The ALFA Model: Absolute Lab Frame & Flexible Aether

Robert Bennett
Box 2457, New York, NY 10009-2457
e-mail: robert.bennett@rcn.com

This paper challenges dissidents to escape the mainstream cage of theories imposed by fiat and adopt a science epistemology based on consistent logic and the scientific method of empirical proof by falsifiability. The Fizeau and Sagnac results will be revisited and analyzed afresh to reach two conclusions that shake the foundations of belief in cosmic architecture and composition. The Absolute Lab frame and Flexible Aether model will be shown to be consistent and supported by all experiments examined to date. This support includes tests that extend Sagnac to linear motion and mechanics, the key results of Michelson & Morley/Gale, and classic aether tests. Establishment claims that support the Earth's rotation, revolution and translation will be subjected to logic and the scientific method. Consequences of the ALFA paradigm will be outlined.

1. Introduction

1.1. The Dissident Paradox

Even though the inconsistency of SR is evident immediately from its two premises, yet the discussion of contradictions is allowed to continue further, in violation of Popper's scientific logic rules.

For example: photon speed is constant in any frame x,

SR axiom 2: $$V_{\text{ph},x} = c \tag{1}$$

(c is light speed in vacuum).

All objects are stationary in their own frames, with respect to themselves, in their own proper frame.

Null axiom: $$V_{x,x} = 0 \tag{2}$$

But if x is the photon frame, then $V_{\text{ph,ph}} = 0$ for the null axiom and $V_{\text{ph,ph}} = c$ from axiom 2.

1.2. Handling Inconsistency

The consequence of ignoring this contradiction is that testing is useless, since anything can be proven true or false in an inconsistent system. To illustrate, just foolishly add the axiom:

$$1 = 2$$

to the valid and consistent rules of arithmetic and behold what mayhem is generated by the inconsistency. When this system proves that

$$x = y$$

for any x, y, the reason is that the inconsistent axiom was allowed. By adding

$$\begin{array}{r} 1 = 2 \\ +2 = 1 \\ \hline 3 = 3 \end{array}$$

the possibility of using two false statements to prove a truth is demonstrated. This example corresponds to dissidents who ignore the SR axiomatic conflict and allow establishment arguments over SR logical conflicts and implementation details and interpretation of SR rules to persist. Just as the inconsistent arithmetic system can prove that $1 = 1$, $2 = 2$ and $1 = 2$, mainstream science can prove any empirical test of SR is valid, because its basic rules conflict.

Relativity claims of experimental support are meaningless; the logical inconsistencies of SR and GR allow any test to prove them true…. or false.

Our epistemology follows the scientific method and logic:

When a contradiction is found, 

!!

a. abandon the theory, or
b. eliminate the contradiction

Why? Accepting contradictions allows anything to be proven true

⇨ nothing can be proven true

MS claims that relativity predicts the correct results for all experiments. This is true. Relativities also predict different results for all tests!

1.3. Clues to SR Rejection

Those who question the relativity principle have no concept of the signs that mark its invalidity – of how to recognize a preferred/absolute frame. If relativity is true:

Start with the relative displacement between 2 objects, a and:

$$D_{a,b}(t) = -D_{b,a}(t) \tag{3}$$

The rate of change of each side gives the condition for relative motion/velocities

$$V_{a,b}(t) = -V_{b,a}(t) \tag{4}$$

Repeated derivatives generate higher order motions, like

$$A_{a,b}(t) = -A_{b,a}(t) \tag{5}$$

(Note that accelerations are relative, not absolute, as some relativists claim – just another inconsistency).

Now, if the relativity principle is false, there must be at least one case where

$$V_{a,b} \neq -V_{b,a} \tag{6}$$

that marks the existence of a preferred frame. E.g., if a is the photon frame 'ph' and b is any inertial frame 'in', then

$$V_{\text{ph,in}} = c\,. \tag{7}$$

But $V_{\text{ph,in}} = ?$ It's undefined. Measurements can't be made from the photon frame, a violation of the scientific method's falsifiability criterion. (except for Einstein, whose gedanken experiments replace real testing.)

In addition, if an absolute frame *abs* exists, then $V_{a,b}$ must use $V_{a,\text{abs}}$ to correspond with experimental tests. We then can detect an absolute reference system by looking for.

$$V_{a,b} \neq -V_{b,a} \tag{8}$$

$$V_{a,b} = V_{a,\text{abs}} \tag{9}$$

1.4. Another Relativity Show Stopper

A dropped ball with mass m hits the ground at speed $V_{m,\text{e}}$ and energy $\frac{1}{2}mV_{m,\text{e}}^2$ measured in the Earth's frame. In the m frame the Earth hits the mass with energy $\frac{1}{2}M_{\text{e}}V_{\text{e},m}^2$.

Conservation of energy requires that

$$\tfrac{1}{2}mV_{m,\text{e}}^2 = \tfrac{1}{2}mV_{\text{e},m}^2 \tag{10}$$

But relativity requires that $V_{m,\text{e}} = -V_{\text{e},m}$, so m must equal M_e, which is 10^{25} times bigger!!

Only the speed in the earth frame is logically consistent with physical laws (energy) and real; the speed in the ball frame is phenomenal… an appearance. Relativity contradicts conservation of energy… the earth frame does not.

Another characteristic of relativity violation is found in dynamic laws that have a velocity dependence, terms that are functions of v, or $F(v)$.

Objects at rest in a dynamically preferred frame will have $v = 0$, and the equations of motion will have their simplest form. E.g., in mechanics the centripetal force

$$F_c = \frac{mv^2}{r} \tag{12}$$

will be zero when the mass is at rest in the preferred frame.

In EM the Lorentz force will only have an **E** field contribution, When the charge q is at rest in the preferred frame,

$$\mathbf{F}_L = q\left(\mathbf{E} + \mathbf{v}\times\mathbf{B}\right) = q\mathbf{E} \tag{13}$$

Dissidents clamor for originality, for thinking outside the box, but does this box contain logic and testing? Many adopt the rejection of the scientific method, as does mainstream physics. All with similar thoughts should stop reading here, for this paper adopts the traditional scientific method of investigation, based on**:**

- **Testability:** capable of being falsified by a test here and now
- **Consistency**: no contradictions in premises, test or meaning. If you have a problem with these two criteria, then don't bother reading further. Subjective dislike of a theory is not a scientific argument.

