel 500 meters. It takes light about 1.6 micro seconds to travel 500 meters.
Thus, the observer (detector) on the aircraft moving directly towards the moon (observer B) is

expected to receive the light pulse 1.6 microseconds earlier than the stationary observer (detector) (observer A) on the earth (according to existing theories of light and space/motion). According to the Relativity of EM Fields/ Waves theory, however, the detector/observer on the aircraft would receive the peak of the light pulse exactly at the same instant that the peak of the pulse is received by the stationary detector/observer A on the ground, but a narrower pulse.

The upper diagram (Fig. 1a and 1b) represents the waveform of the light pulse envelope recorded at the stationary observer A, and the lower diagram as recorded at (by) the moving observer B. Note that if the source was emitting point Q of the waveform at the moment (t=0) that observer B was at the same position as observer A, then both observers would receive point Q on the waveform simultaneously (Fig. 1a). If the source was emitting the peak point P of the waveform at the moment (t=0) that observer B was at the same position as observer A, then both would receive point P simultaneously. (Fig. 1b)

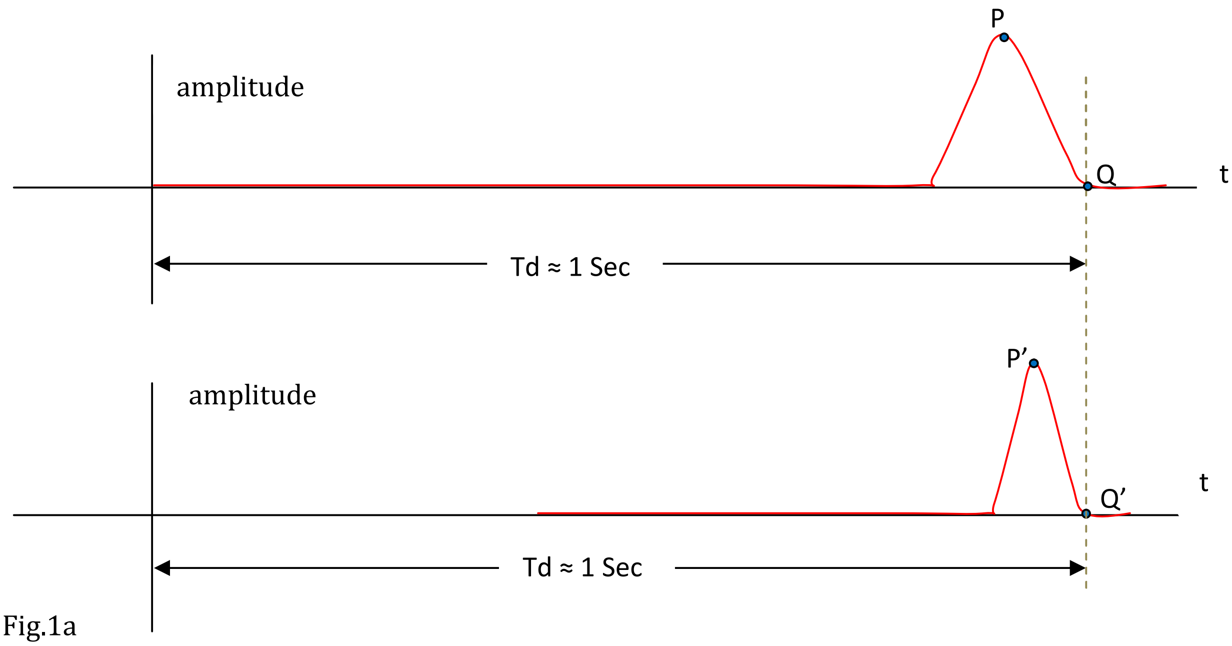
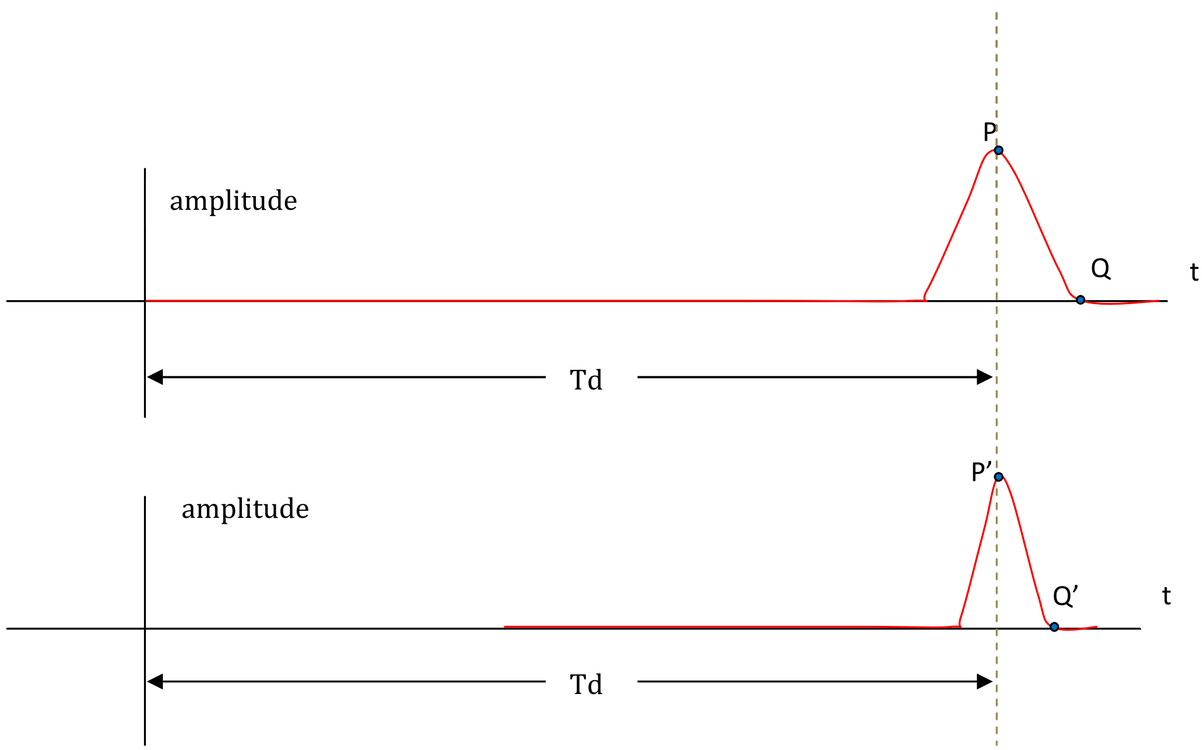

