the general science journal

Experimental evidence for the transfer of information at a speed greater than the speed of light.

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1. Introduction

It is considered axiomatic that information cannot be transferred faster than the speed of light. It is also clear that modern physics, and astrophysics in particular, has encountered several vexing problems that have led to speculations about ‘dark matter’, ‘dark energy’, and ‘dark flow’. A companion paper suggests an explanation of those phenomena and others, which is based on the hypothesis that gravitational influence is transferred at a speed that is many orders of magnitude greater than that of light, but not infinite, nor in accordance with General Relativity. Theoretical ‘gravity waves’ have been regularly described by assuming that there is a ‘magneto-gravitational’ component which, in conjunction with the ‘electro-gravitational’ component, results in gravity wave propagation that is analogous to electromagnetic waves, and travels at the speed of light. The present paper uses the gravity-EM (electro-magnetic) analogy in reverse to argue that the axial component of gravitational influence (along the line of motion) is analogous to the Coulomb force in an electrodynamic case. This analogy is useful because of the great difficulty in making measurements of forces between masses in the laboratory and the relative ease of doing so with electrical charges. The experiment involves measurement of the delay time for Coulomb force effects and contrasts this delay with the delay time for EM propagation.

2. Experimental considerations

The radiation pattern of a quarter-wave monopole antenna is simple and well-understood. The radiation pattern is a maximum in the radial direction, perpendicular to the antenna. The radiation pattern is zero in the axial direction, parallel to the antenna. However, charges surging back and forth in the transmitting antenna must surely affect free charges in a receiving antenna placed close to and on the axis of the transmitting antenna. The experiment involves comparing the phase differences between the transmitted and received signals as the spatial relation between the two antennas is changed. The phase shift as a function of antennas separation gives a direct method of estimating the speed of the transfer of information about charge location. The experiment was first conducted in a school classroom, but was repeated out-of-doors to minimize local reflection and interference effects. The results were substantially the same.

3. Experimental equipment

The equipment used in the experiment consisted of a 75 MHz transmitter with its one-meter antenna, a one-meter receiving antenna (¼ wavelength), a dual trace oscilloscope, 10 meters of RG-58 coaxial cable, and a digital camera to record oscilloscope data. The transmitter was low power of the type used for radio control of model airplanes. The dual trace oscilloscope was a Tektronix 454. It is old, but it has a sweep capability of 5ns cm^{-1}. The output of the transmitter was connected to channel-1 of the oscilloscope via 30 feet of RG-58 coaxial cable. The one-meter receiving antenna was connected directly to channel-2 of the oscilloscope. Stray 60 Hz pickup was eliminated by small inductances connected directly from each antenna to local ground. The inductances were made up of 11 insulated turns around a ¼ inch plastic core. The transmitter signal on channel-1 was used as the sweep trigger for both channels.

4. Experimental procedure

Both antennas rested on insulating cardboard on grassy ground, pointed directly toward the oscilloscope. The transmitter was connected to its antenna at the end that was opposite the oscilloscope. The oscilloscope was also on the ground. To minimize stray effects, the receiving antenna was plugged directly into the channel-2 BNC connector, and the 30 foot cable from the transmitter was routed such that the portions close to the antennas were perpendicular to the respective antenna. The cable thus made a deep “U” shape. Each sequence of the experiment began with the two antennas side by side, close but not touching. In the “axial” sequence, the transmitter and its antenna were translated in the direction of the antenna such that the EM wave reception would be approximately zero. In the “radial” sequence, the transmitter and its antenna were translated sideways such that the EM wave reception would be a maximum. In both sequences, phase relations were noted visually on the scope to ensure that no unexpected shift in phase was missed. Pictures of the waveforms were taken when the antennas separation was at 0.5m intervals (1/8 wavelength).

5. Experimental analysis

The time scale of each photograph was calibrated independently, using the fact that the wave period was 13.3 ns. Note that the transmitter signal reached the oscilloscope via 10 meters of coax cable. Since the goal is to determine the rate at which the delay changes as a function of antennas separation, the precise absolute delay is immaterial and unknown. In the case of zero antennas separation, the delay of the received signal was measured from a peak of the transmitter signal to the following peak of the receiver signal. For increasing separations, the appropriate peaks were used. The differential time delays for the two cases are presented in figure 1.

