Chapter 5

Past and Proposed Experiments Detecting Absolute Motion

In this Chapter I gave different interpretations for the results of some famous past experiments. My interpretations are based on the following unique properties of the E-Matrix:

1. The E-Matrix transmits light isotropically in all directions and in all local frames of reference.
2. The light-path length of a moving meter stick is observer dependent. The light-path length of the observer's meter stick is assumed to be its material length.

It is defined that motions of objects in the E-Matrix are called absolute motions. Also, motion of an object with respect to the light rays traveling in the E-Matrix is also called absolute motion. It is posited that absolute motions of objects with respect to the light rays in the E-Matrix should be detectable. However, numerous past attempts to detect absolute motion were failures. The most notable of these is the Michelson-Morley Experiment (MMX): A light beam was split into two parts that were directed along the two arms of the instrument at right angles to each other, the two beams being reflected back to recombine and form interference fringes. Any shift in the interference fringes as the apparatus is rotated would mean the detection of absolute motion of the apparatus. To everyone's chagrin, the MMX produced a null result. Does this mean that there is no ether occupying space? The answer is 'No'. Why? The MMX assumed an ether that transmits light anisotropically in the direction of motion of the observer in the ether. Had Michelson knew that modern experimental results show that the speed of light is isotropic in all frames of reference he would know that the MMX is not capable of detecting the ether. What this means is that if there is an ether it must have the unique properties set forth at the beginning of this Chapter. The unique structure of the E-Matrix will transmit light isotropically in all horizontal directions and this is the cause of the null result of the MMX. However, in a gravitational field, the E-Strings surrounding the earth are curved and will cause the speed of light to be anisotropic in the vertical directions. That means that if the plane of the MMX arms are oriented vertically we could detect a frequency shift. The team of Pound and Rebka at Harvard performed such experiments and detected frequency shift in the vertical direction. This means that if the plane of the arms of the MMX is oriented vertically then non-null results will be obtained.

Past Experiments Detecting Absolute Motion

The Photoelectric Effect Experiment

The wave nature of light can be easily demonstrated with the diffraction phenomenon. However, the results of the photoelectric experiment are not easily explained if light is just plain old continuous waves. The experimental set up for the photoelectric experiment is simple. It consists of a light source of varying intensities and varying high frequencies is shin ing on a metal surface. The photoelectrons that are boiled off at the various intensities and frequencies are collected and their energy is measured. The results were as follows:

1. The energy of the photoelectron is dependent only on the frequency of the incident light.
2. The intensity of light has no effect on the energy of the photoelectron.
3. Increasing the intensity of light will increase the number of photoelectrons being boiled off the metal surface.

Current Interpretation of the Photoelectric Experiment

The results of the photoelectric experiment suggest that light comes in discrete units. This led Einstein to conclude that light exists in discrete units instead of continuous waves and he called the individual unit a photon of light. However, a photon is not a true particle because it does not have all the attributes of a particle. It is more accurate to describe a photon as a wave packet or a very short pulse of light. This description of light along with Max Planck's light quantum formed the foundation of quantum mechanics. What is the mechanism that causes light to come as wave packets? Current physics provides no explanation to this question.

New Interpretation of the Photoelectric Experiment

Model Mechanics agrees with the current explanation that all lights come as wave-packets. The reason light comes in this peculiar form instead of continuous waves has its origin from the fact that all light sources are moving absolutely in the E-Matrix. In a short specific increment of time, a light source will emit light continuously to a group of neighboring E-Strings. However after this incremental time, the light source will have moved to a new location due to its absolute motion. This cuts off the continuity of waves to these neighboring E-Strings and gives rise to a wave-packet of light. What this new interpretation says is: A photon is consisted of short blocks of light waves in neighboring E-Strings. These blocks of light waves travel coherently towards a common target and this has the effect of a particle hitting the target. With this new interpretation, we have a way to explain why light appears to have duality properties.

