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Physics and Space Science

Highlights

- Ultrasonic Range Finder
- Current Situation in Science
- Michelson-Morley Experiment
- Detection of Absolute Motion

Discovering Thoughts, Inventing Future

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Acoustic Michelson-Morley Experiment with an Ultrasonic Range Finder

By Norbert Feist

Abstract- An ultrasonic range finder was mounted on a horizontally rotatable rail at fixed distance, s, to a reflector on the top of a car. The change of the distance reading, s, determined the two-way velocity of sound as a function of the car's velocity and direction. As a result of this experiment, the out and back velocity c_2 was determined to be isotropic – as in the optical case of the Michelson-Morley experiment. Within the experimental error, the velocity was found to vary as c_2 $(c^2 - v^2)/c$.

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I. The Original Michelson-Morley Experiment (MMX) In Retrospect

At the end of the 19th century, light was assumed to propagate isotropically in the Ether at rest, independent of the source velocity, at a constant speed of c. Similar to sound, measurements should reveal a vector addition of c and v when performed with a detector moving at velocity v in the medium. That means the expected results were c-v in the forward direction and c+v and in opposite direction. In this case, the harmonic mean, $c_2 = (c^2-v^2)/c$, serves as two-way velocity.

The general equation for any angle ϕ between rail direction and car velocity reads:

$$c(\phi) = \sqrt{c^2 - v^2 \sin^2\phi} - v\cos\phi \quad (1)$$

This dependence on direction should determine Earth's velocity v with respect to Ether. But the measuring accuracy was not sufficient for a direct determination.
The two-way velocity is anisotropic as well:

$$c_2(\phi) = \frac{c^2 - v^2}{\sqrt{c^2 - v^2 \sin^2\phi}} \quad (2)$$

Michelson managed to compare two two-way velocities with sufficient accuracy by means of an interferometer. According to Eq. (2), the optimum difference is given in the case of two bars of equal length oriented at right angles. Upon rotation of the interferometer, however, no fringe shift was detected. The Michelson-Morley result thus was: The two-way velocity of light is isotropic in moving systems. The conflict with the Galilei transformation was explained by assuming a length contraction in the forward direction.

Author: *Gersthofen, Germany. e-mail: norbert.feist@web.de*

II. An Acoustic Analogue of MMX

There are many analogies between electromagnetic and acoustic wave propagation. Examples include the constancy of c, the Doppler Effect, interference, diffraction, and refraction. For practical reasons, an analogous length contraction could be ruled out in the case of measuring the velocity of sound along the same measuring gauge.

During the graphical analysis of the MME, the question arose whether sound complies with Eqs. (1) and (2) -- which are assumed to be valid for light. No evidence was found in the literature of an acoustic analogue of the MME with sound waves. After SRT decoupled both fields, developing sound ray sources and experimenting with them would not have produced a stimulus equivalent to those performed with lasers.

At the end of the 20^{th} century, however, the development of inexpensive ultrasonic range finders offered hobby physicists the opportunity to perform these experiments without requiring a wind tunnel. Such an MME analogue needs only one arm because the two-way velocity of sound can be calculated directly.

III. Description of the Experiment

a) Principle

The pulse-echo method measures the time of flight, t, of an ultrasonic pulse from the converter to a reflector at an unknown distance, s, and back. A built-in micro processor calculates the unknown distance s from 2s = ct, using the programmed fixed sound velocity of 343.37 m/s in air at 20^0C (68^0F). For constant s, this method yields a variable sound velocity as the distance changes.

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As mentioned above, the two-way velocity of sound parallel to the forward direction [φ = 0 or 180 degrees] in a moving system should be $C_{2\,(0^0/180^0)} = (c^2 - v^2)/c$. Assuming the head wind velocity to be equal to that of the car (100 km/hr or 27.78 m/s), the measured outside parallel two-way velocity of sound should only be 341.12 m/s (or 99.34% of the sound velocity for the car at rest). The pulse time-of-flight should increase correspondingly.

Assuming Eq. (2) to hold, the distance reading would be:

$$s(v)/s0 = c/c_2 \qquad (3)$$

For example, at v = 100 km/hr, the distance equals 1358.7mm. This compares to a distance of 1350 mm with the car at rest.

Perpendicular to the forward direction, Eq. (2) yields the two way velocity $C_{2(90^0/270^0)} = C\sqrt{1-\vartheta^2/C^2}$ as for the MMX. At 100 km/hr (or v = 27.78 m/s), this corresponds to 342.24 m/s as two way velocity of sound and a distance reading of 1354.5 mm instead of 1350 mm for the car at rest.

For a 1 mm resolution, the expected two-way velocities of sound should be distinctly measurable. (Later experiments show that the standard deviation equalled 0.6 mm at rest.)

The first test rides used a standard supersonic distance range finder with cm resolution, a 2m gauge length mounted on the top of the car, and an assistant to check the car's speed and distance. This validated the measuring principle.

b) Diagram and Equipment

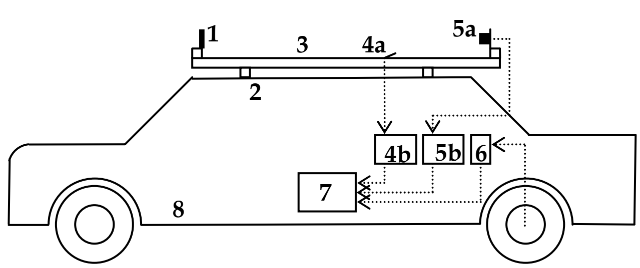

Fig. 1: Acoustic MMX Setup

1. Aluminium Reflector 8 cm x 8.5 cm
2. Carrier Mounted on Top
3. Gauge Length, Al Square Section Pipe

4a. Thermoelement, 0.5 mm Diameter, Time Constant 0.025 sec.
4a. Thermometer, Type Gulton-Tastotherm D700
5a. 50 kHz Foil Supersonic Converter With Factory Quality Control Combined With 5b
5a. Basic Equipment for the Supersonic Distance Finder Type LRS 3, Manufactured by Format Messtechnik, Resolution 0.1 mm („On top of a high time resolution, expressed in nanoseconds, a phase sensitive discrimination of the reflected ultrasonic pulse is essential")
6. Universal Meter Type Fluke 743B as Frequency Meter for the GAL Signal
7. Floppy Disk Operated Data Logger, Type Memograph by Endress+Hauser
8. Car, Type BMW 520i, Fig. 9

Remark concerning 4a:

In air, the velocity of sound rises with temperature. This was tested separately with the gauge length at rest – by 0.18% per K in the relevant measuring range.

The temperature sensor was not sensitive enough for this application. Therefore, the temperature control of the device was disabled. Hence, according to the manufacturer's recommendation, the micro-processor was set to a constant air temperature of 20°C (68°F). A more sensitive external thermometer system was used as a replacement. Because of this, the recorded distance values s_0 (at rest) and s(v) (at velocity v) were multiplied by the factor:

$$k = \left[1-(20-\vartheta)\cdot 0{,}0018\right] \qquad (4)$$

Eq. (4) uses the separately determined temperature ϑ. Because of this, temperatures must be normalized to a reference of 20°C before applying Eq. (6).

Remark concerning 6:

This car's speedometer was calibrated between 0 and 100 km/hr by means of direct rear wheel drive at a motorists' association. This calibration was verified by driving on a highway while using a GPS system. These values then represented the reference for the SCV (Speed Compensated Volume) signal. After obtaining good data as the car accelerated, the signal temporarily dropped out at 63 km/hr. (See the red curve in Fig. 8.) This was taken into account by cancelling the corresponding value. Moreover, a possible error in estimating the car's velocity wouldn't alter the result "The two-way velocity of sound is isotropic for *all* velocities of the moving system" – in accordance with the MMX.

c) Experiment and Evaluation

The rides were performed in externally calm conditions. On the carrier, the gauge length was oriented with the front reflector at angles of $\phi = 0, 22, 45, 68$ and 90^0 with respect to the car's longitudinal axis. (See the diagram Fig. 1 and attached photo Fig. 9.) The car's velocity was increased until the moment when the distance finder "quit" empirically. That was followed by a slow deceleration to a complete stop.

After a short stop, a return journey was recorded with the same procedure. The red curve in Fig. 8 shows that. Once every second, results were recorded for temperature, car velocity, v, and distance, s. The thermal factor, k, and the s values, were normalized to 20^0C as described above.

Eq. (3) was rearranged as follows:

$$c_2 = c(s_0/s(v)) \quad (5)$$

By setting the sound velocity at rest, c, to 100 %, the equation may be represented as follows:

$$c_2 = 100(s_0/s(v)) \quad (6)$$

These percentages are shown in Figs. 2 to 7 (see attachment). The red line represents theoretical anisotropy according to Eq. (3). Rather than matching the red lines, the measured data agrees more closely with the black curves represented by

$$c_2 = (c^2 - v^2) / c \quad (7)$$

d) Discussion of the Result

The results confirm the hypothesis that the two-way velocity of sound is isotropic in a moving system – as in the case of the optical MME.

Considering the unknown flow conditions above the car and "data clouds" in the wind, this potentially important result should no doubt be checked again.

In 2006 there was an attempt to determine the directionality of the one-way velocity of sound in a wind tunnel with known flow conditions, Fig. 10. The noise in the tunnel thwarted the measurements in the range of audible sound by means of loudspeaker, microphone, and maximum length sequences.

After 2000, the mechanical wind detectors in the weather stations were successively replaced by acoustic anemometers with measuring errors below 1% [1]. This, however, was only achieved by programmed corrections (see [2] for 5 additional links) which should be known for a successful reproduction of the experiment.

At present, to reproduce the experiment, superpose the signals from the continuous wave (CW) source, sent and received back from the reflector, on a phase-sensitive oscilloscope. Then, check whether the wind causes a mutual drift upon rotating the measuring gauge.

Acknowledgements

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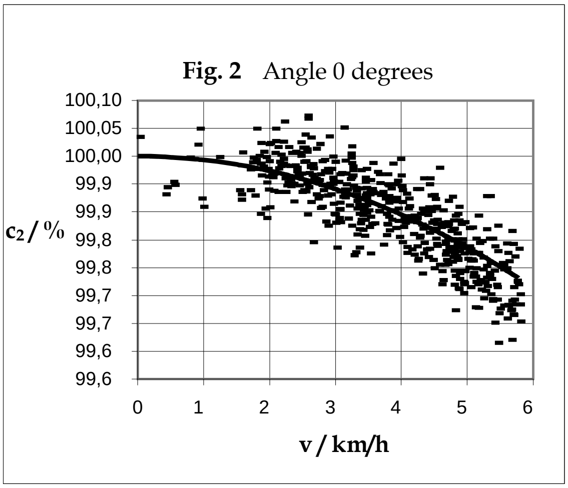

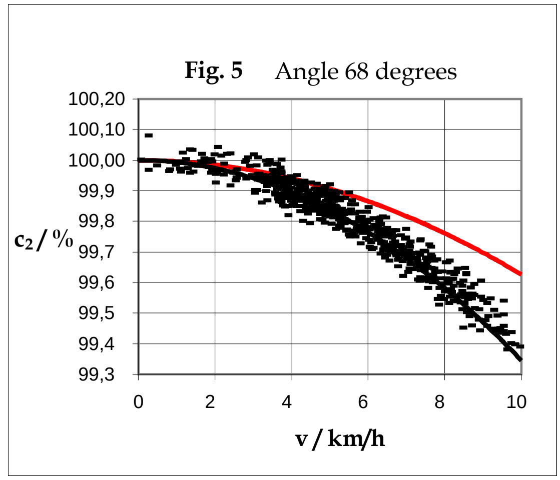

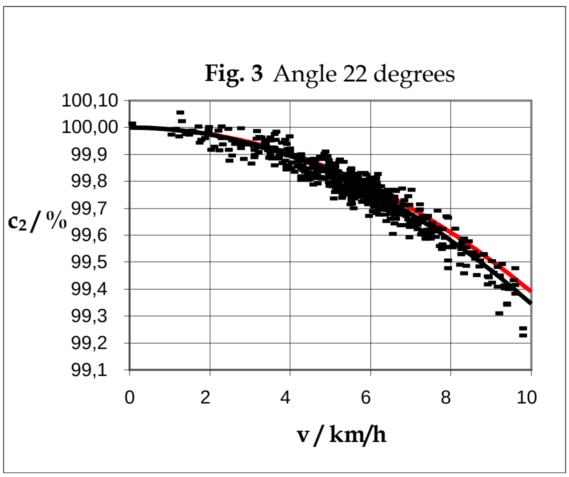

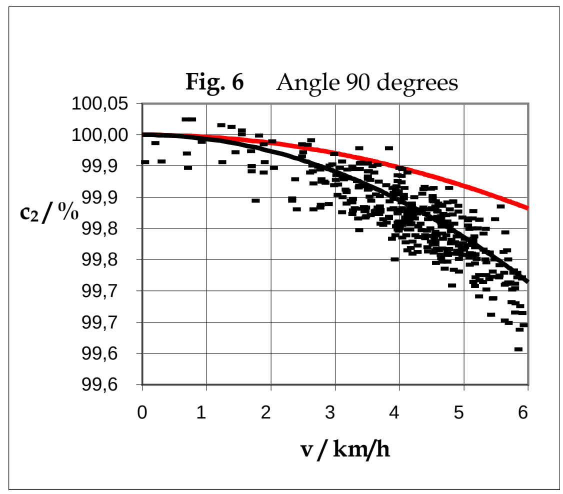

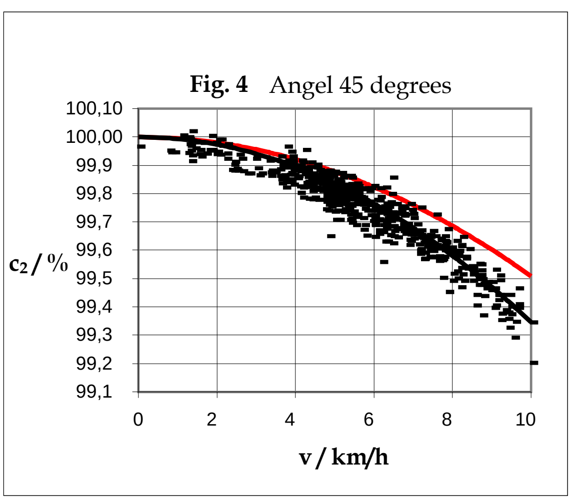

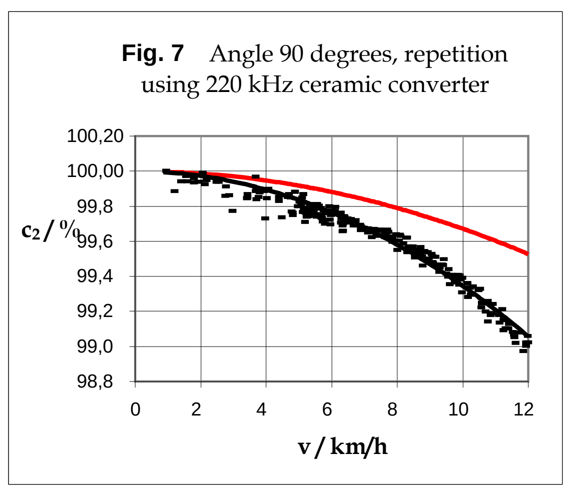

Fig. 2 – 7: Experimental Results on the Directional and Velocity Dependences of the Two-Way Velocity of Sound, c_2. Here, the latter is given in percentage of the velocity of sound at rest, c. The data shown in each Fig. are results of one test run to and fro. The red curves are "anisotropy curves" according to Eq. (2). The black curve was calculated according to Equation (7) $c_2 = (c^2 - v^2)/c$. Therefore it is identical for all directions and figures.