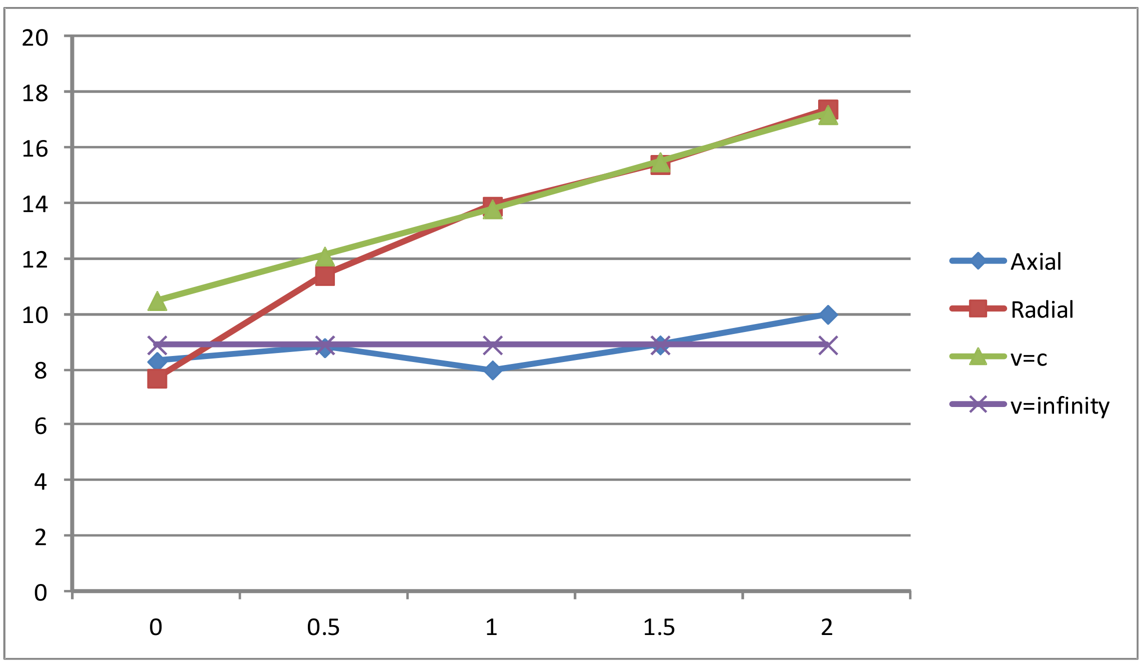
Sequence	0.0m	0.5m	1.0m	1.5m	2.0m
Axial	**8.3**	**8.8**	**8.0**	**8.9**	**10.0**
Radial	**7.7**	**11.4**	**13.9**	**15.4**	**17.4**

Figure 1. Time delay in nanoseconds as a function of antennas separation in meters

6. Experimental results

The data are plotted in figure 2. Two lines have been added depicting theoretical results if the velocity were c (radial case) and if the velocity were infinite (axial case). In the radial case, the deviation from the theoretical line is attributed to the fact that, at separations less than a quarter wavelength, 1 meter, the receiving antenna will be affected by direct Coulomb forces, and will have a significant feedback effect on the transmitting antenna. This effect is called the 'near field' effect. At distances greater than 2 meters, the axial signal became too small to distinguish from noise levels.

Vertical axis is Time delay in nanoseconds



Antennas separation in meters

Figure 2. Differential delay as a function of transmitter-receiver separation

7. Experimental errors

While the coax cable does not provide perfect shielding, tests of varying configurations indicate that they did not appreciably affect the principle goal of the experiment. It may have helped that they were resting in moist grass which could act as a ground plane. The cables were arranged in such a way that the portion in close proximity to the antennas were perpendicular to the antennas, thus minimizing the effect of EM wave pickup. It will be noted that the radial and axial delays at zero separation should have been identical, but differ by .6ns. This is an indication of the degree of repeatability of the experimental results. The precision is not optimal, but does not impair the overall conclusion.

8. Conclusion

It appears clear that charges which oscillate in a transmitting antenna communicate their motion to an axially arranged receiving antenna at a rate that is far in excess of the speed of light. If that speed is less than infinite, then the laws of the conservation of energy and of momentum stand in jeopardy. Such effects would be small and difficult to detect, but nonetheless finite. More to the point, if Coulomb force effects are transmitted at a speed which is orders of magnitude greater than c, but still finite, then gravitational forces may do likewise. The implications of this hypothesis are treated in the companion paper, “Possible link between Dark Matter, Dark Energy, Dark Flow and other astronomical anomalies.”

9. Historical note

Given that the experiment described is easy to perform, why has the result not been previously observed? It may be concluded that 50 years ago the experiment would not have been easy to perform, and that, since that time, investigators have felt confident that all of the fundamental questions had been exhaustively examined.