1.5. The Aether Model

During the 1800's most physicists believed that a fundamental substrate pervaded all space, an elastic medium allowing the propagation of light, namely the EM aether. Its nature was modeled after the properties of sound in fluids like water and air.

We will adopt a general model so as not to eliminate initially any empirically testable model. **Aether phases** may be of three types:

1. solid like ice, a grid or rigid lattice (Lorentz, M&M)
2. flexible passive, dragged by material motion, like water entrained by paddle or propeller
3. flexible active, having a natural flow, like a river, the Jet or Gulf streams

For the last two types, the interaction coupling between aether and matter/particles can be partial or full. The last option of a natural aether flow is most often overlooked by modern analysts, who resort to aethereal euphemisms like quantum foam, vacuum, dark matter or zero point energy.

1.6. Aether Motion Testing

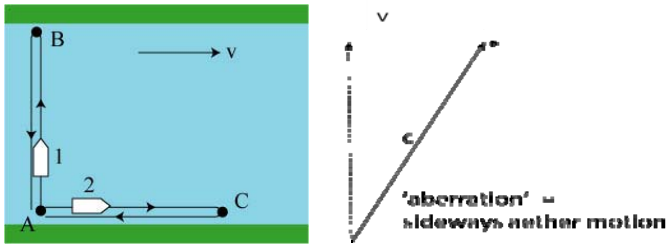

Fig. 1. OWLS /TWLS - One Way Light Speed vs. Two Way Light Speed

We will use the aether model of 150 years ago. A boat (photon) moving in a river(type 3 aether) can simulate interaction of photons and an aether flow moving at speed v.

A boat (Fig. 1 left,#2) can move at speed c in still water, so it moves downstream at $c+v$ and upstream at $c-v$. Measurement of the roundtrip speed along A-C-A (TWLS) will not detect the aether speed v, since

$$\frac{c+v}{2} + \frac{c-v}{2} = c\,.$$

Only an OWLS test will detect aether speed v parallel to the light beam.

Conclusion: All TWLS tests of light speed in parallel aether flows are worthless and claims of isotropy of c with high precision lasers (or vacuum interferometers) are bogus.

Fig. 1 as drawn is incorrect, since boat #1 would be deflected to the right (downstream) while crossing. The right diagram does show what aberration to expect from the moving medium's (water/aether) effect on the boat/photon, an aberration angle of $\sin^{-1}(v/c)$.

The speed of photons perpendicular to the aether current is

$$\left(c^2 - v^2\right)^{1/2} = c\left(1 - \frac{v^2}{c^2}\right)^{1/2} \approx c\left(1 - \frac{2v^2}{c^2}\right).$$

It's this change in c of order v^2/c^2, due to the aether cross-current, that Michelson and Morely sought to measure.

2. Early Aether Tests

Some aether detection tests were designed to be so; others were serendipitous.

2.1. Arago Prism Telescope (1810) [1]

Arago attempted to measure starlight refraction with a glass prism in a telescope (Fig. 2). According to Snell's law angles of refraction would depend on c and the different velocities of the stars and the motion of the earth at different times of the day and year. The angle of refraction will be different for light moving at different speeds. Contrary to this expectation he found there was no difference in refraction between stars, at differing times of day or between seasons. Light from every star is refracted the same.

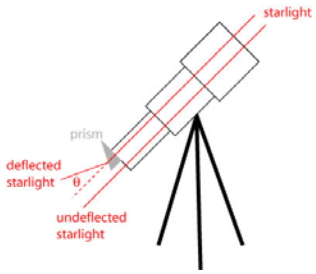

Fig. 2. Arago prism telescope

Conclusion: Light speed c is independent of stellar (source) and earthbound (observer) motions.

2.2. Faraday Rotor Generator (1831) [2]

Faraday found there is an induced current if a conductor and a magnet are joined together and rotated, having no relative motion, but both spinning in the lab frame. This is contrary to Faraday's and Maxwell's laws.

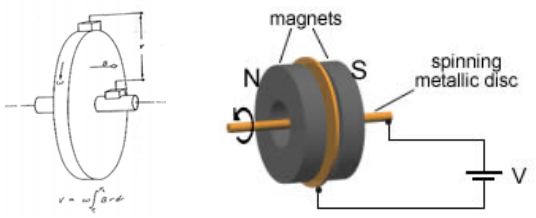

Fig. 3. Faraday Rotor Generator - schematic (left) and physical set-up

Conclusion: The Hertzian EM equations predict this result, if the convective velocity is the speed of aether in the lab $V_{\text{ae,lab}}$.

2.3. Fizeau Water Pipes (1861) [3]

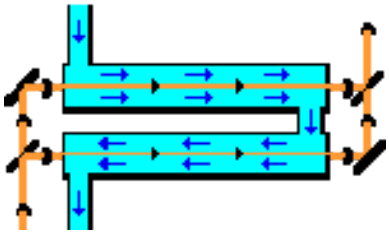

Fig. 4. Fizeau water pipe

Fresnel proposed in 1818 that matter moving at v would partially drag aether along, reduced by the drag factor $1-1/n^2$. The Speed of Light v_{SoL} for this case is Fresnel's Law:

$$v_{SoL} = \frac{c}{n} + v\left(1 - \frac{1}{n^2}\right) \tag{14}$$

Fizeau tested and confirmed the Fresnel conjecture by splitting a beam and sending the half beams through water moving in opposite directions with speeds $+v$ and $-v$ (Fig. 4). The half beams were recombined and compared in an interferometer. Fresnel's law showed aether is dragged with water/ matter at a greatly reduced speed.

Note that if a vacuum is used, where n=1.0000 , no dragging will occur; v_{SoL} will be c. It is hopeless to test for c anisotropy with a vacuum, as there is no mass for the aether to interact with. Yet such vacuum experiments are cited by MS scientists as proof of SR's second axiom, and the non-existence of aether.

Also, note that the aether motion is measured within the dragging medium, not outside it, as in the Sagnac test, which shows no reduction in v_{SoL}. Another important note, for future reference in the Sagnac test, is the understood reference frame for Fizeau's experiment the lab frame!