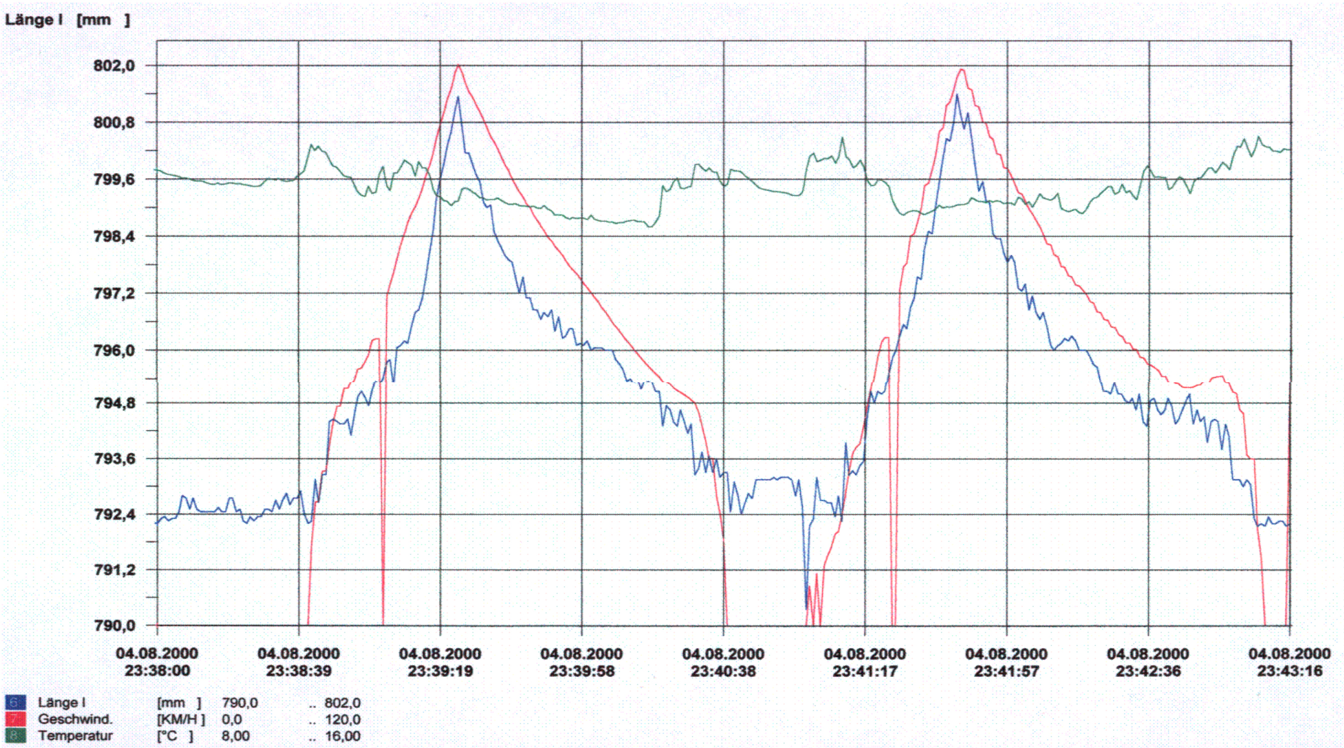

Fig. 8: Data Logger Plot: August 4, 2000, Data for Fig. 7

Fig. 9: Photo showing the Measuring Gauge Mounted on the Car's Top in 2000

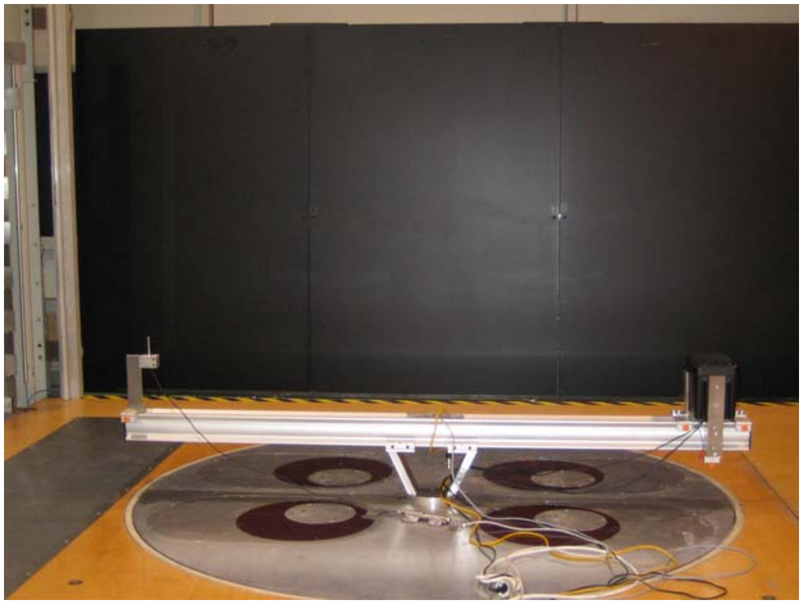

Fig 10: Futile Attempt for Reproduction in 2006 in a Very Noisy Wind Channel

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The Roland De Witte 1991 Detection of Absolute Motion and Gravitational Waves

By Reginald T. Cahill

Abstract- In 1991 Roland De Witte carried out an experiment in Brussels in which variations in the one-way speed of RF waves through a coaxial cable were recorded over 178 days. The data from this experiment shows that De Witte had detected absolute motion of the earth through space, as had six earlier experiments, beginning with the Michelson-Morley experiment of 1887. His results are in excellent agreement with the extensive data from the Miller 1925/26 detection of absolute motion using a gas-mode Michelson interferometer atop Mt.Wilson, California. The De Witte data reveals turbulence in the flow which amounted to the detection of gravitational waves. Similar effects were also seen by Miller, and by Torr and Kolen in their coaxial cable experiment. Here we bring together what is known about the De Witte experiment.

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THEROLANDDEWITTE1991DETECTIONOFABSOLUTEMOTIONANDGRAVITATIONALWAVES

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Reginald T. Cahill

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I. Introduction

Figure 1: Roland De Witte

Ever since the 1887 Michelson-Morley experiment [1] to detect absolute motion, that is motion relative to space, by means of the anisotropy of the speed of light, physicists in the main have believed that such absolute motion was unobservable, and even meaningless[1]. This was so after Einstein proposed as one of his postulates for his Special Theory of Relativity that the speed of light was the same for all observers, that it was necessarily isotropic. This was despite the fact that the Michelson-Morley experiment did observe fringe shifts of the form indicative of such an anisotropy. The whole issue has been one of great confusion over the last 100 years or so. This confusion arose from deep misunderstandings of the theoretical structure of Special Relativity, but also because ongoing detections of the anisotropy of the speed of light were treated with contempt, rather than being rationally discussed. The intrinsic problem all along has been that the observed anisotropy of the speed of light also affects the very apparatus being used to measure the anisotropy. In particular the Lorentz-Fitzgerald length contraction effect must be included in the analysis of the interferometer when the calibration constant for the device is calculated. The calibration constant determines what value of the speed of light anisotropy is to be determined from an observed fringe shift as the apparatus is rotated. Only in 2002 was it discovered that the calibration constant is very much smaller than had been assumed [2, 3], and that the observed fringe shifts corresponded to a speed in excess of 0.1% of the speed of light. That discovery showed that the presence of a gas in the light path is essential if the interferometer is to act as a detector of absolute motion, and that a vacuum operated interferometer is totally incapable of detecting absolute motion. That physics has suppressed this effect for over 100 years is a major indictment of physics. There have been in all seven detections of such anisotropy, with five being Michelson interferometer experiments [1, 4, 5, 6, 7], and two being one-way RF coaxial cable propagation time experiments, see [9, 10] for extensive discussion and analysis of the experimental data. The most thorough interferometer experiment was by Miller in 1925/26. He accumulated sufficient data that in conjunction with the new calibration understanding, the velocity of motion of the solar system could be determined[2] as ($\alpha = 5.2^{hr}$, $\delta = -67^0$), with a speed of 420±30km/s. This local (in the galactic sense) absolute motion is different from the Cosmic Microwave Background

Author: School of Chemistry, Physics and Earth Sciences, Flinders University, Adelaide 5001, Australia.
e-mail: Reg.Cahill@flinders.edu.aul

[1] The older terminology was that of detecting motion relative to an ether that was embedded in a geometrical space. However the more modern understanding does away with both the ether and a geometrical space, and uses a structured dynamical *3-space*, as in [9, 10].

[2] There is a possibility that the direction is opposite to this direction.

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(CMB) anisotropy determined motion, in the direction ($\alpha = 11.20^{hr}, \delta = -7.22^{0}$) with speed 369km/s; this is motion relative to the source of the CMB, namely relative to the distant universe.

The first one-way coaxial cable speed-of-propagation experiment was performed at the Utah University in 1981 by Torr and Kolen [8]. This involved two rubidium vapor clocks placed approximately 500m apart with a 5 MHz sinewave RF signal propagating between the clocks via a buried nitrogen filled coaxial cable maintained at a constant pressure of ~2 psi. There is no reference to Miller's result in the Torr and Kolen paper. There is a projection of the absolute motion velocity onto the East-West cable and Torr and Kolen did observe an effect in that, while the round speed time remained constant within 0.0001%c, variations in the one-way travel time were observed. The maximum effect occurred, typically, at the times predicted using the Miller velocity [9, 10]. So the results of this experiment are also in remarkable agreement with the Miller direction, and the speed of 420 km/s. As well Torr and Kolen reported fluctuations in both the magnitude, from 1 - 3 ns, and the time of maximum variations in travel time.

However during 1991 Roland De Witte performed the most extensive RF travel time experiment, accumulating data over 178 days. His data is in complete agreement with the 1925/26 Miller experiment. These two experiments will eventually be recognised as two of the most significant experiments in physics, for independently and using different experimental techniques they detected the same velocity of absolute motion. But also they detected turbulence in the flow of space past the earth; non other than gravitational waves. Both Miller and De Witte have been repeatably attacked for their discoveries. Of course all seven experiments indicate that the Einstein postulate regarding the anisotropy of the speed of light is falsified, but that is not in conflict with the confirmed correctness of various so-called relativistic effects, rather it indicates that these effects are to be understood as being caused by absolute motion of systems relative to space, as suggested by Lorentz in the 19th century. So it turns out that the evidence from more than 100 years has been that Lorentz relativity is correct, and that the Einstein relativity is falsified. While Miller was able to publish his results [4], and indeed the original data sheets were recently discovered at Case Western Reserve University, Cleveland, Ohio, De Witte was never permitted to publish his data in a physics journal. The only source of his data was from a e-mail posted in 1998, and a web page that he had established. This paper is offered as a resource so that De Witte's extraordinary discoveries may be given the attention and study that they demand, and that others may be motivated to repeat the experiment, for that is the hallmark of science[3].

II. The De Witte Experiment

In a 1991 research project within Belgacom, the Belgium telecommunications company, another (serendipitous) detection of absolute motion was performed. The study was undertaken by Roland De Witte. This organisation had two sets of atomic clocks in two buildings in Brussels separated by 1.5 km and the research project was an investigation of the task of synchronising these two clusters of atomic clocks. To that end 5MHz radio frequency (RF) signals were sent in both directions through two buried coaxial cables linking the two clusters. The atomic clocks were cesium beam atomic clocks, and there were three in each cluster: A1, A2 and A3 in one cluster, and B1, B2, and B3 at the other cluster. In that way the stability of the clocks could be established and monitored. One cluster was in a building on Rue du Marais and the second cluster was due south in a building on Rue de la Paille. Digital phase comparators were used to measure changes in times between clocks within the same cluster and also in the propagation times of the RF signals. Time differences between clocks within the same cluster showed a linear phase drift caused by the clocks not having exactly the same frequency, together with short term and long term noise. However the long term drift was very linear and reproducible, and that drift could be allowed for in analysing time differences in the propagation times between the clusters.

The atomic clocks (OSA 312) and the digital phase comparators (OS5560) were manufactured by Oscilloquartz, Neuchtel, Switzerland. The phase comparators produce a change of 1 V for a phase variation of

3. The author has been developing and testing new techniques for doing one-way RF travel time experiments.

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200 ns between the two input signals. At both locations the comparison between local clocks, A1-A2 and A1-A3, and between B1-B2, B1-B3, yielded linear phase variations in agreement with the fact that the clocks have not exactly the same frequencies due to the limited reproducible accuracy together with a short term and long term phase noise (A.O. McCoubrey, Proc. of the IEEE, Vol 55, No 6, June, 1967, pp. 805-814). Even if the long term frequency instability were 2×10^{-13} this is able to produce a phase shift of 17 ns a day, but this instability was not often observed and the ouputs of the phase comparators have shown that the local instability was typically only a few nanoseconds a day (5 ns) between two local clocks.

But between distant clocks A1 toward B1 and B1 toward A1, in addition to the same linear phase variations (but with identical positive and negative slopes, because if one is fast, the other is slow), there is also an additional clear sinusoidal-like phase undulation (≈ 24 h period) of the order of 28 ns peak to peak.

