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

By Reginald T. Cahill

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

Reginald T. Cahill

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## 1. 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<sup>1</sup>. 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

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<sup>1</sup> 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  $\mathcal{F}$ -space, as in [9, 10].

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<sup>2</sup> as ( $\alpha = 5.2^{\text{hr}}$ ,  $\delta = -67^{\circ}$ ), with a speed of  $420 \pm 30 \text{ km/s}$ . This local (in the galactic sense) absolute motion is different from the Cosmic Microwave Background

<sup>2</sup> There is a possibility that the direction is opposite to this direction.

(CMB) anisotropy determined motion, in the direction ( $\alpha = 11.20^{\text{hr}}$ ,  $\delta = -7.22^{\text{o}}$ ) 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  $\sim 2$  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<sup>3</sup>.

## 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.

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  $2 \times 10^{-13}$  this is able to produce a phase shift of 17 ns a day, but this instability was not often observed and the outputs of the phase comparators have shown that the local instability was typically only a few nanoseconds a day (5 ns) between two local clocks.

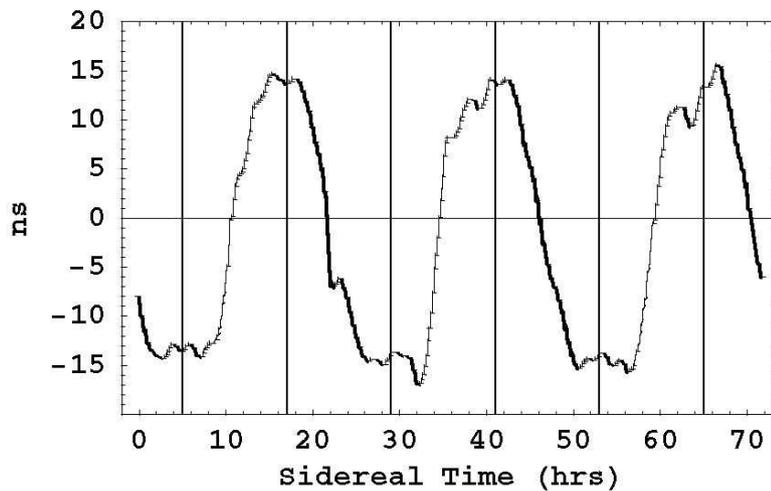
But between distant clocks A1 toward B1 and B1 toward A1, in addition to the same linear phase variations (but with identical positive and negative slopes, because if one is fast, the other is slow), there is also an additional clear sinusoidal-like phase undulation ( $\approx 24$  h period) of the order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

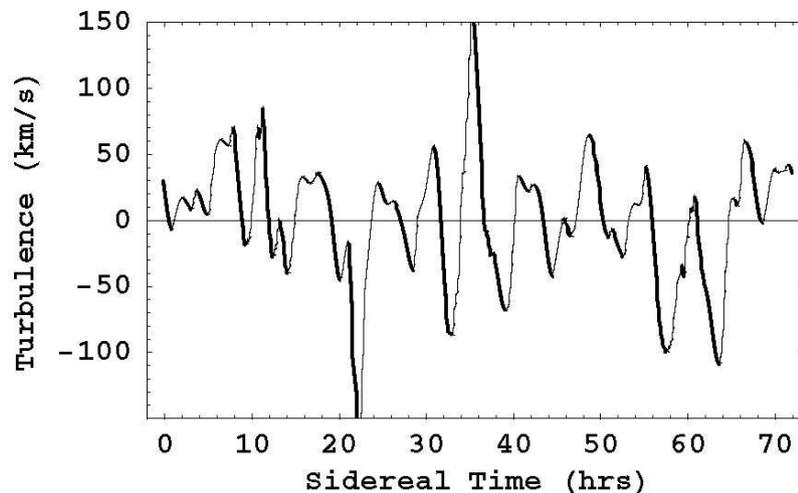
$df/f=0.25 \times 10^{-13}/^{\circ}\text{C}$  and implies, for example, a differential step of room temperature variation of  $24^{\circ}\text{C}$ , two times a day, over 178 days to produce the observed time variations. Moreover the room temperature was maintained at nearly a constant around  $20^{\circ}\text{C}$  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  $df/f = 1.4 \times 10^{-13}/\text{Gauss}$  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 ( $\alpha = 5.2^{\text{hr}}, \delta = -67^{\circ}$ ). 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.



**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 the difference of the travel times for NS and SN propagation. The sidereal time for maximum effect of  $\sim 5$ hr (or  $\sim 17$ hr) (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].

