Motion through the ether

Using a novel interferometer, the author claims to have demonstrated the existence of the ether and to have disproved the principle of Relativity.

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This article presents an account of a new electronic device that has proved conclusively that our motion at speeds of some 400 km/s or so in space can be measured in the confines of a laboratory. The experiment proves that there is an ether and disproves the principle of Relativity.

It does so because it measures the speed at which the laboratory is moving in a fixed direction in space, and that means that something is flowing through the laboratory at that speed. That something is the ether.

The famous Michelson-Morley experiment failed to detect our translational motion through the ether. It did not establish that the speed of light was referred to the observer moving with the apparatus. What it did was to prove that the average velocity of light for a round trip between a beam splitter and a mirror was independent of motion through space. The author supposed that the one-way speed of light, or more specifically its wavelength, did depend upon that motion, but in a way that satisfied the exact null condition of the Michelson-Morley result.

However, the Sagnac experiment, as embodied in the ring laser gyros now used in navigational applications, showed that if a light ray travels one way around a circuit, and its travel time is compared with that of a light ray going the other way around the circuit, the rotation of the apparatus is detectable by optical interferometry. Here the result is just as if there is an ether and the speed of light is referred to that ether.

Readers will have great difficulty finding a book on Relativity that even discusses the Sagnac experiment or the later experiment by Michelson and Gale that detected the Earth's rotation.

In the modern version of the Sagnac experiment a single laser divides its light rays and sends them around a loop in opposite directions, but the resulting standing waves are not locked to the mirror surfaces as they are in the Michelson-Morley experiment.

It was my assumption that the different wavelengths presented by rays moving in opposite directions along that path would allow a detector to sense a modulation or displacement of the standing wave system along the common ray path. The secret was to move the detector or the optical system along a linear path, rather than rotate the optical apparatus, as in the Sagnac experi-

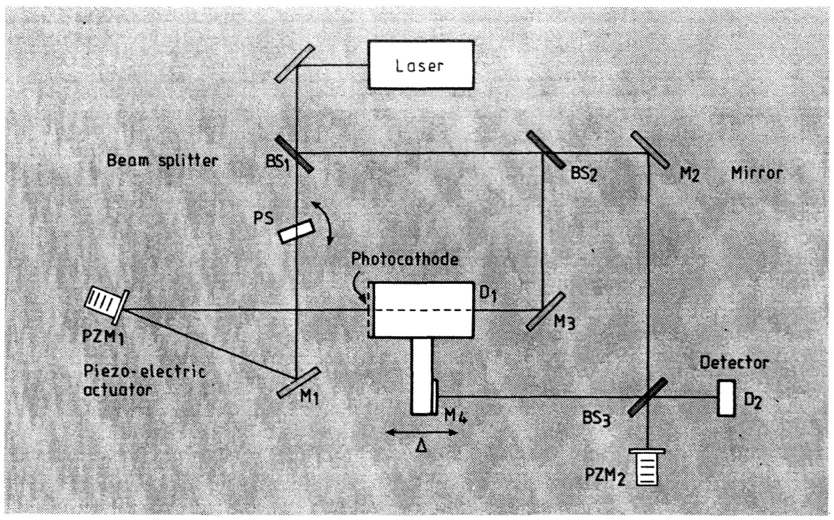


Fig.1. Beam from a HeNe laser is divided into two portions which then pass through D_1 in opposite directions. By this means a standing wave is set up in the region of D_1. Piezo actuators PZM_1 and PZM_2 are fed from a common AC source at a frequency of a few hundred hertz. A part of the beam impinging upon the beam splitter BS_2 passes through and feeds the conventional Michelson interferometer PZM_2, BS_3 M_4, and detector D_2. In operation D_1 and M_4, on a common mount, are moved to get a maximum signal from D_2. Then phase-shifter PS is rotated to get a maximum signal from D_1, and in the same phase as D_2. The assembly D_1M_4 is then moved a distance Δ such that the signals from D_1 and D_2 are again at a maximum, but now 180° out of phase with respect to each other. Note that the round trip path BS_3M_4 is independent of v, the velocity of our motion through space.

THE ETHER CHALLENGE

The progress and welfare of our modern society depends upon scientific advancement on a global scale. In this sense 'global' has not only a geographical meaning. There is a need for global thinking over the whole scientific spectrum. The developing world that was once colonized has become independent, but a new kind of empire domination has crept into our society. It pervades the world of science, a world that has become progressively larger but less responsive to change. It is that world which influences the governmental funding and academic research that is expected to create new technology.