The possible instability of the coaxial lines cannot be responsible for the phase effects observed because these signals are in phase opposition and also because the lines are identical (same place, length, temperature, etc...) causing the cancellation of any such instabilities. As well the experiment was performed over 178 days, making it possible to measure with accuracy (ffi 25 s) the period of the phase signal to be the sidereal day (23 h 56 min), thus permitting to conclude that absolute motion had been detected in contradiction with the Einsteinian "principle of relativity", even with apparent turbulence.

According to the manufacturer of the clocks, the typical humidity sensitivity is $df/f=10^{-14}$/%humidity, so the effect observed between two distant clocks (24 ns in 12 h) needs, for example, a differential step of variation of humidity of 55%, two times a day, over 178 days. So the humidity variations cannot be responsible for the persistent periodic phase shift observed. As for pressure effects, the manufacturer confirmed that no measurable frequency change during pressure variations around 760 mm Hg had been observed. When temperature effects are considered, the typical sensitivity around room temperature is $df/f = 0.25 \times 10^{-13}/^0$C and implies, for example, a differential step of room temperature variation of 24^0C, two times a day, over 178 days to produce the observed time variations. Moreover the room tem- perature was maintained at nearly a constant around 20^0C by the thermostats of the buildings. So the possible temperature variations of the clocks could not be responsible for the periodic phase shift observed between distant clocks. As well the heat capacity of the housings of the clocks would even further smooth out possible temperature variations. Finally, the typical magnetic sensitivity of $df/f = 1.4\times10^{-13}$/Gauss needs, for example, differential steps of field induction of 4 Gauss variation, two times a day, over 178 days. But the terrestrial magnetic induction in Belgium is only in the order of 0.2 Gauss and thus its variations are much less (except during a possible magnetic storm). As for possible parasitic variable DC currents in the vicinity of the clocks, a 4 Gauss change needs a variation of 2000 amperes in a conductor at 1 m, and thus can be excluded as a possible effect. So temperature, pressure, humidity and magnetic induction effects on the frequencies of the clocks were thus completely negligible in the experiment.

Changes in propagation times were observed over 178 days from June 3 1991 7h 19m GMT to 27 Nov 19h 47m GMT and recorded. A sample of the data, plotted against sidereal time for just three days, is shown in Fig.2. De Witte recognised that the data was evidence of absolute motion but he was unaware of the Miller experiment and did not realise that the Right Ascension for minimum/maximum propagation time agreed almost exactly with Miller's direction ($\alpha = 5.2^{hr}, \delta = -67^0$). In fact De Witte expected that the direction of absolute motion should have been in the CMB direction, but that would have given the data a totally different sidereal time signature, namely the times for maximum/minimum would have been shifted by 6 hrs. The declination of the velocity observed in this De Witte experiment cannot be determined from the data as only three days of data are available. However assuming exactly the same declination as Miller the speed observed by De Witte appears to be also in excellent agreement with the Miller speed, which in turn is in agreement with that from the Michelson-Morley and other experiments.

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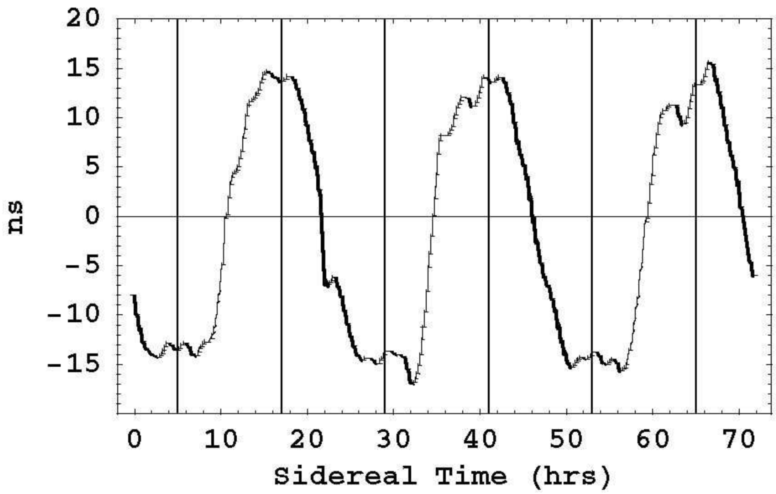

Figure 2: Variations in twice the one-way travel time, in ns, for an RF signal to travel 1.5 km through a buried coaxial cable between Rue du Marais and Rue de la Paille, Brussels, by subtracting the Paille Street phase shift data from the Marais Street phase shift data. An offset has been used such that the average is zero. The cable has a North-South orientation, and the data is ﬃ difference of the travel times for NS and SN propagation. The sidereal time for maximum effect of ~5hr (or ~17hr) (indicated by vertical lines) agrees with the direction found by Miller [4]. Plot shows data over 3 sidereal days and is plotted against sidereal time. The main effect is caused by the rotation of the earth. The superimposed fluctuations are evidence of turbulence i.e gravitational waves. Removing the earth induced rotation effect we obtain the first experimental data of the turbulent structure of space, and is shown in Fig.3. De Witte performed this experiment over 178 days, and demonstrated that the effect tracked sidereal time and not solar time, as shown in Fig.4

Being 1st-order in v/c the Belgacom experiment is easily analysed to sufficient accuracy by ignoring relativistic effects, which are 2nd-order in v/c. Let the projection of the absolute velocity vector v onto the direction of the coaxial cable be v_P. Then the phase comparators reveal the *difference* between the propagation times in NS and SN directions. Consider a simple analysis to establish the magnitude of the observed speed.

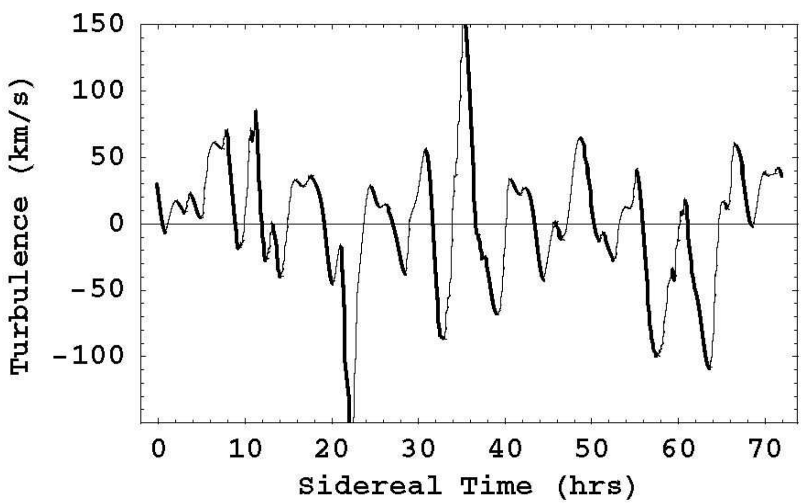

Figure 3: Shows the speed fluctuations, essentially ‘gravitational waves’ observed by De Witte in 1991 from the measurement of variations in the RF coaxial-cable travel times. This data is obtained from that in Fig.2 after removal of the dominant effect caused by the rotation of the earth. Ideally the velocity fluctuations are three- dimensional, but the De Witte experiment had only one arm. This plot is suggestive of a fractal structure to the velocity field. This is confirmed by the power law analysis shown in Fig.5. From [11].

$$\begin{aligned}\Delta t &= \frac{L}{\frac{c}{n} - v_P} - \frac{L}{\frac{c}{n} + v_P},\\ &= 2\frac{L}{c/n} n \frac{v_P}{c} + O(\frac{v_P^2}{c^2}) \approx 2t_0 n \frac{v_P}{c}. \qquad (1)\end{aligned}$$

Here $L = 1.5$ km is the length of the coaxial cable, $n = 1.5$ is the assumed refractive index of the insulator within the coaxial cable, so that the speed of the RF signals is approximately $c/n = 200{,}000$km/s, and so $t_0 = nL/c = 7.5 \times 10^{-6}$ sec is the one-way RF travel time when $v_P = 0$. Then, for example, a value of $v_P = 400$km/s would give $\Delta t = 30$ns. De Witte reported a speed of 500km/s. Because Brussels has a latitude of 51^0 N then for the Miller direction the projection effect is such that v_P almost varies from zero to a maximum value of $|v|$. The De Witte data in Fig.2 shows Δt plotted with a false zero, but shows a variation of some 28 ns. So the De Witte data is in excellent agreement with the Miller's data.

The actual days of the data in Fig.2 are not revealed by De Witte so a detailed analysis of the data is not possible. If all of De Witte's 178 days of data were available then a detailed analysis would be possible.

De Witte does however reveal the sidereal time of the cross-over time, that is a 'zero' time in Fig.2, for all 178 days of data. This is plotted in Fig.4 and demonstrates that the time variations are correlated with sidereal time and not local solar time. A least squares best fit of a linear relation to that data gives that the cross-over time is retarded, on average, by 3.92 minutes per solar day. This is to be compared with the fact that a sidereal day is 3.93 minutes shorter than a solar day. So the effect is certainly galactic and not associated with any daily thermal effects, which in any case would be very small as the cable is buried. Miller had also compared his data against sidereal time and established the same property, namely that, up to small diurnal effects identifiable with the earth's orbital motion, the dominant features in the data tracked sidereal time and not solar time, [4].

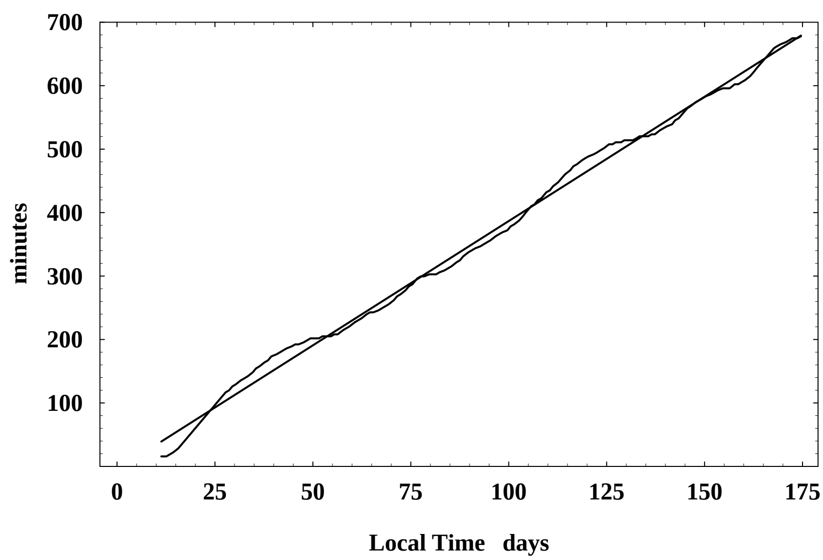

Figure 4: Plot of the negative of the drift of the cross-over time between minimum and maximum travel-time variation each day (at ~ 10^h ffi 1^h ST) versus local solar time for some 178 days, from June 3 1991 7h 19m GMT to 27 Nov 19h 47m GMT. The straight line plot is the least squares fit to the experimental data, giving an average slope of 3.92 minutes/day. The time difference between a sidereal day and a solar day is 3.93 minutes/day. This demonstrates that the effect is related to sidereal time and not local solar time.

The De Witte data is also capable of resolving the question of the absolute direction of motion found by Miller. Is the direction ($\alpha = 5.2^{hr}$, $\delta = -67^0$) or the opposite direction? Being a 2nd-order Michelson interferometer experiment Miller had to rely on the earth's orbital effects in order to resolve this ambiguity, but his analysis of course did not take account of the gravitational in-flow effect [9, 10]. The De

Witte experiment could easily resolve this ambiguity by simply noting the sign of Δt. Unfortunately it is unclear as to how the sign in Fig.2 is actually defined, and De Witte does not report a direction expecting, as he did, that the direction should have been the same as the CMB direction.

The dominant effect in Fig.2 is caused by the rotation of the earth, namely that the orientation of the coaxial cable with respect to the direction of the flow past the earth changes as the earth rotates. This effect may be approximately unfolded from the data, see [9, 10], leaving the gravitational waves shown in Fig.3. This is the first evidence that the velocity field describing the flow of space has a complex structure, and is indeed fractal. The fractal structure, i.e. that there is an intrinsic lack of scale to these speed fluctuations, is demonstrated by binning the absolute speeds $|v|$ and counting the number of speeds $p(|v|)$ within each bin. Plotting Log[$p(|v|)$] vs |v|, as shown in Fig.5 we see that $p(v) \propto |v|^{-2.6}$. The Miller data also shows evidence of turbulence of the same magnitude. So far the data from three experiments, namely Miller, Torr and Kolen, and De Witte, show turbulence in the flow of space past the earth. This is what can be called gravitational waves [9, 10].

III. Biography of De Witte

Roland De Witte was born September 29, 1953 in the small village of Halanzy in the south of Belgium[4]. He became the apprentice to an electrician and learned electrical wiring of houses. At the age of fourteen he decided to take private correspondence courses in electronics from the EURELEC company, and obtained a diploma at the age of sixteen. He decided to stop work as an apprentice and go to school.

