Proposed and Past Experiments Detecting Absolute Motion

Ken H. Seto
e-mail: kenseto@woh.rr.com

A new physical model of our universe called Model Mechanics has been formulated. Model Mechanics posits that a stationary, structured and elastic substance called the E-Matrix occupies all of space and thus we perceive that the E-Matrix as space. The unique physical structure of the E-Matrix enabled me to propose new doable experiments to detect the absolute motion of an object in the E-Matrix. Also, the unique physical structure of the E-Matrix gives physical explanations to the weir results of the Photoelectric Experiment and the Double-Slit Experiment.

1. Introduction

A new model of our Universe, called Model Mechanics has been formulated. Model Mechanics supposes that a stationary substance, called the 'E-Matrix', occupies all of pure-space (void) in our Universe. Subsequently, we perceive the E-Matrix as space. The E-Matrix, in turn, is composed of 'E-Strings', which are very thin three-dimensional elastic objects, of diameter estimated at 10^{-33} cm. The length of an E-String is not defined. Away from matter, the E-Strings are oriented randomly in all directions. This means that a slice of the E-Matrix in any direction will look the same. Near matter, the E-Strings are more organized: some emanate from the matter, and the number of these passing through a unit area followed the well-known inverse square law of physics. The E-Strings repel each other. This means that there is an unknown outside force that compacts them together. The repulsive force and the compacting force are in equilibrium. This state of the E-Matrix allows massive matter particles to move freely within it. The motion of a matter particle or particle system in the E-Matrix is called 'absolute motion'. The absolute motion of matter in the E-Matrix will distort the local E-Strings. The E-Strings will recover to the non-distorted state after the passage of the matter particles.

Light consists of wave-packets (photons) in neighboring E-Strings. On its way toward its target, a wave-packet will follow the geometry of these neighboring E-Strings. This description of light embodies 'duality', i.e. light possessing properties of a mass-bearing particle as well as a wave-packet in the E-Matrix.

With this description of the E-Matrix (space), the next relevant question is: What is matter? All stable and visible matter is made from three basic particles: the electrons, the up quarks, and the down quarks. The protons and neutrons in the nuclei of all the atoms are made from the up quarks and the down quarks. The electrons orbit around the nuclei to complete the picture of all the atoms. The three basic particles are, in turn, made from one truly fundamental mass-bearing particle, called the 'S-Particle'. An S-Particle is a three-dimensional spherical object. It is repulsive to the E-Strings surrounding it and therefore its motion in the E-Matrix is maintained. An S-Particle orbiting around an E-String in the helical counterclockwise direction is an electron. This motion of the S-Particle is the fastest in the E-Matrix, and it gives rise to one unit of negative electric charge. A down quark is also an S-Particle orbiting around an E-String in the helical counterclockwise direction. The speed of its orbiting motion is only 1/3 that of the electron, giving the down quark a negative 1/3 electric charge. An up quark is an S-Particle orbiting around an E-String in the helical clockwise direction at 2/3 the speed of the electron, resulting a 2/3 positive electric charge.

There is one more stable basic particle: the electron neutrino. An electron neutrino has no detectable electric charge, and therefore it does not interact with the other three charged basic particles. It is composed of an S-Particle orbiting around an E-String in the counterclockwise direction like the electron. However, it is moving in a corkscrew like motion away from the charged basic particles. This means that the distortion in the E-Matrix created by the absolute motion of the S-Particle of the electron neutrino will have already dissipated by the time the charged basic particles are ready to interact with it. This is the reason why the electron neutrino does not interact electromagnetically with the charged basic particles.

This simple description of all stable visible matter can answer the thorny question: What is the mass of a Basic Particle? The answer is: mass is the evidence of the orbiting diameter of its S-Particle. Those S-Particles that are not in a state of orbiting motion do not possess any electric charge and therefore they will not interact with the charged Basic Particles electrically. They will, however, interact with them gravitationally. They are the dark matters predicted by the astronomers.