Conclusion: v_{SoL} is composed of two terms, one which depends only on the refractive index n, and the other is dependent on both n and v.

2.4. Airy Water Telescope (1871) [4]

Airy put water in the telescope and saw no change in aberration angle. This was termed a 'failure', since Bradley's theory of receiver motion predicted a change with n.

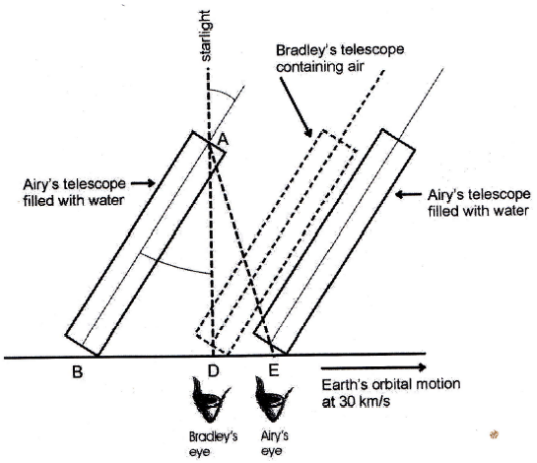

Fig. 5. Airy water telescope

Bradley – For all dashed lines in Fig.5: The middle telescope must be tilted to see the starlight's aberration. When light moves through the telescope from A to D the Earth – and telescope - move from B to D. This determines the aberration angle of tilt,

$$\tan^{-1}\frac{BD}{AD}.$$

Airy – solid lines: With water added (left telescope), the light travels the distance AD through the telescope slower, at ¾ of c.

So the telescope travels further at the Earth's orbital speed, a distance BE, and the aberration is greater, $\sin^{-1}(AD/BE)$. Nice theory, but fails to predict the actual result, shown in the right telescope – there's NO CHANGE in the tilt! The Earth's motion as cause of aberration is simply refuted by Airy's test – the 'failure' to increase aberration with water.

Airy's 'failure' is in reality a 'success' for the ALFA model, where the flexible aether 's sidereal rotation explains that the deflection occurs in transit. The light path is bent in space, before entering the telescope, while the Earth is at rest.

ALFA analysis: There are no D and E distances, since the Earth is motionless. The light beam in water travels slower, at 3/4 of c, from A to B, but there's no sideways motion. So no additional tilting is needed. Airy's test is an ALFA success!

Conclusion: The Earth's motion as cause of aberration is simply refuted by Airy's test – the 'failure' to increase aberration with water. The deflection of starlight known as stellar aberration must occur BEFORE the light enters the scope.

2.5. M&MX (1886) [5]

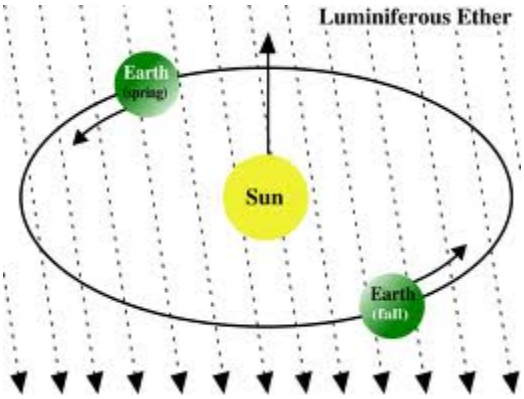

Fig. 6. Earth's annual motion through aether

For a fixed aether, both a daily and annual periodic change in aether direction is forecast, based on the heliocentric model in Fig.6. The annual change is due to the orbital speed of the Earth and is 30 times greater than the equatorial spin.

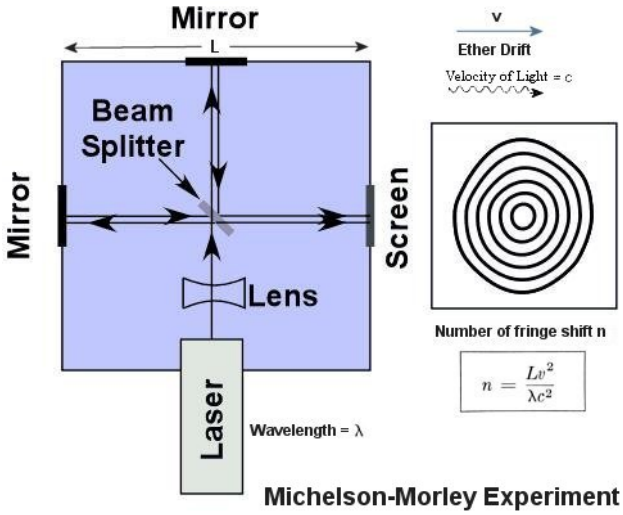

Fig. 7. M&MX - apparatus schematic (left) and screen pattern

The aberration boat model can be conceptually transferred to the motion of a photon up/down an aether stream with motion cross-stream. In the diagram above a beam split into 2 half beams at a right angle is then compared for a phase difference when combined on the interferometer screen.

The result was equivalent to a speed of ~ 5 kms, about 15% of the expected orbital speed of 30 km/s. The disappointment was reflected in the summarizing term – a 'null' result.

The experimental error analysis of 5 runs in Fig.8 shows that the M&M SoL average was always greater than c, and only one set of error ranges overlapped the value of c. Although this result is consistent with an Earth and an aether approximately at rest, this option was not listed among the four options for interpretation given in Michelson's conclusion.

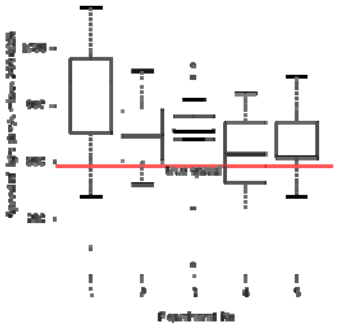

Fig. 8. Box plots from the Michelson–Morley experiment

The search for the aether effectively ended with Einstein's paper on SR in 1905. Albert E said no aether was needed, while Albert M ignored the Earth and aether at rest! Note: this experiment is small-scale and low precision; the use of transverse flow means the accuracy is of second order $\sim(v/c)^2$.

Conclusion: There is no aether, or the Earth and aether are co-moving.