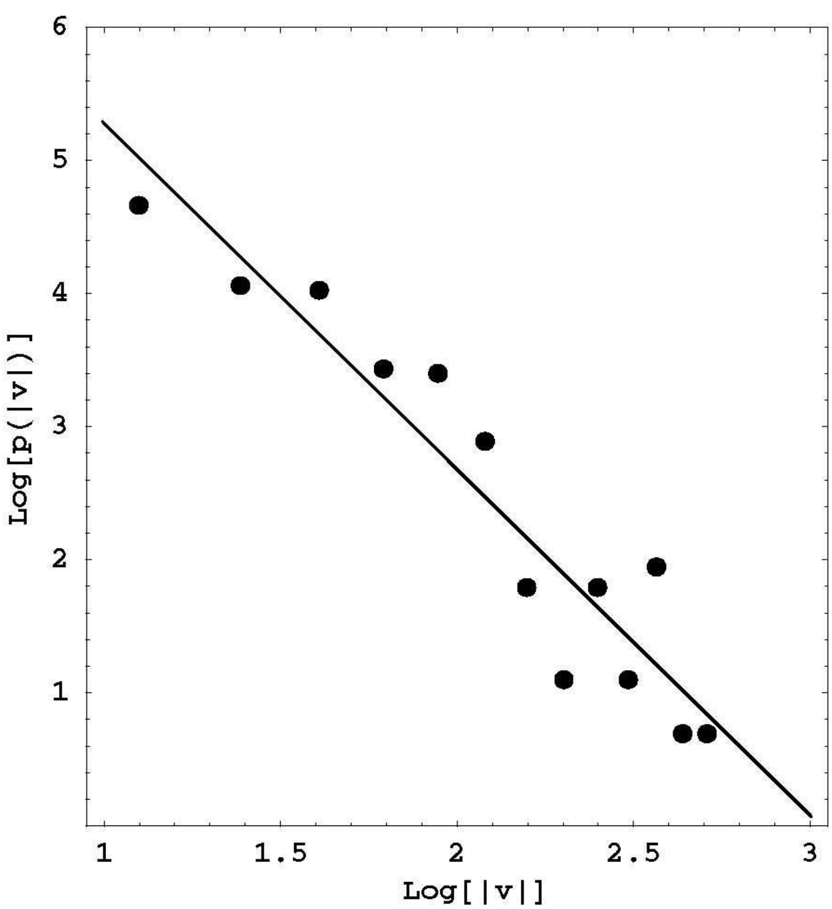

Figure 5: Shows that the speed fluctuations in Fig.3 are scale free, as the probability distribution from binning the speeds has the form p(v) ∝ —v—$^{-2.6}$. This plot shows Log[p(v)] vs —v—. From [11].

4 These short notes were extracted from De Witte's webpage.

Without a state diploma it was impossible for him to be admitted into an ordinary school with teenagers of his age. After working for a scrap company where he used dynamite, he was finally admitted into a secondary school with the assistance of the director, but with the condition that he pass some tests from the board of the state examiners, called the Central Jury, for the first three years. After having sat the exams he became a legitimate schoolboy. But when he was in the last but one year in secondary school he decided to prepare for the entrance exam in physics at the University of Liège, and became a university student in physics one year before his friends. During secondary school years he was interested in all the scientific activities and became a schoolboy president of the Scientific Youths of the school in Virton. Simple physics experiments were performed: Millikan, photoelectric effect, spectroscopy, etc... and a small electronics laboratory was started. He also took part in different scientific short talks contests, and became a prizewinner for a talk about "special relativity", and received a prize from the Belgian Shell Company which had organised the contest. De Witte even visited the house where Einstein lived for a few months in Belgium when he left Germany. The house is the "Villa Savoyarde" at "Coq-Sur-Mer" Belgium, and is just 200 m from the North Sea. During secondary school De Witte had hobbies such as astronomy and pirate radio transmission on 27 Mhz with a hand-made transmitter, with his best long distance communication being with Denmark.

De Witte says that he is not able to study by "heart", and during secondary school, even with his bad memory which caused problems in history and english, he nevertheless always achieved the maximum of points in physics, chemistry and mathematics and was the top of his class. At University he obtained the diploma from the two year degree in physics but was not able to continue due to the "impossibility to study by heart several thousands of pages of erroneous calculations" like the others did to obtain the graduate diploma. Thus even though considered to be intelligent by several teachers, he decided to leave the University and became the manager of a retail electronic components shop. He did this job for ten years while also performing his physics experiments and studying theoretical physics. He was interested in microwaves and became an IEEE member and reader of the publications of the Microwave Theory & Techniques and Instrumentation & Measurement Societies. During that period he built an electron spin resonance spectrometer for the pleasure of studying the electron and free radicals. By chance he was invited by Dr. Yves Lion of the Physics Institute of the University of Li'ege to help them for a few weeks in their researches on the photoionisation mechanism of the tryptophan amino-acid with the powerful EPR spectrometer. He was also interested in TV satellite reception and Meteosat images. He built several microwave microstrip circuits such as an 18 dB low noise amplifier using GaAs-Fets for 11.34 GHz. He also developed some apparatus using microprocessors for a digital storage system for Meteosat's images.

In 1990 he became a civil servant in the Metrology Department of the Transmission Laboratories of Belgacom (Belgium Telephone Company). His job was to test the synchronization of rubidium frequency standards on a distant master ceasium beam clock. It is there that he took the time to compare the phase of distant ceasium clocks and discovered the periodic phase shift signal with a sidereal day period. De Witte retired from the Department, reporting that he had been dismissed, and worked on theoretical physics and philosophy of science, while performing various cheap experiments to test his electron theory and also develop a new working process for a beamless ceasium clock.

De Witte acknowledged assistance from J. Tamborijn, the Engineer Cerfontaine, and particularly Engineer and Executive Director B. Daspremont, all from the Metrology, Fiber Optics and Transmission Laboratory of Belgacom in Brussels, for the use of the six caesium atomic clocks, the comparators, the recorder and the underground lines, and also Paul P'aquet, Director of the Royal Observatory of Belgium, for explanations and documentation provided about the realisation of UTC in Belgium.

IV. De Witte's Publication

Roland De Witte was not able to have his experimental results published in a physics journal. His only known publications are that of an e-mail posted to the newsgroup sci.physics.research, and his webpage. The e-mail is reproduced here:

Ether-wind detected!

** Subject: Ether-wind detected!*

** From: "DE WITTE Roland" <roland.dewitte@ping.be>*

** Date: 07 Dec 1998 00:00:00 GMT*

** Approved: baez@math.ucr.edu*

** Newsgroups: sci.physics.research*

** Organization: EUnet Belgium, Leuven, Belgium*

I have performed an interesting experiment with cesium beam frequency standards.

A 5 Mhz signal from one clock (A) is sent to another clock (B) 1.5 km apart in Brussels by the use of an underground coaxial cable of the Belgium Telephone Company. There, the 5Mhz signal from clock A is compared to the one of clock B, by the use of a digital phase comparator (like those used in PLL).

Incredibly, the output of the phase comparator shows a clear and important sinus-like undulation which permits to conclude of the existence of a periodic variation (24 h period)) of the speed of light in the coaxial cable around 500 km/s.

In performing the experiment during 178 days, with six cesium beam clocks, the period of the phase signal has been accurately measured and is 23h 56 m+-25s. and thus is the sidereal day.

This result, like the one of D.G. Torr and P. Kolen (Natl. Bur. Stand. (U.S.), Spec. Publ. 617, 1984) is well understood with a new space-time theory based on a new electron theory.

It is also the case for the nearly negative result of the experiment of Krisher et al, with a fiber optics instead of a coaxial cable (Physical review D, Vol 42, number 2, 1990, pp. 731-734).

All the details of the experiment is on my web-site under construction: www.ping.be/electron/belgacom.htm together with already a few arguments against Einstein's special theory of relativity.

DE WITTE Roland

www.ping.be/electron

[Moderator's note: needless to say, there are many potential causes of daily variations that need to be studied in interpreting an experiment of this sort. - jb]

V. Conclusions

The De Witte experiment was truly remarkable considering that initially it was serendipitous. The data demonstrated yet again that the Einstein postulates were in contradiction with experiment. No physics journal has published a report from De Witte, although he did make a submission for publication to the Annals of the Louis de Broglie's Foundation. De Witte himself reported that he was dismissed from Belgacom. Papers reporting or analysing absolute motion and related effects continue to be banned by mainstream physics journals. This appears to be based on the almost universal misunderstanding by physi- cists that absolute motion is incompatible with the many confirmed relativistic effects. DeWiite's data like that of Miller is extremely valuable and needs to be made available for detailed analysis. Regrettably Roland De Witte has died, and the bulk of the data was apparently lost when he left Belgacom.

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The Father of Z-Theory and the Current Situation in Science

By Allan Zade

Abstract- Allan Zade, the father of Z-Theory that was published in the form of a book in the US and UK in 2011, explains today an idea of a new device that was disclosed in the form of an international patent application as a Signal Medium Motion Measurement Apparatus (SMA).

Keywords: apparatus, advantage, physics, aviation, relativity, Michelson, De Witte, Norbert Feist.

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THEFATHEROFZTHEORYANDTHECURRENTSITUATIONINSCIENCE

Strictly as per the compliance and regulations of:

The Father of Z-Theory and the Current Situation in Science

Allan Zade

Abstract- **Allan Zade, the father of Z-Theory that was published in the form of a book in the US and UK in 2011, explains today an idea of a new device that was disclosed in the form of an international patent application as a Signal Medium Motion Measurement Apparatus (SMA).**

Keywords: apparatus, advantage, physics, aviation, relativity, michelson, de witte, norbert feist.

I. An Interview about SMA

Mr. Zade, please, introduce yourself to our readers.

Well, I'm an independent researcher who researches in the areas of space, time, and motion. Those areas look so familiar for many people that they do not think about them much. Every step brings a person from one point to another one, and the person passes some space by some time. What can be easier to understand?

However, physical bodies are not the only one sort of things capable of moving through space. Physical signals also show similar ability to make propagation through space. For example, a walking person can cry and listen for the echo. Echo is a well-known "answer" from another object for an incoming signal. A person can determine the distance to the object by the known speed of the sound in the air and traveling time of the signal back and forth between the person and the object.

It is well known that bats use the same principle of orientation in the night or caves.

However, that principle has one huge disadvantage. It uses a known speed of the signal involved in the measurement. If a signal changes its speed significantly, then the measurement shows a significant instrumental error. Modern distance measurement ultrasound devices use some calibration before measurement that includes determination of air temperature, pressure, and humidity to correct such instrumental error.

Does a new device use a different principle of operation?

Yes, it does. A new device, called a Signal Medium Motion Measurement Apparatus or SMA for a short reference, splits the duration of back and forth propagation of the signal into two independent measurements for forward and backward propagation. As a result, the device becomes able to determine two values after each measurement. Those are the speed of the signal in a given medium and the speed of apparatus-to-medium relative motion. The apparatus uses a known value of the distance between two transponders to make calculations.

Does it improve the precision of measurement?

It certainly does. Moreover, the apparatus needs not any calibration at all in a lab. If the signal changes its speed of propagation in the air or water, then forward and backward measurements change their values according to that change. As a result, the apparatus determines a different speed of the signal, but the determined speed of apparatus regarding the air of water remains precisely correct and has not any change until the apparatus changes its proper speed of motion in the air or water.

It looks incredible. Does it mean the apparatus becomes an error-less measurement device?

Yes, it does. Moreover, any change in a medium used in measurements makes not any impact on the apparatus. For example, suppose the apparatus is installed at the bottom of a flying-boat. In case of landed position, the apparatus determines the speed of the flying-boat in the water. As soon as the aircraft takes off and stays in the air, SMA determines its air-speed without any change in the way of measurement because the apparatus determines the change of the signal in the medium but not any change in apparatus-to-medium relative motion or air-speed. Apparently, in case of wind, the apparatus makes some jump in the measured speed immediately after take-off because of that wind. That happens because the device determines its speed in the medium instead of the speed regarding the Earth.

It looks beneficial for modern aviation, right?

Yes, it is. It is well known that the airspeed is a significant value for any onboard computer of an aircraft. Moreover, that value defines the lifting force of a wing that depends on wing-to-air motion instead of wing-to-ground motion. Strictly speaking, an onboard computer cannot determine the condition of the aircraft without a proper value of the airspeed. As you know, there were some accidents in aviation caused by frozen Pitot Tubes. Pitot tubes are widely used in aviation to determine the speed of the aircraft in the air. However, they become frozen under some circumstances.

Can SMA become frozen?

No, it cannot be frozen like Pitot tubes. The difference is this. A Pitot tube determines zero speed of the aircraft in the air in case of its frozen condition. That is the biggest problem of that measurement device. SMA, unlike a Pitot tube, determines measurement error in any case when the apparatus becomes unable to determine its motion in a given medium. That situation can be used by the onboard computer to raise the alarm in the cockpit of the aircraft.

And warn the crew that the aircraft becomes frozen, right?

Right, it does possible. As far as I concern, modern aviation has not any device that determines such condition of the aircraft. It is a hazardous condition because the mass of the plane rises quickly because of icing and pulls the plane down more and more. In case of SMA, the signal power droops gradually according to the thickness of ice growing on a transducer. However, that process makes not any change of SMA's ability of operation. It changes only power that reaches another transducer and can be used as an early warning of aircraft icing. That is not the purpose of the SMA, but that feature looks useful for aviation. As you remember, any additional feature of the same device increases the engineering value of that device.

It looks like a universal device that determines the speed of sound in the air regardless the speed of the aircraft, it determines the speed of the plane regardless any change of air condition around the aircraft, and it determines the frozen condition of the aircraft simultaneously, is not it?

Yes, it is. Moreover, information about air condition by the speed of sound in the air can be used by the onboard computer to early detection of air-condition changes. For example, if the air droops its density in some area because of uprising hot air, the aircraft sinks as soon as it reaches that area because the lifting force of its wings drops in direct proportion to air density. In case of SMA, that change can be immediately recognized by the onboard computer giving a possibility to correct condition of wings to compensate changes of air density. As a result, the aircraft remains its altitude regardless of any changes of air-density. In other words, a plane with onboard SMA takes some feeling of air and its "skin," so to say.

Mr. Zade, I thank you very much for a fascinating interview and your explanation of a new measurement device. I hope to have one more meeting with your description of some optical features of your incredibly useful device.

It will be my pleasure to share that information with you.

II. An Interview about an Optical Application of The Apparatus

Mr. Zade, can you explain the possible optical application of your invention?

Of course, I can. It will be my pleasure to explain. I mentioned the application of the device onboard of an aircraft in the recent interview. In that case, the apparatus measures the aircraft-to-air speed of relative motion, and it also measures the speed of sound in the air in a given condition of the air. Therefore, the apparatus determines the speed of the aircraft precisely correct regardless of any changes of the physical condition of the air, the altitude of the plane, and other possible variations of air condition.

It looks straightforward to understand. Is there any hidden problem here?

Yes. There is something unusual here. Suppose now this. The SMA was mounted onboard of an aircraft as a rotatable device that can change its orientation in the airflow. In that case, the apparatus determines the full speed of the plane in case of its orientation parallel to the airflow. In case of rotation, it determines a component speed that depends on the angle between the apparatus' direction of measurement and the direction of the airflow.

In case of orthogonal orientation, the apparatus determines zero speed relative to the air because the airflow goes perpendicular to the direction of measurement and the component speed of the device in the air droops to zero. Further rotation gradually increases the component speed determined by the apparatus until it reaches the maximum value with a negative sign as soon as the device reaches the opposite orientation in the airflow.