This Model Mechanics explanation of photon generation can be interpreted as the detection of absolute motion. In addition, it will give physical explanation why light come in the form of photon. Most importantly it will explain the probabilistic nature of the quantum mechanical equations such as the Schrodinger Equation. The following schematic diagram shows the generation of three consecutive photons due to the absolute motion of the source in the E-Matrix.

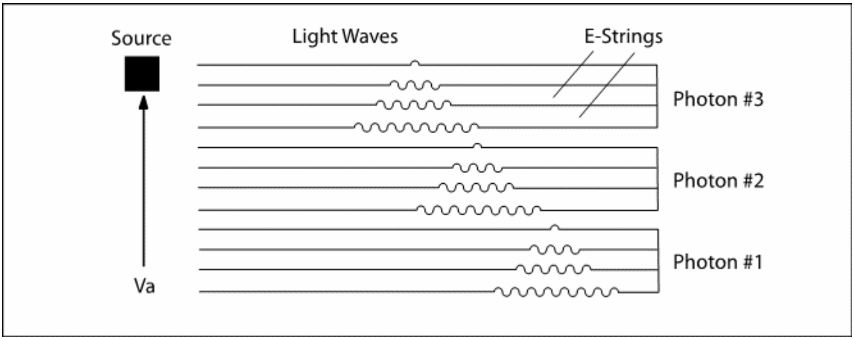

Fig. 5.1 describes the emission of three consecutive photons from an absolutely moving source in the E-Matrix. This explains why light appears to have duality properties.

The Compton Effect Experiment

The experimental set up for the Compton Effect Experiment is simple. It consists of an incident x-ray source that aims at a graphite target. The wavelength of the scattered x-rays are measured at the various deflection angles. The results of this experiment showed that the scattered x-rays have intensities peaked at two wavelengths. One peaked at the same wavelength as the incident x-ray and the other peaked at a longer wavelength (red shifted) than the incident x-ray. The difference between the two wavelengths is called the Compton shift. The Compton shift increases as the scattering angle is increased.

Current Interpretation of the Compton Experiment

The peak that has the same wavelength as the incident x-ray is the result of photons colliding with the combined electrons of the carbon atom. Each of these combined electron has an effective mass of 22,000 electron mass. Therefore, a photon colliding with it will retain almost all of its energy after the collision and thus the wavelength shift would be immeasurably small. The other peak is the result of photons losing some of their energy by colliding with the free electrons. These photons would have lost some energy and they would appear as being red-shifted.

New Interpretation of the Compton Experiment

The red-shifted peak is the reflection of the incident x-ray by the carbon nuclei that are in a state of receding absolute motion with respect to the incident beam. This process is the same as bouncing a radio beam off a receding object. The return beam will be red-shifted. The other peak is the result of absorption and re-emission of the incident photons. There is no energy lost by these re-emitted photons and therefore no change in wavelength was observed.

The Double-Slit Experiment

The double-slit experiment is the most puzzling of all the quantum experiments. It has been said that if one understands the results of the double-slit experiment, one knows quantum mechanics. This experiment confirms the wave nature of light. The apparatus set-up is simple. It consists of a light beam directed at a double-slit opening. In the case of the electronic version of this experiment, the double-slit is in the form of an atomic crystal grating. The images of the fringes are recorded on a screen at a specific distance from the partition. When this experiment was performed with light, the results were characteristic light and dark fringes on the screen. These results were obtained even if only one photon (a wave-packet) is sent through the apparatus at a time. When the electronic equivalent of this experiment was performed, the same results of characteristic light and dark fringes were obtained.

Current Interpretation of the Double-Slit Experiment

The current accepted interpretation of the results of the double-slit experiment is known as the Copenhagen Interpretation. The Copenhagen Interpretation is undoubtedly the most abstractive of all quantum mechanical processes. The results for a light beam are easy to understand. It is simply that light waves go through both slits and spread out--much like water waves spread out after they go through a narrow opening. A light fringe would be the result of those spread-out waves that were in phase and therefore they reinforced each other and showed up as a light fringe on the screen. A dark fringe would be the result of these spread-out waves that were out of phase with each other. Therefore, they interfered and canceled each other out and showed up as a dark fringe on the screen. The results for an electron beam are a little harder to understand. However, they are the same as that for the light beam except that the electrons must somehow become electron-waves when they go through the slits. These electron-waves reinforced or interfered with each other much like the light waves. However, after the interference processes, these electronic waves must reconstitute themselves back into the particle electrons before hitting the screen. This process is known as the collapse of the wave function.