3. Review of Sagnac-type Tests

3.1. Sagnac (1913) [6]

In the Sagnac test an interferometer that detects the overlapping pattern of two counter-rotating light beams resulted in a measured Speed of Light v_{SoL} that was the usual light speed c plus or minus the rim speed of the spinning platform v.

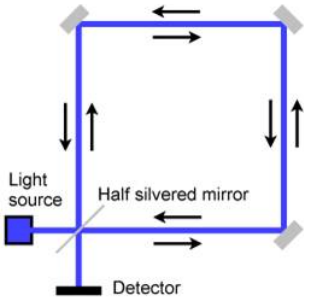

Fig. 9. SagnacX schematic

The light beam in Fig. 9 was split into CW and CCW paths that combined again at the interferometer detector for fringe measurement; the entire apparatus was mounted on a turntable. Sagnac found that $v_{SoL} = c$ when the speed of the rotor in the lab frame was zero. But when the rotor's edge speed was v, $v_{SoL} = c \pm v$.

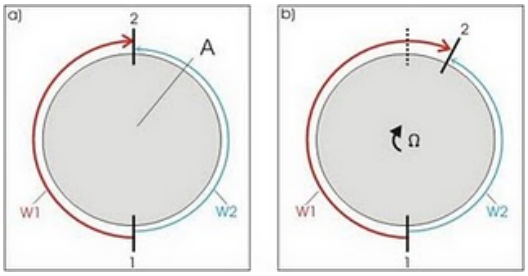

Fig. 10. Optical bench at rest and then rotating CW

When the platform is at rest (Fig.10 left) the CW w_1 and CCW w_2 half-beams travel the same distance in the same time. But when the platform spins CW (Fig.10 right) the co-rotating w_1 beam travels a greater distance than the counter-rotating w 2 beam, in the same time. Were the photons replaced with human runners, the result would be the same - the CCW runner would win the race.

In SR v_{SoL} for either beam must be c in either the lab or rotor frame, whether the rotor spins or not. In the rotor frame, the light beam should see no rotation, because the whole optical bench rotates: source, mirrors and film are on the turntable. Measurements are made in the rest frame of the apparatus which is only rotating in the lab frame. Relativity says v_{SoL} should be c, but Sagnac measures

$$v_{SoL} = c \pm v \tag{15}$$

v_{SoL} is anisotropic - it is not c in the rotating frame!

Sagnac considered that the turntable rotation dragged or entrained the aether in the space around it, at the same speed (full dragging) as the rotor v. The v_{SoL} change was due to the motion of the aether in the path of the light beam, either boosting it $+v$ for co-rotation or $-v$ for counter-rotation. He then concluded that v_{SoL} was independent of the source speed, and that an entrained aether was detected, explaining the unexpected results, that is, to relativists. Incredible as it may sound, although the results had found that counter-rotating light beams travel at $c \pm v$, relativists actually delude themselves that the Sagnac change in v_{SoL} is consistent with SR! Their idol, Einstein himself, chose to ignore the results that contradicted his 1905 paper – even 40 years later he had no adequate response. Einstein was quite aware of Sagnac's work, but chose to ignore the refutation and hope the Sagnac result would be forgotten. But for its use in optical navigation and GPS, it no doubt would be.

3.2. Sagnac Analysis of Light Speed

Note: SagnacX is first order in v/c. The complete Sagnac result in transparent dielectric having index of refraction n is

$$v_{SoL} = \frac{c}{n} \pm \frac{v}{n^2} \tag{16}$$

We simplify the analysis by considering only the fast co-rotating beam, the plus sign, and suppress the factors involving n. (The full expression can be restored at the end.) So v_{SoL} is simplified to

$$v_{SoL} = c + v \tag{17}$$

In both the lab and rotor frame (for the co-rotating beam).

Sagnac found the result was independent of both source and detector speed and the aether was being dragged along at the speed of the rotor.

Note: the lab frame measurement of $c + v$ was not recorded by Sagnac but reported by Dufour & Prunier in 1938. They also found that:

- The same result was found by mixing of optical parts between lab and rotor.
- The effect extended at least 10 cm from the rotor.
- The optical path must include the rotation center, else $v_{SoL} = c$

4. The ALFA Model

4.1. Absolute Lab/Dynamic Aether

The metaphysical premises are:

1. Light speed in aether is always c (c/n in dielectric)

$$V_{\text{ph,ae}} \equiv c \tag{19}$$

where 'ph' represents a photon, 'ae' is aether.

2. Galilean velocity addition is valid: (based on Fizeau's exp.) The Speed of Light in any frame x is

$$\begin{aligned} v_{\text{SoL}} &= V_{\text{photon,aether}} + V_{\text{aether,reference system}} \\ &= V_{\text{ph,ae}} + V_{\text{ae},x} = c + V_{\text{ae},x} \end{aligned} \tag{20}$$

Various theories are now applied to the Sagnac result and their predictions are compared to the Sagnac result. For all models, the measured rim speed of the rotor is v, so

$$V_{\text{rot,lab}} = v \tag{21}$$

Special Relativity is based on no aether and two axioms:

SR1: $$V_{x,y} = -V_{y,x} \tag{22}$$

SR2: $$V_{\text{ph},x} = c \tag{23}$$

Applying SR1 to v_{SoL} gives $V_{\text{ph},x} = -V_{x,\text{ph}}$. But $V_{x,\text{ph}}$ is untestable using the scientific method.

SR2 predicts lab and rotor frames will both measure c, but the Sagnac result is $c + v$ for both. Both axioms are invalid! *There must be some preferred frame in which* $V_{x,y} \neq -V_{y,x}$! Ritz ballistic claims v_{SoL} depends on the emitter's speed. Invalid! Sagnac found v_{SoL} is independent of source speed.