There is nothing unusual here yet! It is quite understandable too.

Yes, it looks logical, but there is something unusual in that measurement. If the apparatus summarizes duration of signal propagation *in the forward and backward direction,* that value remains constant for any orientation of the apparatus in case of a constant speed of the aircraft regarding the air.

What does it mean?

It means this. Such measurement becomes possible in only one condition when the apparatus makes measurements of signal propagation separately in forward and backward direction. In case of summarized analysis of duration of signal propagation, or case of a round-trip experiment, or experiment with a mirroring signal, and so on, that measurement gives a constant value regardless orientation of the device in the airflow.

Don't you mean that the device cannot determine its speed in the air-flow by a round-trip experiment?

Yes, I do mean that. That problem can be solved only by two one-way measurements of signal propagation in the forward and backward direction taken separately.

Is it a severe problem?

Yes, the problem is a deadly serious one because calculations made in 19 century for such experiments gave another result that *does not match physical tests.* The problem comes back to Michelson's argumentation that a round-trip experiment can be used to detect apparatus-to-medium relative motion by rotation of the measurement apparatus in the medium.

As you remember, Michelson made that test himself with a so-called null result. Many decades later, a similar acoustic experiment was conducted by a German researcher Norbert Feist who made the publication of the result of the experiment in 2010 and confirmed similar null-result *in an acoustic environment.*

In other words, both experiments show the same result that a round-trip experiment cannot be used to detect apparatus-to-medium relative motion.

Don't you mean that the Michelson's optical experiment was incorrect because the method of measurement he used was incompatible with the target of analysis???

That is precisely correct. Moreover, Michelson himself made a few mistakes unforgivable to a serious researcher. He forgot the scientific method of research that requires *physical support* of any idea coming from the human mind. In case of the Michelson experiment, the experiment destroyed his point of view immediately. Despite that fact, Michelson insisted that his speculations and calculations are correct and the test is wrong, and the optical device doesn't show the result that he likes or expects to see.

Moreover, he never conducts similar experimenter in an acoustic environment. As a result, his mistake remains in his mind *undetectable for him.* The situation remains unchanged until Norbert Feist conducted an identical experiment in the acoustic environment. He used a rotatable measurement device with an ultrasonic transducer or range detector mounted on the top of his BMW car. The experiment has shown the same so-called null result that appears as a constant duration of signal propagation in any direction at any given speed of the vehicle.

In other words, both experiments destroy Michelson's speculations and calculations. In the language of physics, that means *falsification* of a given idea by the tests. In other words, regarding the scientific method, any idea coming from the human mind should be confirmed by a proper physical experiment. Any suggestion that contradicts experimental results becomes

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falsified and cannot be used as a scientific one.

It looks incredible! Don't you mean that the acoustic experiment destroys Michelson's point of view?

Yes, I mean that. Michelson himself made a grave mistake leaving acoustic signals unnoticed in his experiments and concentrated only on optical tests.

Can your apparatus make correct measurement in case of optical signals?

Yes, it can. Suppose now this. The observer changes the aircraft to a planet and uses the same method of measurement to determine planet-to-space relative motion. The observer should use two apparatuses, in that case, to split a round-trip experiment into two one-way experiments to assess the propagation of light signal separately in the forward and backward direction. The difference between the duration of each test and a known distance between the apparatuses gives a possibility to determine the speed of the observer regarding the space and correct speed of the signal in space.

There is no such possibility in Michelson's time because one way of light propagation can be measured only by modern devices like atomic clocks. Those devices use cesium-based oscillators to determine the duration of any estimated period. They have enough frequency and stability of oscillations to be used in the one-way measurement of light signals.

In case of SMA, two apparatuses make local synchronization before measurement. After synchronization, one of them takes a remote location, and both devices start measurements.

What if a traditional measurement of light propagation be conducted along with SMA experiment?

In that case, a traditional experiment gives a full duration of light propagation from the light source to the mirror and back again. As I mentioned above, that way of measurement ever gives a constant value because of the constant speed of light propagation in space and constant speed of the planet regarding space. That precisely matches the Norbert Feist acoustic experiment. However, SMA splits that round-trip experiment into two one-way experiments and determines the duration of each test separately. The apparatuses use those values and the value of a known distance between them to determine the speed of apparatus-to-space relative motion and light-to-space relative motion. The sum of those values of duration ever coincides with the value of the duration of a round-trip experiment conducted within the same distance between the light source and the mirror by *any other instrument.*

Wait a sec! The speed of light in any direction supposed to be a constant! Don't you mean that constant is not constant at all?

The speed of light measured by SMA depends on physical properties of a given medium. As soon as the medium changes its physical properties, the speed of light changes in that medium accordingly to those changes. For example, if SMA uses water instead of air, the speed of the light signal in water becomes different. However, the speed of apparatus-to-space remains constant as well as in case of acoustic measurement with *the various physical condition of the air.*

Moreover, one-way duration of the experiment with light depends on the orientation of the measurement device, I mean SMA, regarding the direction of motion of the planet in the medium, I mean space. That aspect is similar to the acoustic application of SMA. As a result, SMA determines the speed of Earth-to-space relative motion. Michelson cannot reach that result because he used *only round-trip experiments,* as I mentioned above. The one-way experiments with light give a component speed of motion regarding a given medium; I mean space. Therefore, the value of that component speed depends on the orientation of the direction of measurement. As a result, the rotation of the planet changes that value gradually during the period of rotation of the planet regarding space, I mean sidereal rotation of the Earth.

Is there any evidence about such a possibility from the past?

Yes, there is specific evidence from the past coming from *De Witte experiments.* De Witte conducted some measurements in on-way propagation of radio-frequency between two atomic clocks in Brussels in 1991. A distance of 1.5 kilometers separated the clocks. De Witte conducted his experiments for many days and determined the sidereal deviation of the one-way duration of signal

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propagation between those clocks. Such a result looks like a sinusoidal deviation from a mean duration of signal propagation. That natural experiment shows an essential difference between one-way and round-trip tests and destroys Einstein's postulate about equality of one-way and round-trip experiments.

That experiment contradicts relativity! It is impossible!

There is not any right or wrong experiment. According to *the scientific method,* any idea coming from the human mind should be confirmed by a proper experiment. If that experiment or experiments show a different result than predicted by a given theory, then the theory becomes *falsified* by the experiment. For instance, the speed of light claimed to be constant in any direction by the theory of relativity. As I mentioned above, that point of view can be supported by a round-trip experiment with light. However, all one-way experiments falsify that point of view.

The idea of that constant comes from the human mind, and physical experiments destroy it. The idea was born at the time when the humankind had not any possibility to conduct one-way experiments with light. Therefore, that inability was challenged by Einstein's postulate about equality of one-way and round-trip tests. Modern measurement devices *falsify that point of view and destroy the entire theory.*

That is a great circle of comprehension that appears again and again. Each time a new measurement device or an unusual observation leads to a destruction of the old point of view and creation of a new one that becomes compatible with new evidences coming from new measurement devices.

III. An Interview about the Situation with the Invention and the Situation in Science in General

Mr. Zade, can you explain the reaction of the scientific community on your research?

Of course, I can. The first part of my research was published in the UK and US in the form of a book titled 'Z-theory and its applications.' The book was published in 2011. The book explains the core features of the theory and the law of their application to the explanation of relevant natural phenomena.

Later research appeared as my articles published in various international scientific journals. The result was positive, and I steadily became a member of some international scientific communities like COSIS, Research Gate, and a Fellow of Science Frontier Research Council of Open Association of Research Society after the publication of my articles in Global Journals.

In 2016-2017 years, I participated many scientific discussions in Research Gate trying to find some scientist who can think independently and accept a new paradigm shown in my articles. To my surprise, the general reaction shown a so-called null result. I have seen many situations when other participants of a discussion 'run away' as soon as I explained to them some experiments that they never knew like De Witte and Norbert Feist experiments.

I was also surprised by the point of view shown by some scientists that shows their preferred 'way of action in physics.' They told me this. 'If they don't know something, they should ask a question to a well-known person in that area of research.' Such point of view contradicts the scientific method because that method supported knowledge coming from experiments instead of ideas coming from the human mind and established the priority of experiments instead of limitation of human comprehension.

Such point of view never leads to the right way of understanding of science because it suppresses experimental science by human ideas. A similar point of view led Michelson to his mistake in the interpretation of his famous experiment when Michelson himself insisted that his device should show the result predicted by his mind. He was so blind with his calculations that he could not see any other possibility of an explanation of the experiment. He was so sure in his point of view that he never conducted an acoustic experiment similar to his optical test to observe and analyze their similarity.

Einstein made the situation even worse, claiming his "gedankenexperiment" or thought experiment as 'the primary tool for experimentation in the areas inaccessible to physical experiments.' That was one more grave violation of the scientific method that led to the illusion of similarity between one-way and round-trip experiments. *There is not any physical experiment that confirms such point of view.*

It looks like the general population of scientists shares some ideas 'because someone else produced them.' For example, Michelson was not a scientist at the moment when he conducted his experiment. Einstein was a clerk in the patent office at the moment of publication of his theory. In other words, new ideas came to science from independent researchers who had a keen interest to gain scientific knowledge.

However, the scientific method remains correct ever. Later, new independent researchers use that method to reach a new way of knowledge and explanation of the old experiments. There is nothing strange here. The scientific method by itself is accessible for everyone without any exception. Moreover, modern technologies often exceed the limits of the 19th-century technological level when basic ideas of modern physics were born. Some of those technologies destroy old ideas. A paradigm shift appears as soon as new technology or a measurement device shows something 'impossible' in the theoretical framework of science.

For example, a telescope invented by Galileo Galley turned the science upside down because it snows something that cannot be seen by a naked eye like mountains on the Moon. Some people of that time refused to use that device because "they knew that the Moon is flat and cannot be covered with mountains."

Does it mean a similar situation for today?

I'm afraid it means the same situation ever. People don't like to use the scientific method regardless of their position. They think that their knowledge is ever correct and cannot be wrong. Invalidation of basic knowledge in the human mind leads to tremendous psychological discomfort and "lack of orientation" sometimes. That means the situation after each paradigm shift when all well-known points of reference shift their locations. In every such case, the human mind tries uselessly to "stabilize the situation" by a rejection of a new idea at any cost. Sometimes, that reaction appears as a logical counterarguments "established" against a new idea. For example, "the Earth cannot be spherical because all water *flows down* from the spherical Earth and the Earth becomes dry. The Earth is not dry; therefore, it is not spherical." Such a way of "argumentation" shows only a critical misunderstanding of a new idea.

Sometimes, ideas, including scientific concepts, which exist in the human mind for a long time, transform to dogmas. A dogma is a point of view that cannot be logically checked of falsified by a scientific method. Dogmas often become a part of a belief system.

For example, if a scientist answers a question about a new idea like "I do not believe it!", it means a reference to his belief system instead of rational application of the scientific method. A belief system has an embedded problem. An experiment cannot falsify it.

Does it affect your research and patent application?

Yes, it does. The problem comes from the paralysis of physics in front of explanation of some experiments that falsify fundamental knowledge. Those knowledge are not modern because they were born in the 19th century when technical and technological, I mean instrumental, level was incomparable with the modern one. Some experiments were impossible to conduct that time. One way experiments are one good example.

It is possible today to conduct all those experiments and explain all of them from one point of view that destroys all exception and restriction of old theories. However, that is the biggest problem for today because there is no one from official science, laboratory, research center and so on who likes to conduct those experiments. That happens because any attempt to do such experiments leads to immediate *invalidation* of all dissertations and scientific credentials if all personnel of such a lab because "the Earth is not dray; therefore it cannot be spherical."

It also affects my communication with the European Patent Office (EPO). I send them, again and again, my explanation and references to De Witte and Norbert Feist experiments and their results. However, they do not like that explanation and continue to argue that the disclosed apparatus cannot be feasible. Moreover, they refuse to contact Norbert Feist directly. That person lives and works in German not far from the EPO headquarter. They do not like to see and analyze his acoustic measurement device that does exist and described in his research paper (2010) because that device falsifies a well-

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established point of view. I think they need an official publication from a research lab, but I don't know any lab that can conduct a similar experiment because that experiment falsifies relativity.

Here, look at this! It is my detailed answer on EPO request for explanation. But it changed nothing in their "argumentation." (Allan gave us a document. See the next article. He also gave us a few pictures from his archive. See the third article.)

It makes the situation worse. We have a device that can be used in any air-tube by any student and falsifies relativity, but there is not any textbook for many years that mentions the experiment because that experiment shows "unexplainable results."

We have De Witte experiment that also destroys relativity. It is possible to conduct that experiment again. It is also possible to use my consultations regarding any of those experiments. It is possible also to make optical or acoustic SMA and conduct experiments with that device to confirm its way of operation. However, I'm telling again; I don't see any lab that wishes to perform those experiments.

Do not you mean that the situation "smells kerosene"?

I think you are right. If an expert refuses analysis of a physical device that stays in contrary to his point of view, then the situation means a severe violation of the scientific method. The problem comes from physics itself. They can disregard physical experiments conducted by other researchers, but that way never changes the situation because similar experiments show identical results ever despite any person who conducts them. That is a fundamental principle of science; an experiment shows the same result in any hands. In other words, if an experiment conducted by a student contradicts the point of view of a professor, then the professor's point of view becomes wrong. I mean, lie becomes detectable quickly *because nature cannot be trustful with one person and lie to others.*

Do you the only one independent researcher who works in the area of one-way experiments?

Not at all. There are many of them or us. There are a few groups and independent researchers interested in that area of knowledge. For example, Hanna Edwards, a researcher from Germany, has a similar interest. She knows me in person by a few Skype and e-mail conversations. She asks questions to me from time to time regarding her articles and ideas. Her point of view does not match my one exactly. Therefore, we have ever something to discuss. As far as I concern, no lab permits her to conduct any one-way experiment yet. However, she had a few articles published in the Elsevier journal about one-way experiments.

Another good example is Dr. Chahill from Australia, who put his article about De Witte experiments to arXiv. I think he could not find the right publisher interested in that subject. He mentioned a strange thing in his article that scientists criticized De Witte because of his experiments. That is more than unusual for science because the researcher conducted experiments in full accordance with the scientific method. That result disproves a well-established theory. Therefore, the theory *becomes wrong.*

Is it possible to change the situation?