P
amplitude
Q
t
Td ≈ 1 Sec
P'
amplitude
t
Q'
Td ≈ 1 Sec

Fig.1a


P
amplitude
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P'
amplitude
Q'
t
Td

Fig.1b

3. Absolute motion (velocity) is dynamic

Consider an MM device that has been in uniform rectilinear 'motion' for a long enough time. No fringe shift will be observed in this case. Imagine that the MM device is accelerated with some constant acceleration, a. Then absolute velocity, V_{abs}, will build up gradually as a 'dynamic' time integral of acceleration and fringe shift will be observed and increases as absolute velocity increases. Suppose that the MM device has been in acceleration 'a', for a long enough time. Thus, the absolute velocity no longer keeps on increasing and it will settle on some final value, V_{absf}. Thus, for each value of acceleration ('a'), there will be a final absolute velocity, V_{absf}, proportional to 'a'.

$$V_{abs} = V_{absf} \left(1 - e^{-t/\tau}\right))$$

where $V_{abs} = K . a$, where 'a' is acceleration, K is some constant and τ is the time constant

This theory has already been proposed by this author [2].

4. Absolute motion is intrinsic, analogous to consciousness.

Imagine an observer O and a Michelson-Morley (MM) device (with a light source S and detector D), both inside a space craft moving in space.

☺ ☆ ⟶ V_{abs}

At first, suppose that the space craft has been in uniform rectilinear motion for a long enough time. Hence, as discussed above, the absolute velocity of the space craft would be zero. Observer O won't observe any fringe shift. He/ she would measure the speed of light (from S) to be equal to C. Suppose then that the space craft starts accelerating. Hence, as discussed previously, absolute velocity starts to build up. Observer O and the MM device have the ***same*** absolute velocity, V_{abs}. He would observe a fringe shift. You can imagine the observer and the source to be moving in some imaginary absolute space with velocity V_{abs}. Hence, observer O would measure the speed of light to be $C + V_{abs}$ (if the source is in front of the observer, as seen in the direction of acceleration). If the source is behind the observer, he/she would measure $C - V_{abs}$.