The next relevant question is: what are the processes that give rise to all the forces between matter particles? The proposed answers to this question are as follows:

1. All the processes of Nature are the result of Basic Particles or Basic Particle systems reacting to the geometries of the E-Strings (i.e. distortions or waves) to which they are confined because of their orbiting motions around these E-Strings.
2. Absolute motions of two objects in the same direction in the E-Matrix will cause the objects to converge to each other--an attractive force. Absolute motions of two objects in the opposite directions in the E-Matrix will cause the objects to diverge from each other--a repulsive force.

This completes the Model Mechanical description of our current universe. All the particles, all the forces and all the processes of nature can be derived from this one description.

Model Mechanics replaces the math constructs of space-time and field/virtual particle with the E-Matrix and the distortions or waves in the E-Matrix. This enables us to use the math of Quantum Field Theory (QFT) in combination with the interpretations of Model Mechanics to explain all the processes of nature.

Model Mechanics gives rise to the following postulates:

1. The E-Matrix is a stationary, structured and elastic light-conducting medium. It occupies all of pure space (pure void). It is comprised of very thin and elastic E-Strings and these E-Strings are repulsive to each other. There is an unknown compacting force that compresses these E-Strings together to form the E-Matrix.
2. The S-Particle is the only truly fundamental particle exists in our universe. The different orbiting motions of the S-Particles around the E-String(s) give rise to all the visible and stable particles in our universe.
3. All the processes of nature are the results of absolute motions of S-Particles or S-Particle systems in the E-Matrix.
4. All the forces of nature are the results of the S-Particle or S-Particle systems reacting to the distortions or waves in the E-Strings to which they are confined. The distortions or waves in the E-Strings, in turn, are the results of the absolute motions of the interacting S-Particles or S-Particle systems in the E-Matrix.
5. All the stable and visible matters are the results of orbiting motions of the S-Particles around specific E-Strings.

These postulates eliminate all the infinity problems that plagued both GRT and QM. It has the same mechanism for all the forces of nature and thus it unites all the forces of nature. It gives an explanation why the force of gravity is capable of acting at a distance. It explains the provisions of the Uncertainty Principle. It explains the weird results of all quantum experiments. It eliminates the need for the undetectable force messengers in QM. It eliminates the need for the hypothetical and undetected Higgs particle. It explains the mass of a particle. It explains the charge of a particle. It leads to the discovery of the CRE force, which, in turn leads to a new theory of gravity called Doppler Theory of Gravity (DTG) [1]. DTG and the electromagnetic force and nuclear weak and strong forces are derived from the same physical model and thus they are unified naturally. In addition Model Mechanics gives rise to a new theory of relativity called Improved Relativity Theory (IRT) [1]. IRT includes SRT as a subset. However, unlike SRT, the equations of IRT are valid in all environments, including gravity. In short, Model Mechanics gives us a unique way to achieve the elusive goal of unifying all physics.

2. Proposed Experiments to Detect Absolute Motion

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 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) [2]. In this experiment 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. However, the MMX null result does not mean that there is no absolute motion of the apparatus. It merely means that the speed of light is isotropic in the horizontal plane. In order to detect anisotropy of the speed of light using the MMX, the plane of the light rays must be oriented vertically. This conclusion is derived from the observed gravitational red shift (gravitational potential) in the vertical direction. Also this interpretation is supported by the results of the Pound and Rebka experiments [3]. It should be noted that this new interpretation does not mean that the earth is moving vertically in the E-Matrix on all the locations where the MMX is performed. It merely means that if the plane of the light rays is oriented vertically then the apparatus will give non-null result with respect to these local light rays.

The new interpretation of the MMX null result gives rise to a new concept for the propagation of light as follows:

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 2.1** 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. 2.1)** shows that the light pulse is presumed to travel a slant 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 slant 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. 2.2 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 light 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. However all the subsequent light pulses generated after point C will be able to hit target point E at the top mirror.