The processes of fringe formation by a single photon or electron at a time are much more complex and abstractive. The current interpretation is as follows: A photon or electron becomes a wave-function of probability waves and goes through both slits. These probability waves interfere with each other--much like the water waves. These probability waves are mathematical constructs and therefore they have no physical meaning. After the interference processes, these probability waves re-collapsed into a photon or electron and register at a specific location on the screen. The characteristic light and dark fringes on the screen will become apparent after a large number of photons or electrons are allowed to pass through the double slits.

New Interpretation of the Double-Slit Experiment

The fringe patterns formed by a double-slit are not interference fringes. They are formed by the absolute motion of the partition and the screen with respect to the light carrying E-Strings. **Fig. 5.2** shows a schematic diagram of the light profiles generated when the partition and the screen are in a state of absolute motion. It is noteworthy that if the double-slit experiment was performed in the absolute rest frame of the E-Matrix, the fringe pattern on the screen would simply consist of two bright fringes of the slits. According to Model Mechanics the processes of dark or light fringe formation by a double-slit are as follows:

The absolute motion of the partition and thus the center strip between the two slit openings is continuously exposing new light-wave carrying E-Strings to the two slit openings. The light waves in these new E-Strings will start to travel toward the screen to form a light fringe. However, before these new E-Strings from the center strip of the partition are exposed to the slit openings the light waves they were carrying will have already been absorbed by the source side of the center strip and thus they show up on the screen as a dark fringe. The screen is in the same state of absolute motion with respect to the E-Strings. This motion of the screen will spread out these light and dark fringes to form the observed characteristic pattern on the screen.

The above description of fringe formation is valid for all intensities of light or electron. In other words, even if one photon or electron is used for each experiment, the light and dark fringes will emerge after the same experiment is repeated a large number of times. This interpretation of the double-slit experiment eliminates the abstractive and counterintuitive processes of the Copenhagen Interpretation. Also this interpretation will give physicists a simpler way of doing physics.

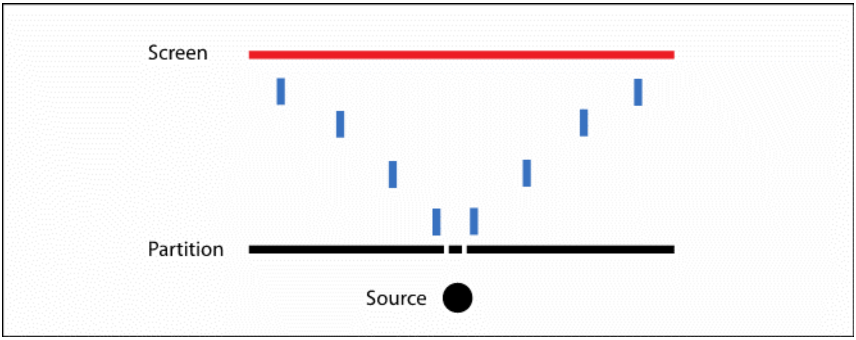

Fig. 5.2. The light profile formed by a double-slit due to the absolute motion of the partition and the screen with respect to the light wave carrying E-Strings.

Absolute Motions of the experimental apparatuses provide the physical explanations for the results of the Photoelectric Experiment, the Compton Shift Experiment and the Double-Slit Experiment. Therefore it is justified to conclude that these past famous experiments have detected Absolute Motion and thus the existence of the E-Matrix.

Propose New Experiments to Detect Absolute Motion

How does light get from point A to point B? The current assumption is that, locally, light travels in a straight line towards the target, and that, in a train of light pulses, the first pulse hits the target is the first one the source generated. These assumptions both make sense if the target is stationary relative to the light pulses, but if the target moves the second assumption could be erroneous.