I think it is possible. However, we need new areas of science that can be split into three areas or zones. Those are alpha, beta, and gamma zones. Alpha zone means all core knowledge known for science. That zone is widely used for education purpose. Beta zone stays close to the alpha zone and includes all research that derives from alpha-zone and satay consistent with alpha-zone.

Gamma-zone includes everything that contradicts alpha-zone and consequently cannot be researched by knowledge exists in that zone and all derived research from beta-zone. Beta-zone expands gradually by the development of instruments. Everything looks fine until a new device shows something that contradicts basic knowledge or alpha-zone. That means a situation of breaking the limit of beta-zone and experiments fall into gamma-zone. Further research in that area leads to a paradigm shift that destroys the ancient knowledge of alpha-zone and replaces them by the new one compatible with some part of gamma-zone. In that case, beta-zone increases its body and incorporates those new experiments from gamma-zone because a new paradigm explains them. That process becomes endless in science because every experiment with a new measurement device should be supposed to be an edge-experiment that destroys the edge of beta-zone or *the comprehension horizon* and comes to gamma-zone.

The best example of such a situation is CERN "faster than light neutrino experiment." As you remember, there is no one from the scientific community who recognized that test as a one-way experiment and supposed to have something unusual from such research. That experiment became a one-way because the neutrino ray goes one direction and *never comes back to the point of origin.*

Therefore, we need independent laboratories or scientific personnel, first of all, independent of dogmas of alpha-zone. Those laboratories should be accessible for everyone to conduct experiments from gamma-zone.

That is the only one possible solution of the problem from my point of view.

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Applicant's Observations of the Communication from the EPO Examining Division Dated 11.10.2018

By Allan Zade

General Considerations- Under normal circumstances, every Patent Application describes some step that explains something *unknown* in the Prior Art. That is a well-known notion of Inventive Step.

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Applicant's Observations of the Communication from the Examining Division Dated 11.10.2018

Allan Zade

I. General Considerations

Under normal circumstances, every Patent Application describes some step that explains something *unknown* in the Prior Art. That is a well-known notion of Inventive Step. The following figure shows it graphically.

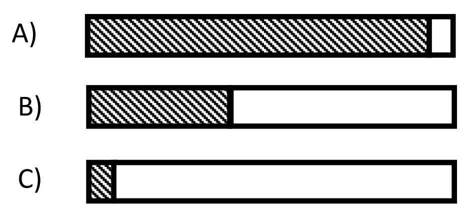

Figure 1

In case of a common Patent Application, the Inventive Step is a very little one in comparison with the Prior Art but enough to be recognized as such step. That is case (A) of Figure 1. The Dark rectangle represents the amount of knowledge of the Prior Art, and the white rectangle represents the Inventive Step.

In case of a good Patent Application, the Inventive Step becomes comparable with the full amount of knowledge from the Prior Art.

For example, suppose someone proposed a Patent Application that discloses a method of Alternating current transformation by a Transformer in the time where only Direct current was known. Such application immediately rises a lot of "objections" that the proposed device (apparatus) would never work because the apparatus uses two isolated electrical circuits and the electrical current "cannot reach another electrical circuit" and so on.

A person who likes to understand the method of operation of the proposed device should come out of the limitations of Direct current and comprehend fundamental aspects of Alternating current. Otherwise, the invention appears as some "mystery" for that person. Moreover, all "objections" coming from such person appear as references to the prior art *known for the person and become irrelevant for the invention.*

If a given person likes to understand such patent application, then the person should *follow explanations of the inventor and comprehend his point of view* with explanations based on some aspects of the prior art unknown (or partly-known) for the person.

In case of an exceptional patent application, the inventive step becomes so vast that it becomes incompatible with the full amount of knowledge of the prior art and suppress some aspects of the prior art. That is case (C) of Figure 1.

The patent application 14729725.3 proposed by the applicant (Allan Zade) falls into the last category (C) of patent applications (see Figure 1).

II. The Elementary Method of Speed Measurement and its Limitation

In case of measurement of a given speed the observer uses the basic equation:

$$V = L/D \qquad (1)$$

where V is the speed, L is the distance between points of measurements (A and B) and D is the duration of the measurement.

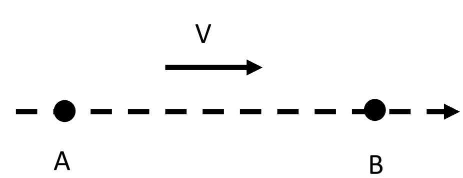

Figure 2

Figure 2 shows it graphically. That method of measurement includes detection (or creation) of something that moves between points of measurements and determination of duration that the moving thing spends to cover a given distance between points of measurements. The most straightforward example is the determination of the speed of a car moving between two points of measurements. A car can be easily replaced by another thing like a cannonball or a rocket (fired from point A and detected at point B) and so on. That method of measurement works perfectly with anything because it determines only *a physical duration* that a moving thing spends to cover a given physical distance between points of measurements.

However, that method has a severe limitation. It required motion of a measuring thing in the same *reference frame* where points of measurements do exist. Therefore, as soon as motion of the measuring thing appears in a different reference frame, that method *becomes useless*.

The best example of such a situation is an attempt to measure sound propagation in air or water by points of measurements mounted on something that moves regarding air or water (like an airplane or motorboat).

In that case, motion of points of measurements regarding a medium makes that method of measurement *useless*.

III. A Two-Way Method of Measurement

Suppose now this. The observer has transmitter and receiver at both points of measurements. In that case, the observer can send a signal back and forth between points of measurements. As a result, the observer possesses one more value – the duration of backward propagation of the signal and the number of values determined by the measurement rises to three.

Those are D_F is a duration of forward propagation of the signal, D_B is a duration of backward propagation of the signal along the straight line connecting the points of measurements, and L is the distance between points of measurements.

That three values can be used to determination two critical values of E (the speed of the signal-to-medium relative motion) and V (the speed of points of measurement to medium relative motion) by the following way.

$$V_F = \frac{L}{D_F} \tag{2}$$

$$V_B = \frac{L}{D_B} \tag{3}$$

where L is the distance between points of measurements.

There are two elements in each case by basic equations of the velocities.

$$V_F = E + V \tag{4}$$

$$V_B = E - V \tag{5}$$

Therefore,

$$V_F = E + V ;$$

$$V = V_F - E;$$

$$V_B = E - (V_F - E) = 2E - V_F;$$

$$2E = V_F + V_B \tag{6}$$

$$E = (V_F + V_B)/2 \tag{7}$$

The similar way gives the following value of V.

$$V_B = E - V ;$$

$$E = V_B + V ;$$

$$V_F = (V_B + V) + V = 2V + V_B;$$

$$2V = V_F - V_B ; \tag{8}$$

$$V = (V_F - V_B)/2 \tag{9}$$

Therefore, a two-way method of measurement transforms two useless one-way methods into a practical method of measurement that gives two critical values in one circle of measurement that includes forward and backward propagation of a signal.

The explanation given in this section is applicable for any signal-medium combination.

Therefore, the method itself is also applicable for *any signal-medium combination*.

IV. Historical Reference

There is one more way of measurements when the observer determines only the full duration of the signal propagation back and forth between two points of measurements. That is *a round-trip measurement* (experiment). That experiment became a grave problem for 19- 20th-century physics.

Famous Michelson-Morley experiment falls into that way of measurement (a round-trip measurement) because it used light (an electromagnetic signal) that makes propagation back and forth between mirrors.

Each arm of Michelson's interferometer used a round-trip measurement.

That way of measurement has one significant aspect. *The duration of a round-trip experiment is a constant regardless orientation of the measurement device in case of a constant speed of device-to-medium relative motion* (explained in details in the article 'Z-Theory the Ultimate Paradigm Shift' written by the Applicant). The Michelson's device immediately shown him that result.

In other words, Michelson's failure of measurement means a failure of his understanding of the physical principles of measurement device operation. It was a human failure instead of a device failure of measurement.

Later, that way of measurement, with all its restrictions, was put into a theory proposed by Einstein.

A similar experiment in an acoustic environment was conducted by Norbert Feist (a German researcher). His findings were published in 2010. The result was similar to Michelson's experiment. It was the same so-called "Null result".

The applicant sent that article to EPO in recent communication. There is no one person from mainstream science (including EPO Experts) who explained that experiment since the date of publication.

Phenomena of both experiments were explained only in articles published by the Applicant in various scientific journals.

In other words, a round-trip experiment is unable to detest device-to-medium relative motion in case of straight uniform motion of the device in any signal-medium combination.

Therefore, an observer should use a two-way method of measurement to reach the goal under similar circumstances.

That method splits a full duration of a round- trip experiment into values of two independent experiments. Therefore, equations 2-9 become applicable to that way of measurement in any signal-medium combination.

V. Applicant's Observations

"The disclosure should be detailed enough to prove to a skilled person conversant with mainstream science and technology that the invention is indeed feasible" (EPO-to-Applicant Communication (EPO-AC), 11.10.2018, p.7)

The application discloses a method of measurement that comprises three steps. Those are:

1. Determination of the duration of one- way signal propagation in the forward direction
2. Determination of the duration of one-way signal propagation in the backward direction
3. Comparison of those values and some calculations.

If the duration of forward propagation and backward propagation have the same value, then the speed of apparatus-to-medium relative motion in a given direction of measurement equals to zero.

Otherwise, the apparatuses determine their speed of motion regarding the medium (V) and the speed of the signal in the medium (E) by equations 7 and 9. The apparatuses need a value of distance that separates them during the measurement. That value comes from the Distance Measurement Device (DMD).

That is a relatively easy method of measurement that is certainly understandable for any "skilled person conversant with mainstream science and technology." *Therefore, EPO reference to "unclear or insufficient disclosure" becomes incorrect.*

Moreover, the proposed method of measurement works with any signal in any medium (as mentioned above). Therefore, the patent application needs not anything that reduces *the scope of the invention* to any specific signal or medium. *Therefore, any request from EPO about such shrink becomes incorrect.*

Moreover, the apparatuses determine the duration of one-way experiments. Therefore, they can use any possible (feasible) method of tracking parameters change. For example, if power becomes a tracking parameter, then apparatuses make any possible changes of signal power and determine the duration of signal propagation by that parameter. The easiest way of such change is to turn the signal on and off. Therefore, that is certainly understandable for any "skilled person conversant with mainstream science and technology," *and any other statements from EPO regarding that aspect disclosed in the patent application become incorrect.*

"Another decision dealing with a case that is close to the present one (referring also to speed measurement) is T 1785/06. In particular, the patent application dealt with in this decision was seen to be in contradiction with the "principle of relativity" from which it could be followed that an absolute measurement of speed was impossible." (EPO- AC, 11.10.2018, p.7)

"A skilled person conversant with mainstream science and technology" should clearly understand the origin of each "well-established principle." The principle of relativity mentioned by EPO was born when researchers had not any possibility to make physical measurements by one-way experiments with light. Michelson himself claimed this "'If it were possible to measure with sufficient accuracy the velocity of light without returning the ray to its starting point, the problem of measurement the first power of the relative velocity of the earth with respect to the ether would be solved" (Michelson, 1887). Therefore, Michelson himself comprehends the necessity of one-way experiments instead of a round-trip experiment.

The proposed patent application discloses that method of one-way measurement "without returning the ray to its starting point" by the Local Synchronization Remote Operation Method of measurement (LSROM). As a result, the proposed apparatus exceeds all limitations of Michelson's device.

Therefore, EPO reference to "a well-established principle of relativity" becomes incorrect.

The applicant understands the problem that EPO experts face. The proposed invention deals with a measurement that was impossible at the time of the creation of "a well- established theory." Michelson's experiment was conducted before the appearance of Relativity. Therefore, any reference to that theory in case of the proposed patent application is incorrect.

All physical measurements (experiments) with high-frequency oscillators (cesium, rubidium and other) gives the result *that contradicts Relativity in case of one-way measurements*.

For example, the applicant sent some articles which describe such experiments. Those are De Witte experiment and Torr-Kolen Experiment.

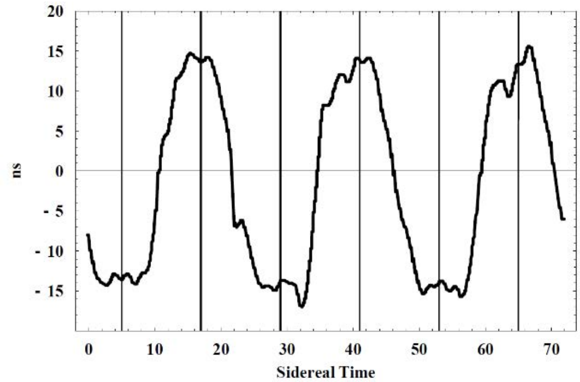

Figure 2

Figure 2 shows this. "*Variations in twice the one-way travel time, in ns, for an RF signal to travel 1.5 km through a coaxial cable between Rue du Marais and Rue de la Paille, Brussels. An offset has been used such that the average is zero. The cable has a North-South orientation, and the data is the difference of the travel times for NS and SN propagation. The sidereal time for maximum effect of ˜5hr and ˜17hr (indicated by vertical lines) agrees with the direction found by Miller. Plot shows data over 3 sidereal days and is plotted against sidereal time. De Witte recorded such data from 178 days, and confirmed that the effect tracked sidereal time, and not solar time.*"

There is not any "skilled person conversant with mainstream science and technology" who explained the result of such measurement within more than 20 last years (!) There is the only one explanation coming from the Applicant that one way-experiment is unequal a round-trip experiment (explained in their articles known for EPO). Therefore, Einstein's statement about their equality *is incorrect.*

Figure 2 shows this. The speed of light in one- way experiments is not constant at all. Therefore, Einstein's statement about that "universal constant (C)" is incorrect.

Torr-Kolen Experiment shows similar results for a different (rubidium-based) oscillating device.

Therefore, EPO reference to "a well-established theory" becomes *incorrect again*.

In other words, oscillating devices with enough frequency and stability of oscillations (available today) become able to make one-way measurements with electromagnetic signals including light.

That is the answer to EPO question about *the feasibility (industrial applicability) of the apparatus disclosed in the patent application.*

Moreover, a device used by De Witte (two atomic clocks and the cable between them) shows the only deviation of signal propagation between points of measurements. Such a device *is unable to determine the speed of the signal in a given medium* and observer-to- medium speed of relative motion because it measures one-way deviation (instead of the duration of a one-way signal propagation).