Aether theories are separated into static and flexible. For **Static Aether** type 1:

$$V_{\text{ae,lab}} = 0\,; \quad V_{\text{ae,rot}} = 0 \tag{24}$$

By Eq. (20) $$v_{\text{SoL}} = V_{\text{ph,ae}} + V_{\text{ae,lab}} = c + 0 = c \tag{25}$$

And $$v_{\text{SoL,rot}} = V_{\text{ph,ae}} + V_{\text{ae,rot}} = c + 0 = c \tag{26}$$

Both rigid aether predictions conflict with Eq. (18). For **Dynamic Aether** type 2 with full dragging:

by measurement $$V_{\text{rot,lab}} = v \tag{27}$$

by assumption $V_{\text{ae,lab}} = v$ and $V_{\text{ae,rot}} = 0$ (28)

The rotor frame sees a co-rotating aether. v_{SoL} in the lab in Eq. (20) $= V_{\text{ph,ae}} + V_{\text{ae,lab}} = c + v$ agrees with Eq. (18). The rotor $v_{\text{SoL,rot}} = V_{\text{ph,ae}} + V_{\text{ae,rot}} = c + v$ from Eq. (18) implies $V_{\text{ae,rot}}$ must equal v, in conflict with the assumption of full dragging,

$$V_{\text{ae,rot}} = 0 \tag{29}$$

Can $V_{\text{ae,rot}} \neq 0$ so that aether speed $= v$ in both frames?

Before rejection this as a dead end, recall that SR was refuted, so a preferred frame must exist. If $V_{\text{ae,rot}}$ is v, not 0, then the lab frame must be preferred for detecting aether motion! $V_{\text{ae,lab}}$ and $V_{\text{ae,rot}}$ both equal v!

From the results Eq. (18) and velocity analysis,

$$V_{\text{ae,rot}} = V_{\text{ae,lab}} + V_{\text{lab,rot}}$$

implies by substitution that

$$v = v + V_{\text{lab,rot}} \tag{30}$$

which further implies that

$$V_{\text{lab,rot}} = 0 \neq V_{\text{rot,lab}} = v \tag{31}$$

In the rotating frame the lab is at rest! If relativity were true $V_{\text{lab,rot}}$ would equal $-v$, not 0. As the rotor can have any speed the result is general.

4.2. Absolute Rest Theorem

$$Vlab,x=0 \tag{32}$$

where x is any rotating frame on Earth. The lab is always at rest with respect to any rotating system. The Earth is the frame of absolute rotation sought by Newton and rejected by Einstein. With $V_{\text{ae,rot}} = v$, Flexible Aether predictions agree with Eq. (18).

Conclusion: Only the Absolute Lab (ECEF) frame with Flexible Aether model $V_{\text{ae,rot}} = v$ agrees with Eq. (18).

$$v_{SoL} = c + v \tag{33}$$

in both frames (and with similar tests: M&MX, R. Wang, Dufour & Prunier, etc.)

The SoL is $c+v$ for the co-rotating beam, in both the lab and rotor frames, independent of source and detector motion, *but dependent on aether motion*.

4.3. Summary of Sagnac Results

$$v_{\text{SoL},x} = V_{\text{photon,aether}} + V_{\text{aether},x} = c + V_{\text{ae,lab}} \tag{34}$$

from Eq. (32). So whatever reference frame x is used, light speed only depends on the aether speed in the lab frame.

$$V_{\text{photon,aether}} + V_{\text{aether,lab}} = c + V_{\text{ae,lab}} \tag{35}$$

4.4. Absolute Time

Newton had an abstract concept of absolute space and time, though neither could be defined concretely for measurement. Does the absolute frame of ALFA have a corresponding well-defined absolute time… capable of being tested?

The conditions for having an absolute time-keeper are:

- Stable
- Global synchronization
- Autonomous operation
- Universal accessibility across the world
- Immunity from environmental changes

There is really only one clock that fills all these slots – the most ancient of time-keepers, the heavenly procession of the stars – astronomical star time! Stellar rotation provides a universal master clock in the time domain.

Clones of the master clock – or slave clocks – can be used just as now, as long as they are monotonic and can be scaled up to the master clock in the heavens. This resolves time dilation issues. Cosmic time is free of local influences and is truly universal, the sky being accessible anywhere on Earth.

The ALFA model axioms are:

1. Light speed in aether is always c =>

$$V_{\text{photon,aether}} = V_{\text{ph,ae}} = c \tag{36}$$

2. Absolute velocity addition: (lab = ECEF frame)

$$v_{\text{SoL},x} = V_{\text{photon,aether}} + V_{\text{aether,lab}} = c + V_{\text{ae,lab}} \tag{37}$$

3. Absolute Rest theorem:

$$V_{\text{lab},x} = 0 \tag{38}$$

The lab/Earth is universally at rest.

4. Absolute Frame theorem:

$$v_{SoL,x} = c + V_{\text{ae,lab}} \tag{39}$$

Whatever reference frame x is used, light speed only depends on aether speed in the lab frame.

5. Absolute time:

$$T_{\text{lab}} = T_x \tag{40}$$

measured with the aethereal motion of the stars, or 'cosmic time'.

5. More Empirical Support

5.1. M&M Redux

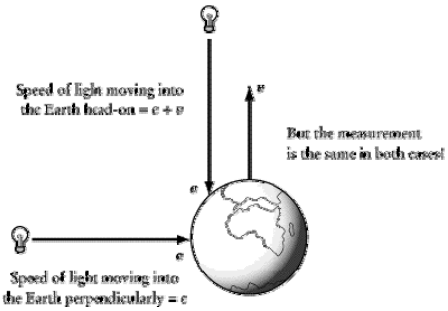

Fig. 11. Predicted light speed for motion parallel and orthogonal to Earth's motion

Let's all concentrate. Is there any value of Earth's speed v for which c does equal $+v$? All the establishment super-stars for over a century couldn't get this right!

From Eq. (2): $$v_{\text{SoL,lab}} = c + V_{\text{ae,lab}} \tag{41}$$

from 'null' result:

$$v_{\text{SoL,lab}} = c + \sim 0 \tag{42}$$

implies $$V_{\text{ae,lab}} = 0 \tag{43}$$

The aether speed is approximately zero at the Earth's surface, so both the Earth and the surface aether speed are zero (within the M&MX precision limits - MMX is second order in $(v/c)^2$; Sagnac is first order in v/c. *ALFA* explains the null result as a motionless Earth and aether.

5.2. Michelson-Gale (1925) [7]

Counter-rotating half beams traversed a 1.2 mile perimeter in an Illinois field (Fig. 12, right). There should be a phase difference arising from the difference in rotation speed between the north and south leg, where $v_1 > v_2$. The result indicated a difference corresponding to a daily eastward rotation, which Mic-Gale misinterpreted as the Earth's rotation, since Sagnac's result showed the Earth doesn't rotate. Besides ignoring the possible

aether rotation westward around a static Earth, detection of Earth's rotation by the light beam requires an aether medium.