Fig 5.3 describes a thought experiment that is currently used by physicists to derive the time dilation equation. A light clock is constructed of two mirrors parallel to each other with light pulses bouncing between them. In one period of the clock, a light pulse travels up to the top mirror and returns back to the bottom mirror. The diagram **(Fig. 6.3)** shows that the light pulse is presumed to travel a diagonal path when the light clock is in motion. This description of the actual processes raises the question: How does light know when to follow a vertical path and when to follow one of the infinite numbers of diagonal paths? It is more realistic to say that light will always follow the perpendicular path on its way to the upper mirror. The reason is that the vertical path is the direction where all the light pulses are directed.

Fig. 5.4 shows this: the first pulse of a train of pulses follows the original path AB, but the pulse detected at "E" travels the path CE. Current physics says that AE is the path that the first light pulse follows to the top mirror and the angle for this path is depended on the length AC that, in turn, is depended on the motion of the light clock. The new interpretation for light propagation is that every light pulse generated will follow a perpendicular path on its way to the target point E at the top mirror. The first light pulse will follow the path AB and it will miss the target point E at the top mirror because the light clock is in a state of absolute motion. The subsequent light pulses generated by the source between points A and C will also miss the target point E at the top mirror.

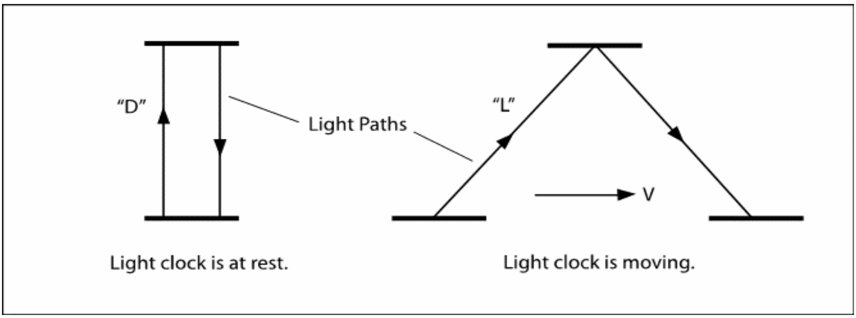

Fig. 5.3: Current interpretation for light path in a light clock

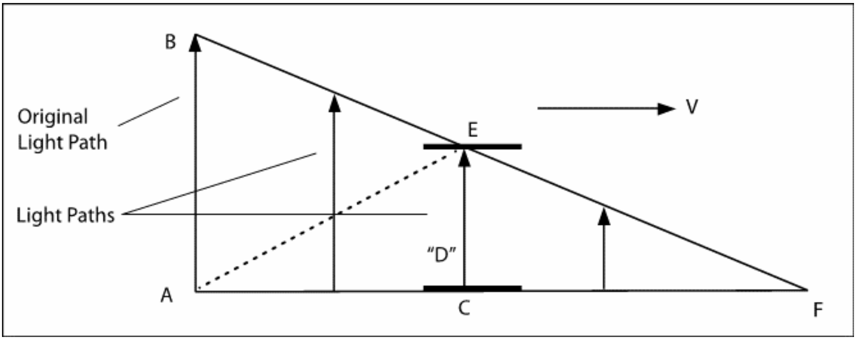

Fig. 5.4: New interpretation for light paths in a moving light clock

With this description of the light paths, the first batch of pulses is never detected at "E." The light pulse detected at "E" is generated by the source at a later time. It turns out that this description of light paths is also capable of giving us the time dilation equation by using the Pythagorean Theorem. The reason is that the original light path (AB) is equal to the assumed light path (AE) and both are the radii of a light sphere at the point of origin "A". It is noteworthy that as the speed of the mirrors approaches light speed only the light pulses generated at a later time by the source will be able to reach the point "E" at the top mirror. When the light clock is moving at the speed of light, no light pulse is able to reach the target point "E" at the top mirror at all. Current physics interprets this situation as time standing still at the speed of light. The new interpretation is that time keeps on ticking at all speeds of the light clock. The amount of time (duration) needed for a later pulse to reach the point "E" at the top mirror is dependent on the length of the original light path AB divided by the speed of light 'c'. This new interpretation