That problem can be solved by Local Synchronization and Remote Operation Method of measurement (LSROM, disclosed in the patent application).

That method is feasible for an observer because he can put two (or more) apparatuses together which have cesium-based oscillating devices (in a particular case), make synchronization of their counting devices, put those apparatuses at a given distance and make measurements of individual duration of two one-way experiments by forward and backward propagation of a given signal (light for example) in a given direction.

Equations 7 and 9 give the observer values of the speed of observer-to-medium relative motion and signal-to-medium relative motion.

In case of experiments with light, the value of observer-to-medium relative motion gives the speed of the Erath relative to the ether or space. It is only matter of words how to call that medium. Yes, that measurement disproves relativity at the ground level because Einstein never comprehends the physical possibility of the existence of such measurement devices throughout his life.

Therefore, EPO speculations about the feasibility of the disclosed way of measurement *have not any ground.*

"The applicant explains that the propagation of the measuring signal depends only on the medium where it propagates. He does not limit this to particular signals (light, sound, other types of information transmission) and he does not distinguish a medium (with which the signals interact) and vacuum (which is no medium, and there is no interaction)" (EPO-AC, 11.10.2018, p.8)

The applicant draws the attention of EPO experts to documents sent to EPO with the recent communication. Norbert Feist acoustic version of Michelson-Morley optical experiment shows the same so-called Null result in case of straight uniform motion of the observer regarding the medium (air) *in complete disagreement with Michelson's speculations and calculations.* Therefore, that easy acoustic experiment disproves Michelson's speculations and Einstein's postulates. As a result, the experiment becomes "unnoticed" by the mainstream scientific community for about ten years (after the date of publication).

Strictly speaking, Michelson's optical experiment becomes only a particular case of such experiments in any signal-medium combination because Michelson's measurement device (i.e., interferometer) moves in space within the planet (the Erath) in straight uniform motion.

In other words, both experiments show this. *In case of straight uniform motion, the duration of a round-trip experiment remains constant regardless orientation of the measurement device.*

Therefore, if all those experiments show the same so-called null result, then the physical principles of signal propagation become exactly equal in anything that supports propagation of those signals as well as any other physical principle. For example, Huygens.

Principe of wave propagation remains correct for any signal-medium combination (including light-space combination).

That situation should raise a question from EPO experts that Huygens Principe should not be valid for vacuum because the vacuum is not a medium "and there is no interaction." However, no one from EPO experts asks that question to any "skilled person conversant with mainstream science and technology" because no one of them gives an accurate answer on that question.

However, physical experiments show the exact similarity of signal propagation in round-trip experiments for sound-air and light-space combinations. The observer *is unable to understand* those principles of interaction based on his point of view based on mainstream ideas of physics. It makes no impact on physical measurements by physical devices.

The applicant explained the presence of that continuum in the attached article (section Z- Continuum). The medium that supports propagation of light in space can be unreachable for the observer by another way of interaction, but it confirms its presence by the similarity of signal propagation in any medium. Therefore, the applicant makes no difference between any signal-medium combinations.

It should be mentioned again, Norbert Feist experiment was unknown for Einstein. As a result, "a well-established theory" does not explain that experiment and subsequently *becomes irrelevant to physical experiments.*

The applicant should mention that again. The measurement device created by Norbert Feist does exist. It does accessible for observation and usage in experiments as well as Norbert himself accessible to communications regarding his experiment that disproves "a well-established theory." He lives and works in Germany.

Strictly speaking, any analysis of the patent application should be made by reference to the relevant experiments (the prior art) without any reference to Relativity and any speculation of that theory.

Michelson, Morley, and others can conduct Norbert Feist experiment years ago and before their optical experiments. In that scenario, Relativity has not any place to born because both types of experiments (optical and acoustic) show the same "unusual data" or the constant duration of signal propagation in a round-trip experiment in case of straight uniform motion of the measurement device regarding a given medium. Therefore, both ways of physical experiments disprove Michelson a priori point of view *with all his speculations and calculations.*

In other words, Michelson's experiment shows the failure of human comprehension instead of the failure of the experiment.

VI. The Best Way of Analysis of The Patent Application

The experts should keep in mind, that

1. Each expert is responsible for the understanding of a patent application
2. The applicant is responsible for the explanation

The applicant already provided all relevant information and gave answers on all EPO requests made so far.

It is better for any person to analyze the patent application (especially for EPO experts) regarding all aspects mentioned in the section of applicant's observations the following way:

1. *Read and understand* all articles that the applicant sent to EPO as a reference to the Prior Art.
2. Comprehend self-inconsistency of Relativity and its inability to predict results of physical experiments (for example, acoustic round-trip experiments based on Michelson's speculations)
3. Make a critical analysis of Michelson's optical experiment with connection to Norbert Feist's acoustic experiment. Both experiments show the same result in case of straight uniform motion of the measurement device regarding the medium. That result contradicts Relativity.
4. Understand the inability of modern physics to explain Norbert Feist experiment and its interconnection with round-trip optical experiments.
5. Understand the difference between one-way and round-trip experiments.
6. Understand similarity of all round-trip experiments in any signal-medium combination (it is a critical aspect!)
7. Understand inability of modern physics to explain one-way experiments with light (like De Witte and Torr-Kolen Experiments) which should be explainable by "the Principle of Relativity," but they cannot be explained that way (as mentioned above)
8. Understand Local Synchronization Remote Operation Method (LSROM) disclosed in the patent application. That is a critical step in the understanding of the entire patent application
9. Understand Industrial Applicability of LSROM at the modern technological level by the feasibility of high frequency and stability oscillating devices like cesium-based oscillators (rubidium-based, and others)
10. Understand alternatives disclosed in the patent application and their relation with the primary apparatus and method
11. Understand the relationship of the patent application with the Prior Art in the form of Norbert Feist experiment, De Witte, Torr-Kolen (and other "impossible experiments")
12. Understand superiority and technical feasibility (industrial applicability) of the

disclosed method of measurement of apparatus-to-medium relative motion by applicant's explanations

13. Understand the superiority and technical feasibility of the disclosed method of measurement of signal-to-medium relative motion that needs not any extra measurement and calibration of the measurement device by static location in a given medium
14. Understand that all experiments from the Prior Art (including Michelson optical experiment) disprove all speculations and calculations of Michelson and others
15. Understand that the disclosed apparatus and method of measurement crash "a well-established" theory indeed. There is not any "tragedy" that way because a theory does exist until *a revolutionary measurement device disproves that theory*
16. Understand that the patent application discloses and explains the apparatus and methods the easiest and shortest possible way that requested by the Patent Law and recommended by EPO

VII. Reference to the Patent Law and Industrial Applicability

The invention must relate to a technical field (Rule 5. (a) (i):

The invention discloses an apparatus and method of measurement that determines apparatus-to-medium relative motion.

Unlike other inventions, the proposed apparatus uses signal propagation back and forth between at least two apparatuses. Therefore, it is *a measurement device*.

The proposed solution should not be obvious.

All questions from EPO to the applicant show the patent application follows that requirement and proposes a unique way of measurements that was NOT used ever before and *it is far from any obvious solution*.

The invention must be concerned with a technical problem (Rule 5.1(a)(iii)

The invention discloses a solution to a problem of measurement of the observer-to-medium speed of relative motion in the observer-bound reference frame without any interaction with other artificial reference frames.

In a particular case, the invention shows the solution that determines the Erath-to-Space relative motion. That is the problem where Michelson failed to detect motion because he does not understand the fundamental physical processes happen inside his device (the interferometer). Those processes *made the interferometer useless regarding the problem*.

The invention must have technical features in terms of which the subject-matter for which protection is sought can be defined in the claim (Rule 6.3(a))

The invention uses the signal-bound reference frame or Wave Reference Frame (WRF) to make measurements. Presence of that WRF and motion of the observer regarding that WRF makes the duration of forward propagation of the signal different from the duration of its backward propagation.

However, in case of straight uniform motion of the measurement device the full duration of two measurements (or the duration of a round-trip experiment) remains constant, that makes the rotation of the measurements device useless to measurements.

That is the critical problem that Michelson faced with his experiments.

The solution comes only from one-way measurements of signal propagation as disclosed in the patent application.

The invention should be feasible at the PRESENT technological level to follow the requirement of the Industrial Applicability.

The proposed invention makes measurements of signal propagation in a given medium. In case of acoustic signals in air or water standard quartz-based oscillating devices can be used for such measurements. In that case, the disclosed apparatuses use LSROM and quartz oscillators.

In case of EM-signals (optical signals, light) the proposed apparatuses use the oscillating devices suitable to that purpose. Those are cesium-based oscillating devices, rubidium- based oscillating devices or other devices suitable for such measurements. In that case, the disclosed apparatuses use LSROM and cesium oscillators (for example, De Witte used a similar combination of devices in his experiments, as mentioned above).

Cesium-based oscillating devices were not accessible at the time of Michelson's experiment because they were not invented at that time.

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As a result, Michelson was unable to conduct one-way experiments and reach the conclusion that the interferometer (he used) is useless to the purpose of his measurements by its method of measurement.

As soon as any signal shows some duration of one-way propagation between two casually taken points in any reference frame, physical nature of the signal and a given medium is not essential for the apparatuses because they make physical measurements of the duration of signal propagation.

As a result, the proposed invention covers any signal-medium combination without any exception (as disclosed in the patent application).

VIII. Position of the Applicant in Modern Science

Recently, the applicant became a Fellow of the Science Frontier Research Council (FSFRC) of the Open Association of Research Society (see the attached letter of commendation and the certificate).

If explanations coming from the applicant regarding his scientific activity and findings (in the form of his articles) do understandable for scientific members of abovementioned society, then similar explanations at the engineering (technical) level should be understandable for EPO experts.

The applicant has not any doubt regarding that aspect of *understandability* of his explanations.

Allan in pictures

Allan is delivering a lecture on 'National seminar on Z-Theory and its applications' (NSZTA) (Ghaziabad, India, 2013)

NSZTA (Ghaziabad, India, 2013)

Allan is giving a certificate of the seminar to a student (NSZTA) (Ghaziabad, India, 2013)

NSZTA (Ghaziabad, India, 2013)

Allan at the central gate of the University of Zurich (Zurich, 2014)

Allan in Bern, 2014

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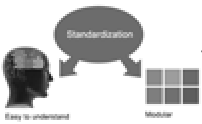

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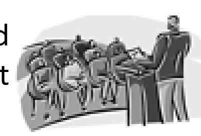

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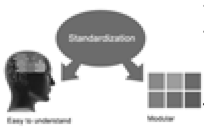

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"

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- Author name in font size of 11 in one column.
- Abstract: font size 9 with the word "Abstract" in bold italics.
- Main text: font size 10 with two justified columns.
- Two columns with equal column width of 3.38 and spacing of 0.2.
- First character must be three lines drop-capped.
- The paragraph before spacing of 1 pt and after of 0 pt.
- Line spacing of 1 pt.
- Large images must be in one column.
- The names of first main headings (Heading 1) must be in Roman font, capital letters, and font size of 10.
- The names of second main headings (Heading 2) must not include numbers and must be in italics with a font size of 10.

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The recommended size of an original research paper is under 15,000 words and review papers under 7,000 words. Research articles should be less than 10,000 words. Research papers are usually longer than review papers. Review papers are reports of significant research (typically less than 7,000 words, including tables, figures, and references)

A research paper must include:

a) A title which should be relevant to the theme of the paper.
b) A summary, known as an abstract (less than 150 words), containing the major results and conclusions.
c) Up to 10 keywords that precisely identify the paper's subject, purpose, and focus.
d) An introduction, giving fundamental background objectives.
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f) Results which should be presented concisely by well-designed tables and figures.
g) Suitable statistical data should also be given.
h) All data must have been gathered with attention to numerical detail in the planning stage.

Design has been recognized to be essential to experiments for a considerable time, and the editor has decided that any paper that appears not to have adequate numerical treatments of the data will be returned unrefereed.

i) Discussion should cover implications and consequences and not just recapitulate the results; conclusions should also be summarized.
j) There should be brief acknowledgments.
k) There ought to be references in the conventional format. Global Journals recommends APA format.

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4. Use of computer is recommended: As you are doing research in the field of science frontier then this point is quite obvious. Use right software: Always use good quality software packages. If you are not capable of judging good software, then you can lose the quality of your paper unknowingly. There are various programs available to help you which you can get through the internet.

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6. Bookmarks are useful: When you read any book or magazine, you generally use bookmarks, right? It is a good habit which helps to not lose your continuity. You should always use bookmarks while searching on the internet also, which will make your search easier.

7. Revise what you wrote: When you write anything, always read it, summarize it, and then finalize it.

8. Make every effort: Make every effort to mention what you are going to write in your paper. That means always have a good start. Try to mention everything in the introduction—what is the need for a particular research paper. Polish your work with good writing skills and always give an evaluator what he wants. Make backups: When you are going to do any important thing like making a research paper, you should always have backup copies of it either on your computer or on paper. This protects you from losing any portion of your important data.

9. Produce good diagrams of your own: Always try to include good charts or diagrams in your paper to improve quality. Using several unnecessary diagrams will degrade the quality of your paper by creating a hodgepodge. So always try to include diagrams which were made by you to improve the readability of your paper. Use of direct quotes: When you do research relevant to literature, history, or current affairs, then use of quotes becomes essential, but if the study is relevant to science, use of quotes is not preferable.

10. Use proper verb tense: Use proper verb tenses in your paper. Use past tense to present those events that have happened. Use present tense to indicate events that are going on. Use future tense to indicate events that will happen in the future. Use of wrong tenses will confuse the evaluator. Avoid sentences that are incomplete.

11. Pick a good study spot: Always try to pick a spot for your research which is quiet. Not every spot is good for studying.

12. Know what you know: Always try to know what you know by making objectives, otherwise you will be confused and unable to achieve your target.

13. Use good grammar: Always use good grammar and words that will have a positive impact on the evaluator; use of good vocabulary does not mean using tough words which the evaluator has to find in a dictionary. Do not fragment sentences. Eliminate one-word sentences. Do not ever use a big word when a smaller one would suffice.

Verbs have to be in agreement with their subjects. In a research paper, do not start sentences with conjunctions or finish them with prepositions. When writing formally, it is advisable to never split an infinitive because someone will (wrongly) complain. Avoid clichés like a disease. Always shun irritating alliteration. Use language which is simple and straightforward. Put together a neat summary.