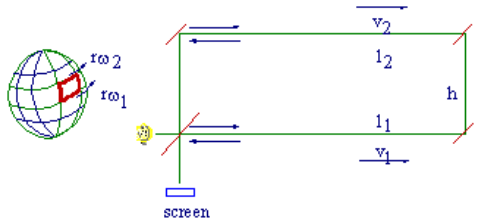

Fig. 12. Michelson-GaleX – location and schematic

Test result:

$$v_{\mathrm{SoL}} = c + r\omega = c + v$$

where r is the distance to polar axis, and ω is the sideral angular velocity

From Eq. (2) $v_{\mathrm{SoL\text{-}lab}}\ v_{\mathrm{SoL\text{-}lab}} = c + V_{\mathrm{ae,lab}}$ (44)

from the test result $v_{\mathrm{SoL\text{-}lab}} = c + v$ (45)

implies $V_{\mathrm{ae,lab}} = v$ (46)

$v =$ aether flow near the ground

Conclusion: The Earth has an autonomous aetherosphere that rotates westward at every latitude in one sidereal day. The aether here is flowing naturally, not passively being dragged, a proof of existence of type 3 active aether currents, the analog of rivers or the Jet and Gulf streams. Other cases of type 3 flow are the GPS "Sagnac" effect and the E-W radio signal delay.

5.3. Dufour & Prunier (1937) [8]

… extended the Sagnac study with much the same equipment. They found the same results as Sagnac did, but with important additions.

Conclusion: v_{SoL} in the lab frame is the same as in the rotor frame.

$$v_{\mathrm{SoL}} = c \pm V_{\mathrm{ae,lab}} \quad (47)$$

$V_{\mathrm{ae,lab}} = 0$ if the light path doesn't include the rotor's center, and is unchanged up to 10 cm above the rotor surface. (Unfortunately this was not extended to find the range of aether drag by the rotor.) Aether is dragged around the rotor at the same speed. The aether speed in any frame is the same as the lab frame.

5.4. Ruyong Wang FOC (2005) [9]

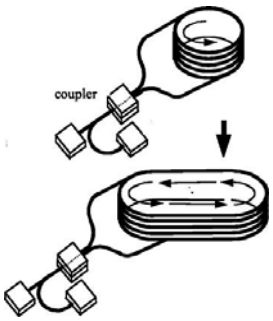

Fig. 13. Converting a FOG into a FOC

Strictly interpreted, the SagnacX only applied to rotational dragging of aether. But Wang showed the same result is found when aether is dragged in a straight line.

The Sagnac setup is improved by using fiber optics instead of mirrors to form the optical path and amplify the timing difference by using multiple coils – the Fiber Optic Gyro - FOG (Fig.13 top). Then the loops are distorted into a racetrack oval to create linear sections (Fig.13, bottom).

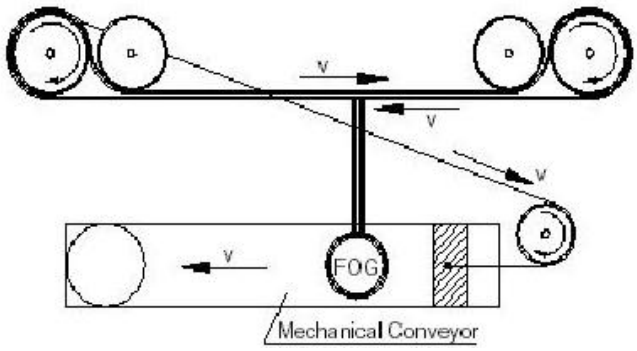

Fig. 14. Fiber Optic Conveyor - FOC

The bold line is the optical path/fiber which corresponds to the Sagnac rotor frame. The light diagonal line is the conveyor cord. The FOG apparatus is mounted on a FOC and records the change in SoL as the system moves linearly with speed v, dragging aether with it (Fig.14).

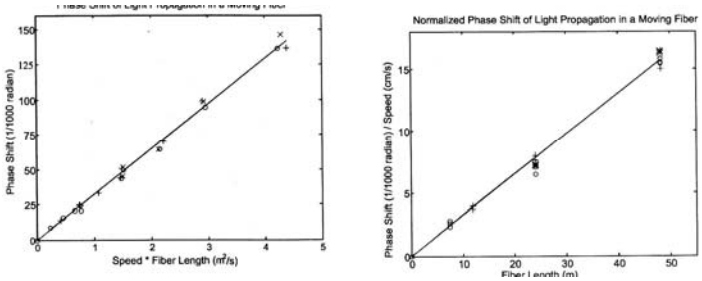

Fig. 15. The phase shift (y) is proportional to optical path length and conveyor speed (x).

$$\text{Phase shift} \sim v_L \quad (48)$$

This is consistent with the Sagnac cocept of matter dragging aether, which causes the observed change in v_{SoL}. Going unnoticed by Wang is the outstanding evidence in this experiment of the motionless Earth. The graph clearly displays the zero speed in the lab frame, when MS mavens have the Earth rushing in various directions, around the Milky Way center, toward the Virgo cluster, etc.

Conclusion: The ALFA model is not restricted to photons in rotating aether, but also holds for aether in linear motion - that is, to all aether motions.

5.5. The Universal ALFA

The Sagnac effect has also been applied to matter-waves – Ca atoms, neutrons and electrons [10]. The ALFA formula for light speed,

$$v_{\mathrm{SoL}} = c \pm V_{\mathrm{ae,lab}} \quad (49)$$

is replaced by

$$v_{\mathrm{SoM}} = V_{m,\mathrm{ae}} + V_{\mathrm{ae,\,lab}} = V_{\max} + v \quad (50)$$

where $v_{\mathrm{SoM}} =$ Speed of Matter, $V_{m,\mathrm{ae}} =$ speed of mass in aether, and $v =$ speed of aether in the lab frame. In complete generality,

the ALFA model can apply to the motion of photons or particles for aether motion in the lab frame.

Conclusion: The same effect of aether speed, whether photons or particles, whether rotational or linear, is verified. The Sagnac result is not photo-specific, but a general relationship between moving aether and objects in the lab frame.