Now let us come to the intrinsic nature of absolute motion (velocity).
Observer O measures $C + V_{abs}$ (or $C - V_{abs}$) because the source and observer share the ***same*** absolute motion (velocity). Note that I didn't even say 'equal' , I said 'same'. They share the same absolute velocity : the absolute velocity of the space craft. The space craft, the MM device (with the source S, detector D, the mirrors, the frames) and the observer O move as a *unit*.

Now let us see the distinction in this theory.
Imagine that there is another observer O' in a different space craft, which is at rest relative to the space craft of observer A, but is moving independently. Assume that both space crafts can also accelerate together, but are always at rest relative to each other, but they always have independent motions. i.e. they don't exist/move as a unit.

Assume that observer O' can also measure the speed of light from the source S, which is part of the

MM device on the space craft of observer O, and can (some how) also look into the detector on the MM device. Note that the space crafts are not allowed to have any physical contact, and observer O' also is allowed only to look into the detector D (can't have any physical contact with it).
Now, what velocity of light and fringe shift would the observer O' measure ?!

Both observers (O and O') would observe a fringe shift, by looking into detector D. But observer O' can't explain the fringe shift ! For him, the source S is always at the center of the wave fronts, the speed of light is always equal to C, both the forward and lateral beams travel equal distances, . . .

Now suppose that the detector D on the MM device (which was fixed to and moving as a unit with the device) was removed and observed O' tried to observe a fringe shift by using another detector D' (that is inside his own space craft) that is some how placed to detect fringe shift of light from the MM device. Note that the detector D' and the MM device (with detector removed) are on different space crafts, and have no physical contact.

In this case, observer O' would not observe any fringe shift with his own detector D' , even when there is acceleration ! But observer O can observe a fringe shift with detector D that is on his own space craft. The speed of light relative to the detector D depends on the absolute velocity of the MM device, but the speed of light is *always* (as far as there is no relative acceleration between the two space crafts, in which case the effect of relative motion would appear : see 'General Relativity of EM waves' theory already proposed) equal to C relative to the detector D'. Therefore, detector D' can't detect the absolute velocity of the MM device.

Observer O' can't observe any fringe shift with his own detector D' and can't explain the fringe shift observed with detector D ! The absolute motion of the MM device is intrinsic to the MM device (to the space ship carrying it) ! Only a detector that shares the *same* absolute velocity as the MM device can detect the fringe shift. Observer O can explain the fringe shift he is observing because he has already detected that he is in absolute motion (he already measured $C \pm V_{abs}$).

Observer O' would observe a fringe shift only if he/she had another MM device *on his own space ship* ! In that case, he would measure only the absolute velocity of his own space craft.

Thus, an observer can observe the effect of absolute velocity ($C \pm V_{abs}$ and fringe shift) only if he/she shares the *same* motion (absolute velocity) with the MM device. The source (the MM device) and the observer share the same motion if both are inside the same space craft. They share the same motion also if they are in different space crafts which have the *same* motion. This can be done only by fixing the two space crafts *rigidly* together. In this case, the two space crafts move as a unit, as a single object.

This is the new paradigm.

5. Assumptions, speculations and reasonings in the development of ' Dynamic, Intrinsic' theory of motion/space

The ' Intrinsic and Dynamic' theory of absolute motion/space presented above was developed in an attempt to reconcile the outcomes of MM's and Sagnac's experiments. The reasonings and assumptions followed in the development of this theory were as follows.

- Absolute motion is related to a *change* in state of motion (acceleration) of an object and has no connection with the motion of that object relative to other objects or relative to a medium (an ether or an absolute space).

- If all inertial observers agree on the motion of an object, then that motion is an absolute motion. Thus all inertial observers agree on rotational motion of an object. All agree on the same angular velocity of that object. Thus rotational motion is always absolute.
- Translational motion is different. Not all inertial observers always agree on the same translational velocity of an object. However, all inertial observers will agree on the same acceleration of an object.
- Now we have to make some logical speculation. If we accept that an object that has been in uniform rectilinear 'motion' for a long enough time *is* at absolute rest, then the acceleration of that object must result in an absolute velocity (as a time integral of acceleration). All inertial observers will agree on this velocity.
- But that (absolute) velocity which resulted from acceleration (as a time integral of acceleration) should not be permanent and static because, if acceleration resulted in a permanent/static absolute velocity, a fringe shift would be observed in the Michelson-Morley (MM) experiment (but didn't). Thus, it follows that absolute velocity must be dynamic (changing). Absolute velocity builds up during acceleration and, if the acceleration lasts long enough, (absolute velocity) settles in a final steady-state value and (absolute velocity) will be discharged/decay gradually towards zero (with some time constant) if the acceleration ceases.