14. Arrangement of information: Each section of the main body should start with an opening sentence, and there should be a changeover at the end of the section. Give only valid and powerful arguments for your topic. You may also maintain your arguments with records.

15. Never start at the last minute: Always allow enough time for research work. Leaving everything to the last minute will degrade your paper and spoil your work.

16. Multitasking in research is not good: Doing several things at the same time is a bad habit in the case of research activity. Research is an area where everything has a particular time slot. Divide your research work into parts, and do a particular part in a particular time slot.

17. Never copy others' work: Never copy others' work and give it your name because if the evaluator has seen it anywhere, you will be in trouble. Take proper rest and food: No matter how many hours you spend on your research activity, if you are not taking care of your health, then all your efforts will have been in vain. For quality research, take proper rest and food.

18. Go to seminars: Attend seminars if the topic is relevant to your research area. Utilize all your resources.

19. Refresh your mind after intervals: Try to give your mind a rest by listening to soft music or sleeping in intervals. This will also improve your memory. Acquire colleagues: Always try to acquire colleagues. No matter how sharp you are, if you acquire colleagues, they can give you ideas which will be helpful to your research.

20. Think technically: Always think technically. If anything happens, search for its reasons, benefits, and demerits. Think and then print: When you go to print your paper, check that tables are not split, headings are not detached from their descriptions, and page sequence is maintained.

21. Adding unnecessary information: Do not add unnecessary information like "I have used MS Excel to draw graphs." Irrelevant and inappropriate material is superfluous. Foreign terminology and phrases are not apropos. One should never take a broad view. Analogy is like feathers on a snake. Use words properly, regardless of how others use them. Remove quotations. Puns are for kids, not grunt readers. Never oversimplify: When adding material to your research paper, never go for oversimplification; this will definitely irritate the evaluator. Be specific. Never use rhythmic redundancies. Contractions shouldn't be used in a research paper. Comparisons are as terrible as clichés. Give up ampersands, abbreviations, and so on. Remove commas that are not necessary. Parenthetical words should be between brackets or commas. Understatement is always the best way to put forward earth-shaking thoughts. Give a detailed literary review.

22. Report concluded results: Use concluded results. From raw data, filter the results, and then conclude your studies based on measurements and observations taken. An appropriate number of decimal places should be used. Parenthetical remarks are prohibited here. Proofread carefully at the final stage. At the end, give an outline to your arguments. Spot perspectives of further study of the subject. Justify your conclusion at the bottom sufficiently, which will probably include examples.

23. Upon conclusion: Once you have concluded your research, the next most important step is to present your findings. Presentation is extremely important as it is the definite medium though which your research is going to be in print for the rest of the crowd. Care should be taken to categorize your thoughts well and present them in a logical and neat manner. A good quality research paper format is essential because it serves to highlight your research paper and bring to light all necessary aspects of your research.

Informal Guidelines of Research Paper Writing

Key points to remember:

- Submit all work in its final form.
- Write your paper in the form which is presented in the guidelines using the template.
- Please note the criteria peer reviewers will use for grading the final paper.

Final points:

One purpose of organizing a research paper is to let people interpret your efforts selectively. The journal requires the following sections, submitted in the order listed, with each section starting on a new page:

The introduction: This will be compiled from reference matter and reflect the design processes or outline of basis that directed you to make a study. As you carry out the process of study, the method and process section will be constructed like that. The results segment will show related statistics in nearly sequential order and direct reviewers to similar intellectual paths throughout the data that you gathered to carry out your study.

The discussion section:

This will provide understanding of the data and projections as to the implications of the results. The use of good quality references throughout the paper will give the effort trustworthiness by representing an alertness to prior workings.

Writing a research paper is not an easy job, no matter how trouble-free the actual research or concept. Practice, excellent preparation, and controlled record-keeping are the only means to make straightforward progression.

General style:

Specific editorial column necessities for compliance of a manuscript will always take over from directions in these general guidelines.

To make a paper clear: Adhere to recommended page limits.

Mistakes to avoid:

- Insertion of a title at the foot of a page with subsequent text on the next page.
- Separating a table, chart, or figure—confine each to a single page.
- Submitting a manuscript with pages out of sequence.
- In every section of your document, use standard writing style, including articles ("a" and "the").
- Keep paying attention to the topic of the paper.
- Use paragraphs to split each significant point (excluding the abstract).
- Align the primary line of each section.
- Present your points in sound order.
- Use present tense to report well-accepted matters.
- Use past tense to describe specific results.
- Do not use familiar wording; don't address the reviewer directly. Don't use slang or superlatives.
- Avoid use of extra pictures—include only those figures essential to presenting results.

Title page:

Choose a revealing title. It should be short and include the name(s) and address(es) of all authors. It should not have acronyms or abbreviations or exceed two printed lines.

Abstract: This summary should be two hundred words or less. It should clearly and briefly explain the key findings reported in the manuscript and must have precise statistics. It should not have acronyms or abbreviations. It should be logical in itself. Do not cite references at this point.

An abstract is a brief, distinct paragraph summary of finished work or work in development. In a minute or less, a reviewer can be taught the foundation behind the study, common approaches to the problem, relevant results, and significant conclusions or new questions.

Write your summary when your paper is completed because how can you write the summary of anything which is not yet written? Wealth of terminology is very essential in abstract. Use comprehensive sentences, and do not sacrifice readability for brevity; you can maintain it succinctly by phrasing sentences so that they provide more than a lone rationale. The author can at this moment go straight to shortening the outcome. Sum up the study with the subsequent elements in any summary. Try to limit the initial two items to no more than one line each.

Reason for writing the article—theory, overall issue, purpose.

- Fundamental goal.
- To-the-point depiction of the research.
- Consequences, including definite statistics—if the consequences are quantitative in nature, account for this; results of any numerical analysis should be reported. Significant conclusions or questions that emerge from the research.

Approach:

- o Single section and succinct.
- o An outline of the job done is always written in past tense.
- o Concentrate on shortening results—limit background information to a verdict or two.
- o Exact spelling, clarity of sentences and phrases, and appropriate reporting of quantities (proper units, important statistics) are just as significant in an abstract as they are anywhere else.

Introduction:

The introduction should "introduce" the manuscript. The reviewer should be presented with sufficient background information to be capable of comprehending and calculating the purpose of your study without having to refer to other works. The basis for the study should be offered. Give the most important references, but avoid making a comprehensive appraisal of the topic. Describe the problem visibly. If the problem is not acknowledged in a logical, reasonable way, the reviewer will give no attention to your results. Speak in common terms about techniques used to explain the problem, if needed, but do not present any particulars about the protocols here.

The following approach can create a valuable beginning:

- Explain the value (significance) of the study.
- Defend the model—why did you employ this particular system or method? What is its compensation? Remark upon its appropriateness from an abstract point of view as well as pointing out sensible reasons for using it.
- Present a justification. State your particular theory(-ies) or aim(s), and describe the logic that led you to choose them.
- Briefly explain the study's tentative purpose and how it meets the declared objectives.

Approach:

Use past tense except for when referring to recognized facts. After all, the manuscript will be submitted after the entire job is done. Sort out your thoughts; manufacture one key point for every section. If you make the four points listed above, you will need at least four paragraphs. Present surrounding information only when it is necessary to support a situation. The reviewer does not desire to read everything you know about a topic. Shape the theory specifically—do not take a broad view.

As always, give awareness to spelling, simplicity, and correctness of sentences and phrases.

Procedures (methods and materials):

This part is supposed to be the easiest to carve if you have good skills. A soundly written procedures segment allows a capable scientist to replicate your results. Present precise information about your supplies. The suppliers and clarity of reagents can be helpful bits of information. Present methods in sequential order, but linked methodologies can be grouped as a segment. Be concise when relating the protocols. Attempt to give the least amount of information that would permit another capable scientist to replicate your outcome, but be cautious that vital information is integrated. The use of subheadings is suggested and ought to be synchronized with the results section.

When a technique is used that has been well-described in another section, mention the specific item describing the way, but draw the basic principle while stating the situation. The purpose is to show all particular resources and broad procedures so that another person may use some or all of the methods in one more study or referee the scientific value of your work. It is not to be a step-by-step report of the whole thing you did, nor is a methods section a set of orders.

Materials:

Materials may be reported in part of a section or else they may be recognized along with your measures.

Methods:

- Report the method and not the particulars of each process that engaged the same methodology.
- Describe the method entirely.
- To be succinct, present methods under headings dedicated to specific dealings or groups of measures.
- Simplify—detail how procedures were completed, not how they were performed on a particular day.
- If well-known procedures were used, account for the procedure by name, possibly with a reference, and that's all.

Approach:

It is embarrassing to use vigorous voice when documenting methods without using first person, which would focus the reviewer's interest on the researcher rather than the job. As a result, when writing up the methods, most authors use third person passive voice.

Use standard style in this and every other part of the paper—avoid familiar lists, and use full sentences.

What to keep away from:

- Resources and methods are not a set of information.
- Skip all descriptive information and surroundings—save it for the argument.
- Leave out information that is immaterial to a third party.

Results:

The principle of a results segment is to present and demonstrate your conclusion. Create this part as entirely objective details of the outcome, and save all understanding for the discussion.

The page length of this segment is set by the sum and types of data to be reported. Use statistics and tables, if suitable, to present consequences most efficiently.

You must clearly differentiate material which would usually be incorporated in a study editorial from any unprocessed data or additional appendix matter that would not be available. In fact, such matters should not be submitted at all except if requested by the instructor.

Content:

- Sum up your conclusions in text and demonstrate them, if suitable, with figures and tables.
- In the manuscript, explain each of your consequences, and point the reader to remarks that are most appropriate.
- Present a background, such as by describing the question that was addressed by creation of an exacting study.
- Explain results of control experiments and give remarks that are not accessible in a prescribed figure or table, if appropriate.
- Examine your data, then prepare the analyzed (transformed) data in the form of a figure (graph), table, or manuscript.

What to stay away from:

- Do not discuss or infer your outcome, report surrounding information, or try to explain anything.
- Do not include raw data or intermediate calculations in a research manuscript.
- Do not present similar data more than once.
- A manuscript should complement any figures or tables, not duplicate information.
- Never confuse figures with tables—there is a difference.

Approach:

As always, use past tense when you submit your results, and put the whole thing in a reasonable order.

Put figures and tables, appropriately numbered, in order at the end of the report.

If you desire, you may place your figures and tables properly within the text of your results section.

Figures and tables:

If you put figures and tables at the end of some details, make certain that they are visibly distinguished from any attached appendix materials, such as raw facts. Whatever the position, each table must be titled, numbered one after the other, and include a heading. All figures and tables must be divided from the text.

Discussion:

The discussion is expected to be the trickiest segment to write. A lot of papers submitted to the journal are discarded based on problems with the discussion. There is no rule for how long an argument should be.

Position your understanding of the outcome visibly to lead the reviewer through your conclusions, and then finish the paper with a summing up of the implications of the study. The purpose here is to offer an understanding of your results and support all of your conclusions, using facts from your research and generally accepted information, if suitable. The implication of results should be fully described.

Infer your data in the conversation in suitable depth. This means that when you clarify an observable fact, you must explain mechanisms that may account for the observation. If your results vary from your prospect, make clear why that may have happened. If your results agree, then explain the theory that the proof supported. It is never suitable to just state that the data approved the prospect, and let it drop at that. Make a decision as to whether each premise is supported or discarded or if you cannot make a conclusion with assurance. Do not just dismiss a study or part of a study as "uncertain."

Research papers are not acknowledged if the work is imperfect. Draw what conclusions you can based upon the results that you have, and take care of the study as a finished work.

- You may propose future guidelines, such as how an experiment might be personalized to accomplish a new idea.
- Give details of all of your remarks as much as possible, focusing on mechanisms.
- Make a decision as to whether the tentative design sufficiently addressed the theory and whether or not it was correctly restricted. Try to present substitute explanations if they are sensible alternatives.
- One piece of research will not counter an overall question, so maintain the large picture in mind. Where do you go next? The best studies unlock new avenues of study. What questions remain?
- Recommendations for detailed papers will offer supplementary suggestions.

Approach:

When you refer to information, differentiate data generated by your own studies from other available information. Present work done by specific persons (including you) in past tense.

Describe generally acknowledged facts and main beliefs in present tense.

The Administration Rules

Administration Rules to Be Strictly Followed before Submitting Your Research Paper to Global Journals Inc.

Please read the following rules and regulations carefully before submitting your research paper to Global Journals Inc. to avoid rejection.

Segment draft and final research paper: You have to strictly follow the template of a research paper, failing which your paper may get rejected. You are expected to write each part of the paper wholly on your own. The peer reviewers need to identify your own perspective of the concepts in your own terms. Please do not extract straight from any other source, and do not rephrase someone else's analysis. Do not allow anyone else to proofread your manuscript.

Written material: You may discuss this with your guides and key sources. Do not copy anyone else's paper, even if this is only imitation, otherwise it will be rejected on the grounds of plagiarism, which is illegal. Various methods to avoid plagiarism are strictly applied by us to every paper, and, if found guilty, you may be blacklisted, which could affect your career adversely. To guard yourself and others from possible illegal use, please do not permit anyone to use or even read your paper and file.

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Topics	Grades		
	A-B	**C-D**	**E-F**
Abstract	Clear and concise with appropriate content, Correct format. 200 words or below	Unclear summary and no specific data, Incorrect form Above 200 words	No specific data with ambiguous information Above 250 words
Introduction	Containing all background details with clear goal and appropriate details, flow specification, no grammar and spelling mistake, well organized sentence and paragraph, reference cited	Unclear and confusing data, appropriate format, grammar and spelling errors with unorganized matter	Out of place depth and content, hazy format
Methods and Procedures	Clear and to the point with well arranged paragraph, precision and accuracy of facts and figures, well organized subheads	Difficult to comprehend with embarrassed text, too much explanation but completed	Incorrect and unorganized structure with hazy meaning
Result	Well organized, Clear and specific, Correct units with precision, correct data, well structuring of paragraph, no grammar and spelling mistake	Complete and embarrassed text, difficult to comprehend	Irregular format with wrong facts and figures
Discussion	Well organized, meaningful specification, sound conclusion, logical and concise explanation, highly structured paragraph reference cited	Wordy, unclear conclusion, spurious	Conclusion is not cited, unorganized, difficult to comprehend
References	Complete and correct format, well organized	Beside the point, Incomplete	Wrong format and structuring

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