There are techniques of savage conquest in this academic life amongst the ivory towers. These are very effective in discouraging independent scientific initiative, particularly in the countries that command high research funding.

"Suppress, ignore and ridicule" are the weapons that are used to block the insurgent scientist seeking a hearing for his own theories and even his experimental discoveries. The only existence allowed in scientific society is one which is subservient to accepted doctrines.

The imperialists dominating the field that matters to those interested in electronic communication serve under the flag of Einstein. For many, this service is mere lip service because Relativity does not affect what they are doing on a daily basis. Nevertheless, the hordes involved in the Einstein army follow that flag blindly, even though their quest has no apparent destiny. Whatever they accomplish is viewed in exactly the same way by all those observing their efforts. That is in accord with the principle of Relativity; all physical laws are seen to be the same in any frame of reference. There is no room for dissent or anomalous observation. Powerful missiles are hurled into space under the control of navigators that use charts drawn up in four-dimensional space-time. They serve for satellite communication and position location. Errors do occur that would not occur in three-dimensional space independent of time, but a blind eye allows these to pass without notice, because those who control these activities cannot challenge that Einstein 'flag'.

Ten years ago Dr Louis Essen, famous for his pioneer research on the caesium clock and the measurement of time and the speed of light, wrote an article in *Wireless World* that spoke of the suppression of the truths concerning Einstein's theory[7]. He was not following any other flag than the flag of truth. Scientists should know only that flag and conduct their research with an open mind. If serious argument of a dissident nature stands in the way, that is a basis for parley rather than a vanquishing attack.

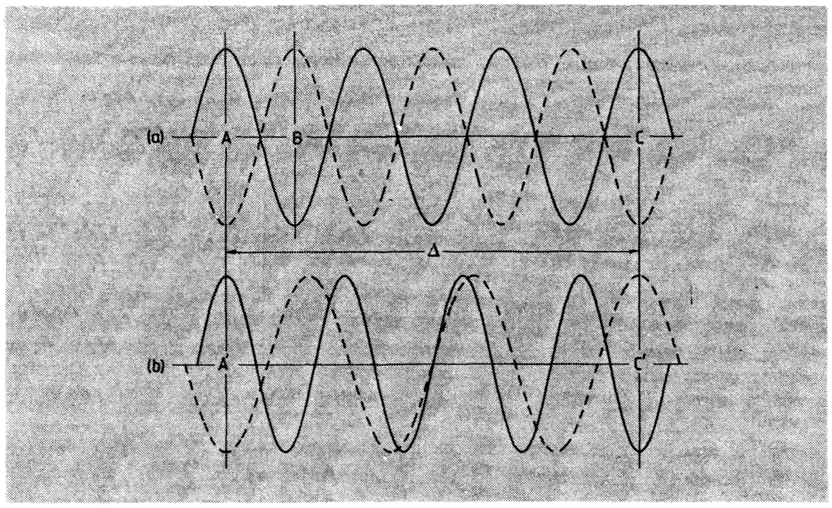


Fig.2. In (a) $\lambda_1=\lambda_2$. In (b) $\lambda_1\neq\lambda_2$. When the dotted curve is jittered in phase with respect to the solid curve, it is seen that there is a phase reversal between (a) and (b) in the vicinity of C and C′. (The intensities add.)

ment. A little analysis showed that such effects would exhibit a linear first-order dependence on v/c and that the detector would need to scan through a distance that was inversely proportional to v/c in order to cycle through a sequence of that standing wave pattern.

This was exactly what I found when the experiment was performed.

THE STANDING-WAVE SENSOR

The one-beam interferometer or standing wave sensor consists of a photomultiplier tube comprising two optically flat windows, with a semitransparent photocathode of 50nm thickness deposited on the inner surface of one window. The tube also contains a six-stage annular dynode assembly such that a collimated laser beam can pass through the tube.

In the application described in reference 1 the beam was reflected back on itself by a mirror to set up standing waves. The performance of the wave sensor was tested by incorporating a tiltable phase-shifter between the sensor and the mirror. This provided an adjustable displacement of the standing wave relative to the sensor.

The object of the test was to measure the effective thickness of the photosensitive surface, to estimate the precision available from the sensor for making measurements on standing waves.

Signal-to-noise ratio for the photocathode when positioned at an antinode compared with that at a node was measured as approximately 20 000 to 1. This was shown to correspond to detection of photoelectrons in the 50nm thickness of the photocathode, which assured us that position measurement within a standing wave could be made to within 1% of the laser wavelength.

Three such wave sensors were fabricated at Syracuse, New York, by the General Electric Company of the USA from standard parts of image orthicons. For this experiment, the sensor was connected as shown in the arrangement of **Fig.1**.