Note that after acceleration has ceased, the object is 'inertial' , but the object will have an absolute velocity until it discharges/decays completely (with some time constant) back to zero.

- The above ' Dynamic' theory can account for the 'null' result of MM experiment. Let us see the paradox that arises, which required the new paradigm: ' Intrinsic' .

The Sagnac effect has been the most difficult and daunting phenomena to be reconciled with any theory of relativity (and MM experiment). Imagine that a miniature MM device is mounted on and rotating with a Sagnac device. We can easily account for the fringe shift detected by the Sagnac device by assuming an absolute space/motion. The forward and backward beams start from the same point in space and, as the detector is in (absolute) motion towards the backward beam and away from the forward beam, the two beams will travel different distances before they arrive at the detector and this will account for the observed phase (fringe) shift. The absolute velocity of the detector (and the source) is equal to the product of angular velocity and radius (ωr). Although there is a fundamentally wrong assumption associated with this analysis (an objective absolute space), this is the simplest and the most straight forward explanation; this same explanation will be adopted with a different paradigm in this paper: an intrinsic absolute space/ motion. The assumption of an objective absolute space results in a paradox because then the MM device would also have the same absolute velocity as the detector of the Sagnac device (ωr) and we would observe a fringe shift accordingly. But according to the 'Dynamic' theory already proposed (and according to the MM ‘null’ result), this is incorrect and the absolute velocity of the MM device is different in its nature: it depends on the ' dynamic' time integral of its (centripetal) acceleration and thus directed towards the center of rotation of the Sagnac device , where as the absolute velocity of the detector as part of the Sagnac device is equal to the product of angular velocity and the radius (ωr), and is directed tangentially. Thus the two absolute velocities have fundamentally different natures, different values and directions !, even if the detector of the Sagnac device and the MM device always moved together.

This was a daunting paradox that required a new paradigm that may replace the paradigm that existed for centuries.

The way out of the above paradox is proposed as follows.

Space is empty. An objectively existing absolute space or medium (ether) doesn't exist. But absolute motion exists. So absolute motion must be intrinsic to physical objects! The absolute motion (velocity) of an object is intrinsic to that object.

The Sagnac device as a unit (as a single object) has its own absolute motion: rotation. What is rotating? *The Sagnac device* is rotating *as a unit*. All (inertial) observers agree on its angular velocity. We assume some imaginary absolute space associated with (intrinsic to) the device in which the angular velocity of the Sagnac device is its absolute angular velocity. Then the source and the detector are (absolutely) moving (revolving around the center), in that imaginary absolute space, with velocity equal to ωr. Due to a difference in path length of the forward and the backward beams, then a fringe shift will result. The absolute rotation of the Sagnac device is intrinsic to itself. Even though the MM device is rotating with the Sagnac device, it is not constrained to have the same absolute velocity ωr as the detector of the Sagnac device because the Sagnac device is rotating in its own intrinsic absolute space, and not in an objective absolute space. There is no common objective absolute space in which both the detector and MM device move. Space is empty.

Even though the MM device is rotating together with the Sagnac device, it has no role in the determination of the fringe shift detected by the Sagnac device. The MM device is not part of the *Sagnac device*. So, in the absolute space of the Sagnac device, only the Sagnac device is imagined and analyzed.

The MM device should also be analyzed in its own intrinsic absolute space. That space is the space in which the velocity of the MM device is its absolute velocity, which is equal to the 'dynamic' time integral of acceleration.

If the same detector was used as part of both devices, it would have different absolute velocities as part of each device. The Sagnac device is rotating in its own intrinsic absolute space and the MM device is translating (moving) in its own intrinsic absolute space. In the intrinsic absolute space of the Sagnac device, the detector is moving with an absolute velocity equal to ωr. In the intrinsic absolute space of the MM device, the detector is moving with absolute velocity equal to the 'dynamic' time integral of its (centripetal) acceleration.

If the MM device detected a fringe shift corresponding to ωr, in that case it would detect rotation, but we know that it will not.