suggests that absolute time for a moving frame is not slowed or dilated as currently assumed. The specific amount of absolute time (duration) required for light to travel the original light path AB is equal in all frames. A light clock runs slow when it is in motion because it is not catching the first light pulses, but rather some later ones. This means that a moving clock will accumulate elapsed clock second at a lower rate than a stationary clock, because a moving clock second contains a higher amount of absolute time. The above new interpretations for the light-paths in a light-clock is supported by the 'Inverse Square Law' of physics. The increase in the size of the diameter of a light-circle from a laser source is dependent on the distance of separation between the source and the detector. The pulses (the photons) detected at the center of the light-circle were generated at a later time than those pulses (photons) detected at the outer rim of the light-circle. That's why a moving light-clock will accumulate clock seconds at a slower rate.

Proposed New Experiments to Detect Absolute Motion

The above new concept for the propagation of light in a light-clock suggests that if the top mirror is a light sensitive detector such as photographic paper, the light pulses generated between points A and C (**Fig.5.6**) will trace out a line on the photographic paper. It is this interpretation that gives us a new way to detect the existence of absolute motion. This proposed method of detecting Absolute Motion is supported by the Inverse Square Law for the transmission of a light front from a laser source. The Inverse Square Law says that the diameter of a laser source will increase proportionately with the increasing distance from the source. It is premised that this increase in diameter of the laser is due to the state of Absolute Motion of the light-clock. The following is the schematic diagram **(Fig.5.5)** for this proposed experiment:

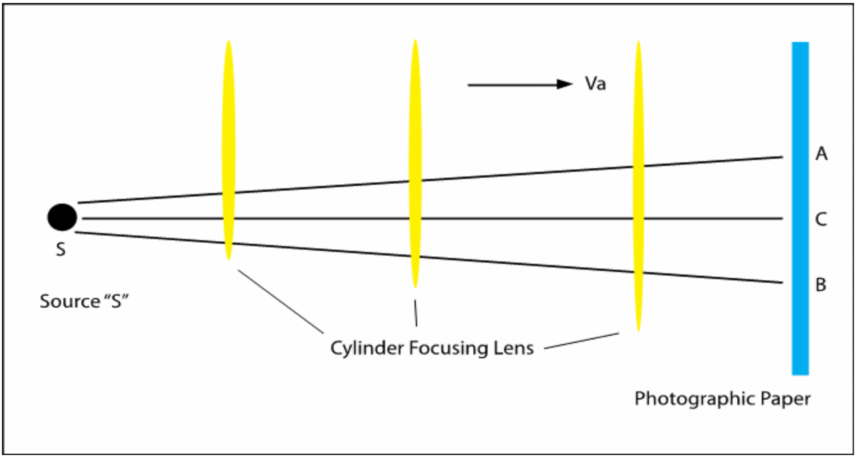

Fig. 5.5. Schematic diagram for the Proposed Experiment to detect Absolute Motion.

Blue line = Photographic Paper

SC = Distance of separation between the laser and the photographic paper.

AB = The distance the laser traced out on the photographic paper due to the absolute motion of the photographic paper during the transit of the laser light from S to A, C and B .

SA = SB = The distance the leading edge of the laser must travel so that the light front at all points arrive at the photograph paper simultaneously. Path SA is longer than SC means that the leading edge of the light front must travel a longer distance than SC to reach the photographic paper. The longer path length of SA is caused by the state of absolute motion of the paper with respect to the leading edge of the light front.

AC = BC = The distance traced out on the photograph paper due to the Absolute Motion of the paper with respect to the leading edge of the light front.

V_a = Absolute motion of the photographic paper and the laser source ‘S’.