5.6. Aberration

The aberration of light in a moving medium was demonstrated by Jones in 1971 [11]. The transverse 'Fresnel ether drag' experienced when light passes through a refracting medium moving at right angles to the original direction of the light, and confirmed indirectly by Airy's water- filled telescope experiment, has now been observed directly. A change in rotation speed from 600 to 1800 rpm of a glass disc produced a transverse displacement of $1.5^{*}10^{-6}$ mm in a light beam passing twice through the disc. This agrees with the Fresnel formula to within the 10% accuracy of the experiment.

Note: had Jones used a light path outside the glass, instead of inside, the displacement would have been about twice as great.

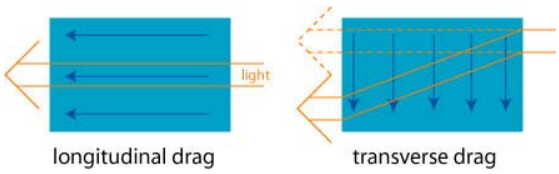

Fig. 16. Light beam direction vs. aether motion

Longitudinal drag (Fig.16 left) occurs when light passes parallel $c+v$ or antiparallel $c-v$. Transverse drag (Fig.16 right) entrains the photons sideways at an angle $\sin^{-1}(v/c)$.

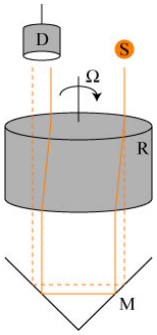

Fig. 17. The dashed line is the light path through the glass at rest into detector D. The solid line is the path with rotation □.

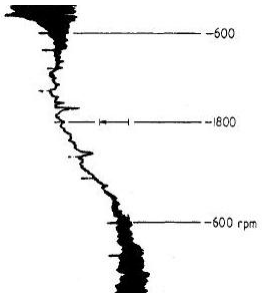

Fig. 18. Eyepiece view of beam position after passage through a rotating glass disk

Fig. 18 is the angular shift Jones saw when the glass disk's speed was increased by 1200 rpm.

Conclusion: Stellar aberration can be caused by the dragging of light by the transverse motion of aether rotation around the Earth.

5.7. Newton's Spinning Bucket

…remains a perennial puzzle for cosmology, unsolved over four centuries. Newton's belief was in evidence of an absolute space (whose origin was not specified), while Mach and Bishop Berkeley held that the bucket test showed relative rotation, the influence of distant matter on local rotation. It represents the classic clash of absolute frame and relative motion perspectives, whose arguments pro and con are still being debated.

Considered a gedanken exp. by the MS establishment, it is usually summarized by its basic features [12]. But it can easily be implemented in reality [13] – the best (and only) kind of theoretical testing. After all, why would we test theory with a theoretical experiment? By improving the protocol, using a motor-driven rotation and media other than water, hidden wave motion and nodes may be revealed, as in this link [14]. Further analysis of this experiment should reveal more key properties of the aether.

5.8. Spinning Bucket Description (Simplified)

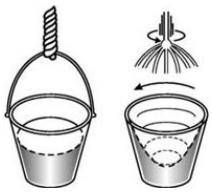

Fig. 19. Initial and final state of bucket

After twisting the supporting ropes in Fig.19, then release the bucket with a calm flat surface. Uncoiling causes the aether around the bucket – not just within the solid bucket - to rotate at the bucket's angular velocity (Sagnac measured this aether drag external to the rotor).

The aether motion is partially coupled by the Fresnel drag factor to the water, causing the water to be slowly dragged into the same rotation. Eventually the entrained water rotates at the bucket's speed and forms a vertical vortex.

Note details that support a model of entrained aether and water: There is a delay between the rotation of the bucket and the water, the inertia of the water. All of the water begins to rotate at about the same time, not spreading from the edges to the center. The bucket's spin affects all of the water, but slowly. (Fizeau found that aether is dragged by the Fresnel factor of $1-1/n^2$, or about 0.55 of the bucket speed for water.)

The solid bucket doesn't transfer mechanical energy to increase the water's rotation, because the elastic collision of the water molecules with the bucket walls causes a normal reaction force. The normal force is radial and cannot change the water's rotation.

It is in this system state that we will analyze the angular speeds in both lab and bucket frame, just as was done with Sagnac, which has been successfully analyzed above. The bucket corresponds to the rotor; water motion detects aether entrainment, as did the light beam for Sagnac.

Lab frame: centered any place on the bucket axis

$$V = V_{b,l} = \text{speed of bucket in lab frame}$$
$$= V_{w,l} = \text{speed of water} \quad (51)$$
$$= V_{a,l} = \text{speed of aether}$$

Bucket frame: centered any place on the bucket axis

$$V_{w,b} = 0 = \text{measured} \quad (52)$$

$$V_{a,b} = 0 = \text{aether} \quad (53)$$

Since the aether spins with the bucket and the water is dragged by the aether

$$V_{l,b} = -V \quad (54)$$

and the lab rotates in the opposite sense to the bucket.

But…. the vortex seen in the bucket frame means the water and bucket are really rotating, although the water speed $V_{w,b}$ seems to indicate that it is not moving! The lab frame is preferred for rotation measurements; the bucket frame is fictitious and invalid for applying physical laws.

To obey the laws of physics any speeds observed in the bucket frame must be replaced by the absolute lab frame data. So

$$V_{x,b} = V_{x,lab} \quad (55)$$

Measurement of the lab frame in any other frame must be zero, so the measured value of $V_{l,x}$ must be replaced with

$$V_{l,x} = 0 \quad (56)$$

The speed of an object in frame x is computed from the Galilean law.

$$V_{x,l} = V_{x,a} + V_{a,l} \quad (57)$$

These three mechanical results in red are equal to the Sagnac analysis and consistent with an ALFA model based on EM.

Conclusion:

1. A flexible aether is consistent with the bucket result.
2. Aether can drag matter, as well as the reverse, as was seen in SagnacX and FizeauX.
3. Newton was right… almost. His vague concept of absolute space is actually the lab frame or ECEF - the absolute frame for measuring rotation of aether.

Energy considerations also show the inconsistency of relativity. In the lab frame the total energy E is the rotational kinetic energy of the bucket and water; in the bucket frame E is the rotational energy of the water, the lab, the Earth and the universe, together rotating around the bucket.