If we say that absolute velocity is intrinsic to the MM device, then this requires that the existence of the MM device as a *unit*. As a unit, all parts of the Sagnac device, i.e the mirrors, the source, the detector, and even the connecting rods ! , 'know' each other ; they are moving as a single unit and are designed and constructed and arranged to detect (absolute) rotation. Even the frame of the device has a fundamental role, the same as that of other parts ! All parts of the device have the same role: detection of rotation. What is detected is rotation of the whole device. The whole device must exist if we are even to talk about its rotation. All parts of the device (the mirrors, the source, the detector, the frame) make up the device, and thus all have a fundamental role. We will discuss the consequences of this paradigm soon.

The arguments can be restated as follows.

Does a Sagnac device exist? Is it rotating? Yes. All observers can agree on these. The observers don't require the existence of absolute space or the ether to know this. So, whether a fringe shift will be observed or not depends on whether the Sagnac device is rotating or not, which in turn depends on the agreement of all inertial observers. The absolute motion of the light source and the detector follows from the absolute rotation of the device.

Does an MM device exist? Is it (absolutely) moving? If all inertial observers accept absolute velocity as a 'dynamic' time integral of acceleration, then they will agree on the absolute velocity of the MM device.

Thus what matters is what all observers agree on the (absolute) motion of a physical object. That motion is absolute motion and is intrinsic to that object. The agreement of all inertial observers on an absolute motion is the beginning of all analysis.

Let us see another consequence of the new paradigm.

Previously we stated that an observer can observe the effect of absolute motion (measuring $C \pm V_{abs}$) only if he/she shares a common (*same*) absolute velocity with the light source.

According to the 'dynamic' theory of absolute motion proposed earlier, an accelerated MM device will be 'charged' with absolute velocity if accelerated and hence will form a fringe shift.

Imagine that the parts (the mirrors, the detector) of an MM device are not rigidly fixed to each other, but assume that the parts are arranged in space to form (rather simulate) an MM device. Assume that each part (mirrors, source, detector) can be accelerated independently. So all parts can be accelerated at the same time with equal (but independent) accelerations, so that they always stay together to form (rather look like) a real MM device. But they don't *really* exist as a unit.

Then will a fringe shift be observed in this case also ?

According to the 'Intrinsic' paradigm, no fringe shift will be observed even if the parts are accelerated at the same time to look exactly like an accelerated real MM device !

The argument goes as follows.
If an MM device is accelerated, then it will develop absolute velocity and hence a fringe shift. This absolute velocity is intrinsic to the MM device. But an MM device, as a single unit, doesn't exist in the above case. So, we can't talk about (let alone observe) absolute velocity of an MM device when the MM device doesn't exist in the first place. Absolute velocity is intrinsic. This requires the existence of an MM device as a single unit. The parts of the MM device should exist as single unit (as an MM device) by being connected rigidly to each other, arranged properly, for an MM device to exist. A *real* MM device should exist.

If absolute space (or ether) existed objectively, there would be no difference between a real MM device and an MM device with parts not rigidly fixed together. But absolute motion/ space is intrinsic and doesn’t exist objectively.

The same argument can be made about Sagnac device. A fringe shift can be observed only on a *real* (with rigidly connected parts) Sagnac device. Even if parts of a Sagnac device rotate independently and look exactly like a real Sagnac device, the Sagnac device as a single unit doesn't exist ! If a *real* Sagnac device doesn't exist as a unit, to what will absolute rotation be intrinsic?! If we say that

absolute velocity is intrinsic, then there must be a physical entity (object) to which it will be intrinsic.
The analogy with consciousness is as follows:
A conscious being should exist in the first place, before we talk about feelings and perceptions. Just as feelings and perceptions are intrinsic to the conscious being (e.g a cat), so is absolute velocity intrinsic to the physical object.

6. An observer can observe directly (with his own detector) only his own absolute velocity (fringe shift).

An observer can see a fringe shift directly (with his own detector) only if he has the *same* absolute velocity as an MM device. Note again the fundamental difference between 'same' and 'equal'. Even if an observer is at rest relative to an accelerating MM device or a rotating Sagnac device, he will not observe any fringe shift *directly* (with his own detector, i.e a detector moving as a unit with him), if he/she does not have the same absolute motion as the MM device. The observer must be on the same space craft carrying the MM device or, in the case of the Sagnac device, the observer should rotate together with the device (as a unit) to observe a fringe shift *directly* (with his own detector).