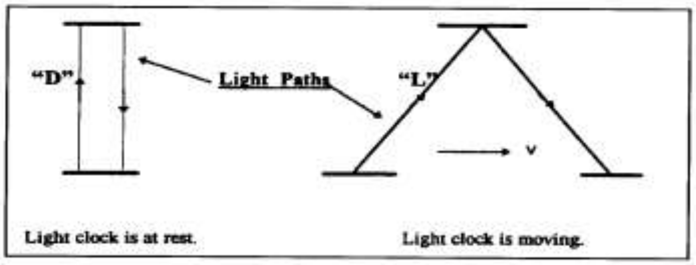

Fig. 2.1 Current interpretation for light path in a light clock

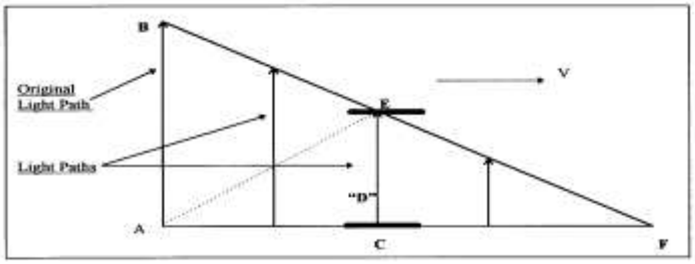

Fig. 2.2 New interpretation for light paths in a moving light clock

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 a light pulse will take a longer time to reach the upper mirror. When the mirrors are moving at the speed of light, no light pulse is able to reach the upper 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) passed depends 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 one. 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 concept for the propagation of light suggests that if the top mirror is large enough it will catch all the light pulses generated by the source along the line AC. If the top mirror is a light sensitive detector such as photographic paper the light pulses generated between points A and C (between S and S′ in the following diagram Fig. 2.3) 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. The following is the schematic diagram of the proposed experiment:

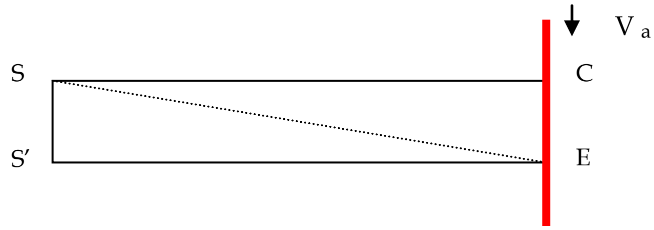

Fig. 2.3. Proposed Absolute Motion Detector

Red line = Photographic Paper

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

CE = L_o = 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 E.

SE = The distance the leading edge of the laser pulse from S must travel before the laser pulse from S′ is able to reach the point E on the photographic paper.

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

2.1. Experimental Equipment

1. Blue laser sources.
2. Cylinder focusing lens.
3. Fixtures to support the lasers, 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.

2.2. Experimental Procedure

1. The experiments are to be performed outside at night-time.
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 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 called L_o.
8. Insert a new photographic paper along with cover board into the holder then remove the cover board. 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 diameter of the laser pulse shown on the photographic paper is called D_o. The length of ($L_o - D_o$) is the length caused by the absolute motion of the photographic paper with respect to the laser beam.
9. Repeat steps 4 to 7 three times.
10. Repeat steps 4 to 8 with the distance of separation between the source and the paper holder 100m apart.

11. Repeat steps 4 to 8 with the distance of separation between the source and the paper holder 150m apart.
12. Repeat steps 4 to 8 with the distance of separation between the source and the paper holder 200m apart.
13. Reverse the directions of the laser and the photographic paper holder and repeat steps 4 to 11. This is designed to show the isotropy of the speed of light when the corresponding lengths of $L_o - D_o$.
14. Repeat steps 1-13 at different time of the year.
15. Repeat steps 1-14 at different locations.