Experimental Equipment

1. Blue laser sources.
2. Cylinder focusing lens.
3. Fixtures to support the laser, the cylinder focusing lens and the photographic paper holder.
4. Photographic paper holding table and fixture.
5. Measuring tape.
6. Black and white Photographic Papers.
7. Photographic developing chemical solutions.

Experimental Procedure

1. The experiments are to be performed outside at nighttime.
2. Distances of 50 m, 100m, 150m and 200m are marked out using the measuring tape and the laser beam is use as a guide to ensure that the distance measurements follow a straight line.
3. The distance between the source and the photographic paper holder is moved to 50m apart.
4. Place the cylinder focusing lens at 10 meters intervals between the laser source and the photographic paper holder.
5. Insert the photographic paper with cover board into the photographic paper holder. Remove the cover board to expose the photographic paper to the incoming laser light.
6. Switch on the laser light.
7. Insert the cover board after the photographic paper is exposed to the laser light for 2 seconds and remove the composite from the holder for development. The length of the line shown on the photographic paper is AB and ½ of AB is AC and it is identified as L_o in the following calculations.
8. Repeat steps 4 to 7 three times.

9. Repeat steps 4 to 8 with the distance of separation between the source and the paper holder 100m apart.
10. Repeat steps 4 to 8 with the distance of separation between the source and the paper holder 150m apart.
11. Repeat steps 4 to 8 with the distance of separation between the source and the paper holder 200m apart.
12. Repeat steps 1-11 at different time of the year.
13. Repeat steps 1-12 at different locations.
14. Repeat steps 1-13 with the cylinder focusing lens oriented horizontally. It is expected that the vertical line on the photograph paper will be longer than the horizontal line due to the gravity effect.

The predictions for SC = 100 meters between the source and the photographic paper holder are calculated as follows:
The distance traced out by the laser on the photographic paper due to the absolute motion of the photographic paper = AC = L_{100}. The time interval required for light from S to traverse the distance SA is: $T_{100} = \frac{\sqrt{L_{100}^2 + 100^2}}{c}$. The time interval ($T_{100}$) is also the time interval required by the laser to trace out the distance L_{100} on the photographic paper. This time interval (T_{100}) is also the time interval required by the laser to trace out the length AC on the photographic paper. Therefore the absolute motion of the photographic paper = $V_a = V_{100} = \frac{L_{100}c}{\sqrt{L_{100}^2 + 100^2}}$

The following **Table 5.1** shows some assumed values of L_{100} along with the corresponding values of V_{100}. The assumed values of L_{100} and the corresponding values of V_{100} can be plotted in a graph. Therefore any assumed value of V_{100} will give a predicted value for L_{100} from the graph.

Assumed values of L_{100}	**The values of** T_{100} **in seconds correspond to the assumed values of** L_{100}	**The values of** V_{100} **(m/ second) correspond to the assumed values of** L_{100}
0.2 m	3.3356476×10^{-9}	599,583.92 m/sec
0.1 m	3.3356443×10^{-9}	299,792.16 m/sec
0.05 m	3.3356414×10^{-9}	149,896.21 m/sec
0.02 m	3.3356410×10^{-9}	59,958.49 m/sec
0.01 m	3.3356410×10^{-9}	29,979.25 m/sec
0.005 m	3.3356410×10^{-9}	14,989.62 m/sec

Table 5.1. Values of L_{100} , T_{100} and V_{100}

Conclusions

The unique structure of the E-Matrix enables it to transmit light isotropically in all directions. This is the cause of the null result of the MMX. The Photo-Electric experiment shows that photons are generated due to the Absolute Motion of the source in the E-Matrix. In the Compton Shift Experiment, the Absolute Motion of the graphite target with respect to the incident x-ray light front caused the shift. In the Double-Slit Experiment, the Absolute Motion of the partition and the screen in the E-Matrix gives rise to the observed dark and light fringes on the screen. These past experiments are direct proofs of Absolute Motion. A new experiment to detect Absolute Motion is proposed. This experiment is based on the assumption that the Inverse Square Law is the result of Absolute Motions between the light front and the detector.