If an observer observes a fringe shift (absolute velocity) *directly* on an MM device, then that is his own absolute velocity ! If an observer detects a fringe shift (angular velocity) *directly* on a Sagnac device, then that velocity his own (absolute) angular velocity.
An observer can't observe an absolute motion *directly* if he/she doesn't have that ***same*** absolute motion. In effect, this means that an observer can observe *directly* only his own absolute motion.

With this paradigm, absolute motion would be analogous to consciousness. Only the physical object can 'feel', 'perceive' its own absolute motion.

7. An observer who does not have the *same* absolute velocity as a light source can not observe the effects of absolute velocity

Imagine an inertial light source S and an inertial observer O, with independent motions. The observer will always measure the speed of light to be equal to C, irrespective of the relative motion between the source and the observer. If there is relative acceleration between the source and the observer, the observer will measure the speed of light to be different from C.
These have been discussed in the two theories previously proposed by the author: 'Relativity of EM Fields/Waves' and ' General Relativity of EM Fields/Waves'.

If an observer and a light source have independent motions, the observer will observe only the effect of relative motion (Doppler effect, stellar aberration, . . as discussed in the two theories mentioned above) and cannot observe the effect of absolute motion *of the light source*. One effect of absolute motion is measuring the speed of light (from S) to be equal to $C \pm V_{abs}$. The other effect is the source not being at the center of the wave fronts. Another related effect is the anisotropy of the speed of light, relative to the source.
Thus, an observer who has motion independent of the motion of the light source S will not observe these effects. He/she will always observe the source S to be at the center of the wave fronts, i.e. irrespective of any motion (absolute or relative) (or acceleration) of the observer or the source. Even if an observer just happened to be at rest relative to a source that is accelerating (absolutely moving), he/she cannot observe the anisotropy of the speed of light relative to that source. Thus an observer who is on an accelerating space craft can observe the anisotropy of the speed of light

emitted from the space craft, but another observer with an independent motion cannot observe the anisotropy of the speed of light emitted from the accelerating space craft. For him, the speed of light is always equal to C, if he measures in all directions relative to the source, and for him the light source is always at the center of the wave fronts.

8. Effect of source-observer relative velocity when both are moving with the *same* absolute velocity

Imagine an observer O and a light source S, at rest relative to each other, both inside an accelerating space craft, with the source in front of the observer as seen in the direction of the acceleration.

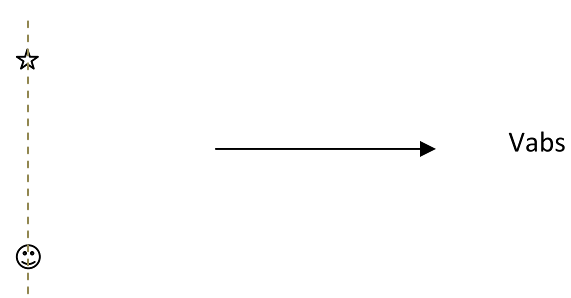
Previously we discussed that the observer would measure speed of light to be $C+V_{abs}$. (And $C- V_{abs}$ if the source was behind the observer). Now, the question is:

What if the observer moves towards /away from the source with relative velocity, V_{rel} (while both are in the same accelerating space ship) ? What velocity of light would he/she measure ? He/she would measure the speed of light to be equal to $C+V_{abs}$, irrespective of the relative velocity V_{rel} ! Therefore, for the positions of the source and the observer shown above, the speed of light is always a constant $C+V_{abs}$! (if the observer was in front of the source, this would be $C- V_{abs}$).

If the relative positions of the source and the observer is at an angle Θ relative to the acceleration (absolute velocity), then he/she would always measure the speed of light C' to be the vector sum of two vectors : C and Vabs, where the angle between the two vectors is Θ, irrespective of any velocity relative to the source.

If the relative position of the observer and the source is lateral to the direction of acceleration (absolute velocity), the observer would measure C' as :

$$C' = (C^2 + V_{abs}{}^2)^{1/2}$$



Conclusion

The new ' Intrinsic' paradigm about absolute space/ absolute motion presented in this paper is not a mere speculation. This theory evolved as a result of an exhaustive search for all possibilities to explain and reconcile the Sagnac effect with relativity theories. This paradigm may take us a long way, but this paper gives only a hint and much remains to be explored. Any new explanations and clarifications will be presented in future versions of this paper.

Always thanks to God and His Mother, Our Lady Saint Virgin Mary.

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