Since kinetic energy is truly zero only in the lab frame, the lab frame is reality; the bucket frame is just phenomenal.

6. Consequences of the ALFA Paradigm

- Relativity refuted.
- Big Bang fizzles.
- Cosmological Principle is found to be unprincipled!
- Aether causes QED enigmas: entanglement, Bell's theorem.
- Newton's 3 laws now include aether effects.
- Kinetic energy is anchored, with an absolute meaning of rest.
- All physical laws that involve speed must use the lab frame: Centripetal, Coriolis, Lorentz forces.
- Lorentz transforms and inertial frames and Riemannian geometry are of no physical importance.
- Mach's principle disproven – rotation is not relative.

7. Conclusion

SR is inconsistent and invalid. Aether exists, is flexible both actively and passively, and is not the absolute reference frame. For both EM and mechanical motion the laboratory or Earth Centered Earth Fixed (ECEF) is the preferred reference frame. It uses astronomical time as the absolute time base.

Responses are solicited that refute this Sagnac analysis, which concludes with the existence of a flexible/dynamic aether and the identification of a preferred frame for measuring motion – the lab/ECEF system. Please stick to objective evidence using the scientific method and logic. Subjective opposition is not scientific. In the follow-up paper, ALFA–part 2, specific details will cover the topics here and introduce more supporting experiments and explore the consequences of the ALFA paradigm.

References

Progress in the ALFA model: http://alfachallenge.blogspot.com/.
Ongoing critique of relativity: http://mythpages.blogspot.com/.

[1] http://en.wikipedia.org/wiki/Aether_drag_hypothesis.
[2] http://en.wikipedia.org/wiki/Faraday_paradox.
[3] http://en.wikipedia.org/wiki/Fizeau_experiment.
[4] http://www.relativityoflight.com/Chapter7.html.
[5] http://en.wikipedia.org/wiki/Michelson%E2%80%93Morley_experiment
[6] http://www.wbabin.net/historical/pprhst.htm#Sagnac.
[7] http://www.conspiracyoflight.com/Michelson-Gale/Michelson-Gale.html.
[8] http://www.wbabin.net/pprhst.htm#Dufour.
[9] R. Wang et al "Genralized Sagnac Effect", *Physical Review Letters* **93**: 143901 (2004), http://web.stcloudstate.edu/ruwang/PRL93.pdf; http://web.stcloudstate.edu/ruwang/GED_2005_MarApr_Wang.pdf.
[10] S. A. Werner, J.-L. Staudenmann, & R. Colella, *Phys. Rev. Lett.* **42**: 1103 (1979); F. Riehle, Th. Kisters, A. Witte, J. Helmcke, & Ch. J. Bordé, *Phys. Rev. Lett.* **67**: 177 (1991). http://www.atomwave.org/rmparticle/ao%20refs/aifm%20refs%20sorted%20by%20topic/ifm%20demonstrations/borde1991.pdf; F. Hasselbach & M. Nicklaus, *Phys. Rev. A* **48**: 143 (1993), http://www.atomwave.org/_rmparticle/ao%20refs/aifm%20refs%20sorted%20by%20topic/inertial%20sensing%20refs/rotations/HAN93%20%20Hasselbach%20electron%20Sagnac.pdf.
[11] R V Jones, *J. Phys. A: Gen. Phys.* **4**: L1 (1971).
[12] http://en.wikipedia.org/wiki/Newton%27s_bucket.
[13] "Newton's Rotating Bucket Experiment (HPSC-X 102 Group Project)", http://www.youtube.com/watch?v=CTODD8p-fF8&feature=related.
[14] T.R.N. Jansson, et al, "Polygons on a Rotating Fluid Surface" (2008) http://arxiv.org/PS_cache/physics/pdf/0511/0511251v1.pdf.

Figures

[1] http://4.bp.blogspot.com/_XQ0IS25R8wU/TQ-nG7Z98eI/AAAAAAAAAC4/GonFSU6rrck/s1600/aber3.JPG.

[2] http://skullsinthestars.files.wordpress.com/2008/07/aragoexperiment.jpg?w=395&h=343.
[3] http://www.esotericscience.com/Faraday.jpg; http://jnaudin.free.fr/images/hmpbasic.gif.
[4] http://www.numericana.com/answer/fizeau.gif.
[5] http://2.bp.blogspot.com/_XQ0IS25R8wU/TQ7LRXXYkDI/AAAAAAAACE/PAHiX__2lSc/s1600/airy1.JPG.
[6] http://mousely.com/wiki_image/1/15/AetherWind.png.
[7] http://universe-review.ca/I15-57-ether.jpg.
[8] http://nelsontouchconsulting.files.wordpress.com/2011/01/box-plot-of-morley-michelson-experiments.png.
[9] http://3.bp.blogspot.com/_XQ0IS25R8wU/TREk5atnu1I/AAAAAAAAADw/Q5BJ6tyaUrI/s1600/sagnac1.jpg.
[10] http://2.bp.blogspot.com/_XQ0IS25R8wU/TRElPNbktHI/AAAAAAAAAD4/bAcPCDpODaI/s1600/sagnac3.jpg.
[11] http://img.sparknotes.com/content/testprep/bookimgs/sat2/physics/0009/michelsonmorley.gif.
[12] http://renshaw.teleinc.com/papers/fizeau/Image49.gif.
[13] http://web.stcloudstate.edu/ruwang/GED_2005_MarApr_Wang.pdf, Fig. 4.
[14] http://web.stcloudstate.edu/ruwang/PLA312.pdf, Fig. 2.
[15] http://web.stcloudstate.edu/ruwang/PRL93.pdf, Figs. 1, 2
[16] http://skullsinthestars.files.wordpress.com/2008/06/drag_t_vs_l.jpg?w=442&h=131.
[17] http://1.bp.blogspot.com/_XQ0IS25R8wU/TQ-pBPqfQ5I/AAAAAAAAADQ/3KxwYWOTOyg/s1600/jones2.JPG.
[18] http://4.bp.blogspot.com/_XQ0IS25R8wU/TQ-pMc5TDeI/AAAAAAAAADU/gsg0vB466WI/s1600/jones3.JPG.
[19] http://einstein.stanford.edu/Library/images/newtonsBucket.jpg.