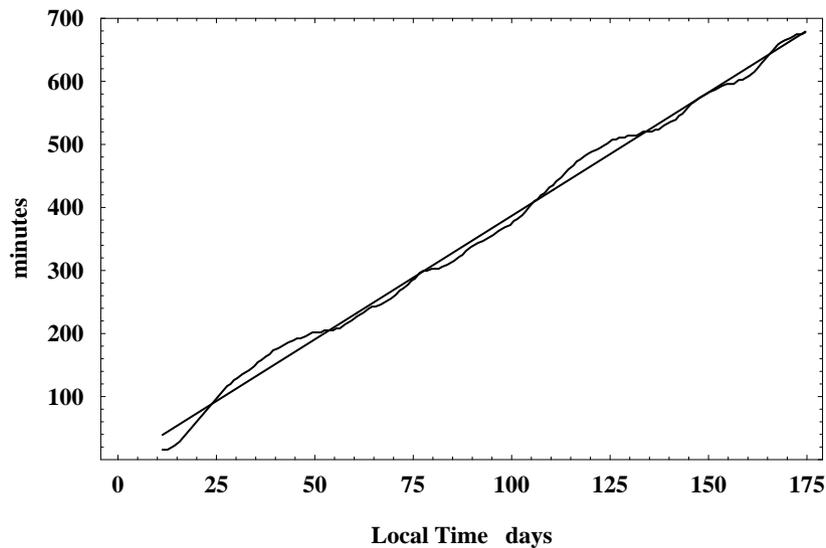
$$\begin{aligned} \Delta t &= \frac{L}{\frac{c}{n} - v_P} - \frac{L}{\frac{c}{n} + v_P}, \\ &= 2\frac{L}{c/n} \frac{v_P}{c} + O\left(\frac{v_P^2}{c^2}\right) \approx 2t_0 n \frac{v_P}{c}. \end{aligned} \quad (1)$$

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 500 km/s. Because Brussels has a latitude of  $51^\circ$  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  $\Delta t$  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  $\sim 10^h$  fff  $1^h$  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 ( $\alpha = 5.2^{\text{hr}}$ ,  $\delta = -67^\circ$ ) 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

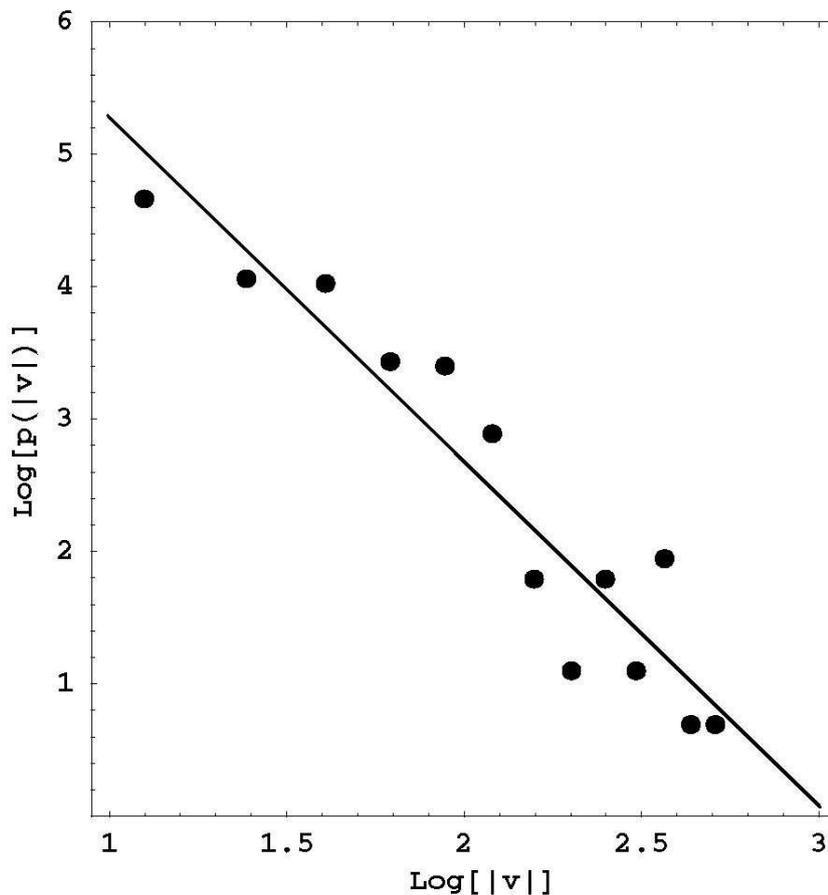
Witte experiment could easily resolve this ambiguity by simply noting the sign of  $\Delta t$ . Unfortunately it is unclear as to how the sign in Fig.2 is actually defined, and De Witte does not report a direction expecting, as he did, that the direction should have been the same as the CMB direction.

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  $\text{Log}[p(|v|)]$  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<sup>4</sup>. 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  $p(v) \propto |v|^{-2.6}$ . This plot shows  $\text{Log}[p(v)]$  vs  $|v|$ . From [11].

<sup>4</sup> 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 Liège 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 caesium beam clock. It is there that he took the time to compare the phase of distant caesium 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 caesium 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’auquet, 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](http://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](http://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 physicists that absolute motion is incompatible with the many confirmed relativistic effects. DeWitte'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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