The predictions for the above proposed experiments are summarized in the following table. The distance SC = S′C =100 meters between the source and the photographic paper holder is selected for the following calculations:

The distance traced out by the laser on the photographic paper due to the absolute motion of the photographic paper = CE = L_{100} = $L_o - D_o$. The time interval required for light from S′ to traverse the distance S′E = $T_{100} = \frac{\sqrt{L_{100}^2 + 100^2}}{c}$. 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. The time interval (T_{100}) is also the time interval required by the laser pulse from S′ to reach the point E on the photographic paper. Therefore the absolute motion of the photographic paper = V_a = $V_{100} = \frac{L_{100}c}{\sqrt{L_{100}^2 + 100^2}}$

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}	599583.92 m/sec
0.1 m	3.3356443×10^{-9}	299792.16 m/sec
0.05 m	3.3356414×10^{-9}	149896.21 m/sec
0.02 m	3.3356410×10^{-9}	59958.49 m/sec
0.01 m	3.3356410×10^{-9}	29979.25 m/sec
0.005 m	3.3356410×10^{-9}	14989.62 m/sec

Table 2.1. Values of L_{100}, T_{100} and V_{100}

The above table 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.

3. Past Experiments Detecting Absolute Motion

3.1. Re-Interpreting 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 shining 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.

3.2. 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.

3.3. Model Mechanics 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 appear to emit light that is continuous. 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 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.

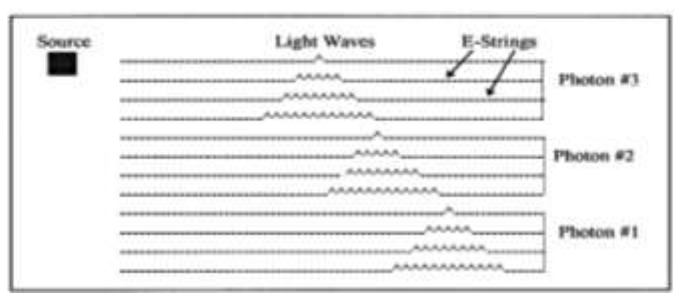

Fig. 3.1 Schematic diagram of photon emission from a source in a state of absolute motion in the E-Matrix.

Fig. 3.1 describes the emission of three consecutive photons from an absolutely moving source. These photons are wave-packets in different neighboring E-Strings. They travel coherently and transversely towards the target. This explains why light appears to have duality properties.

3.4. Re-Interpreting 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 light 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.

3.5. 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 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 these experiments are performed.

3.6. Model Mechanics 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. 3.2 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. 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.

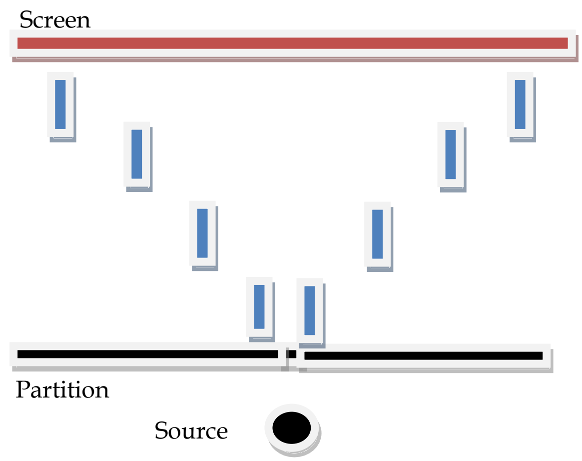

Fig. 3.2. The light profile formed by a double-slit due to the absolute motion of the partition and the screen with respect to the light wave carrying E-Strings.

Conclusions

Model Mechanics posits that absolute motions of S-Particles in an elastic, stationary and structured medium called the E-Matrix give rise to all the forces and particles of nature. Model Mechanics gives rise to a new theory of gravity called Doppler Theory of Gravity (DTG) and unite gravity with the other forces of nature. Also it gives rise to a new theory of relativity called Improved Relativity Theory (IRT). IRT includes SRT as a subset. However, unlike SRT, the equations of IRT are valid in all environments, including gravity.

New doable experiments designed to detect absolute motion are proposed. Also new interpretations of the photoelectric and the double-slit experiments show that the results of these past experiments can be explained by the existence of absolute motion.

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