If we write the wavelength of light moving one way as λ_1 and the wavelength of light moving the opposite way as λ_2, then

$$(\lambda_1-\lambda_2)/\lambda=\lambda/\Delta$$

where λ is the nominal wavelength of the laser output and Δ is the displacement distance that was measured as corresponding to a phase reversal in the standing wave oscillations. In a typical measurement Δ as defined in the equation above was 0.025cm at its minimum; and since the nominal laser wavelength λ was 0.63μm, and the wavelengths depending upon the spatial orientation were $\lambda_1 = \lambda(1+v/c)$ and $\lambda_2=\lambda(1-v/c)$, it is clear that the maximum value of v is given by $2v/c = (0.000063)/(0.025) = 0.00252$.

Since c is 300 000km/s this gives v as 378km/s on the day when this particular test was performed. The axis of the photodetector making the linear scan through the standing wave was directed towards the constellation Leo when this maximum value of v was registered. Six hours before and after this event the displacement of the detector revealed no phase changes, meaning that the photodetector was then being displaced perpendicular to its motion relative to the ether.

The experiment has been repeated in a variety of configurations over the past several years. Values of Δ measured have all ranged within ±5% of the cited value. The micrometer is graduated in increments of 0.0025 millimetres. However, a micrometer drive is too coarse to set the interferometer on a fringe peak. This is accomplished by means of a third piezo actuator supplied from a DC source through a ten-turn potentiometer which provides conveniently the finesse for setting on a fringe peak.

Since the author first disclosed this discovery[2,3] there has been a great deal of effort by a number of individuals in different countries, including USA, West Germany, UK, Italy, France and Austria, all aimed at theorizing as to why the experiment works or why it should not work[4].

The Sagnac Effect

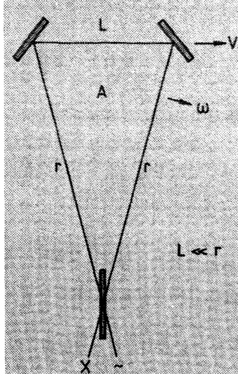
A monochromatic light beam impinges upon a beam splitter. The transmitted beam proceeds anticlockwise round the closed path and returns to the vicinity of the source. The reflected beam proceeds clockwise and rejoins the first beam to establish a fringe pattern. If the assembly rotates at an angular velocity ω the fringe pattern shifts an amount δ as shown in the equation. A is the area enclosed by the paths, v is the tangential velocity along the line element L, and ν is the frequency of the source. The fringe shift is independent of the shape of the area or of the centre of rotation. It is further seen that δ, the difference in the number of wavelengths in the two paths is independent of r, and hence the equation holds when L is in pure translation. δ may be written as

$$\delta=\frac{L}{\lambda_1}-\frac{L}{\lambda_1}=\frac{2L}{\lambda}\left(\frac{v}{c}\right)$$

When this is solved simultaneously with the equation for one leg of the Michelson-Morley experiment

$$\frac{L}{\lambda_1}-\frac{L}{\lambda_2}=\frac{2L}{\lambda}$$

we have the values for λ_1 and λ_2 as given in the text: λ_1 and λ_2 are, of course, the wavelengths in the reciprocal directions along the path L. The Sagnac effect is well known and proven: nearly all long haul airliners and modern submarines navigate with laser gyros based on G. Sagnac's discovery (1913).



$$\delta=\frac{4A\omega\nu}{c^2},\ \nu=\frac{c}{\lambda}$$

$$A=\frac{Lr}{2},\ \omega=\frac{v}{r}$$

$$\delta=\frac{2Lv}{c\lambda}=\frac{2L}{\lambda}\left(\frac{v}{c}\right)$$

The author, however, declines in this article to go into the mathematical argument that underlies the theory involved, simply because that itself becomes a topic of debate and it tends to detract from the basic experimental fact that appears in the measurement.

Further reading

1. E.W. Silvertooth and S.F. Jacobs, *Applied Optics*. vol.22, 1274, 1983.
2. E.W. Silvertooth, *Nature*, vol. 322, 590, 1986.
3. E.W. Silvertooth, *Speculations in Science and Technology*, vol. 10, 3, 1987.
4. B.A. Manning, *Physics Essays* vol. 1 No4, 1988.
5. E.W. Silvertooth, Letters, *Electronics & Wireless World*, June 1988 p.542.
6. L. Essen, *Electronics and Wireless World*, February 1988, p.126.
7. L. Essen, *Wireless World*, October 1978, p.44.