

Mercury's Orbital Anomaly And Electromagnetic Waves

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Abstract – It was noted about 200 years ago that there was an unexplained anomaly in Mercury's orbit. Astronomers could not account for an about 43 arcsecond difference in its orbit. What is not noted today is what was not known 200 years ago or even a little more than 100 years ago when conclusions were accepted about what causes the anomaly. The term plasma, as applied to one of the states of matter, was defined in the 1920s. The term plasma was applied to the Sun in just the last century and how electromagnetic waves of various frequencies are influenced by plasma concentrations is ongoing research. Snell's law can be applied to any substance that allows and influences the propagation of electromagnetic waves. A century ago, there were astronomers and scientists that made conclusions based upon Mercury's orbit anomaly that knew nothing about how plasmas influence the propagation of electromagnetic waves. Einstein heads the list.

Introduction

“Where people went wrong was looking for objects. Einstein eventually revealed that they should have been looking at space itself.”[1] When optical astronomers look at space with nothing in it, it is considered to be empty space. Where optical astronomers see nothing, radio astronomers can detect a host of electromagnetic (EM) frequencies. In the unseen plasma surrounding the Earth, radio astronomers can detect the presence of *whistlers*, EM waves that propagate within the unseen plasma density ducts that surround the Earth.[2] Einstein may have been aware of *whistlers* after WWI, because that was when they were detected on the telephone lines used by soldiers in that war.

Einstein would not have been aware of the plasma ducts surrounding the Earth, which are created by the Earth's magnetic field, when he published his theories about relativity. In the early 1900s, little was known about the propagation characteristics of EM waves in and above the Earth's atmosphere because the arc transmitters in the very early 1900s interfered with each other. After the invention and utilization of the vacuum tube in 1908, transmitters could operate on a single frequency. It was then possible to identify that there were density changes in the upper atmosphere that allowed EM waves to reflect or skip off of an ionospheric transition zone and that produced long range radio waves, non-line-of-sight, propagation over the curvature of the Earth.

Until 1940, Einstein and all other scientists of that time would not have been aware that EM waves, other than light, were propagating from the Cosmos.[3] Although published in 1932, the Karl Jansky report was not addressed to astronomers. This was corrected by Grote Reber in 1940.[4-5]

Maxwell's Electromagnetic Waves

It is surprising how little we know about EM waves. Everyone thinks Maxwell's equations provide all the information we need to know about them, but Maxwell left something out and he stated so. In 1864, James Clerk Maxwell published his equations describing EM waves in a paper titled, “A Dynamical Theory of the Electromagnetic Field.” In the paper, Maxwell mentioned the possibility of particles acting at a distance. He stated, “The mechanical difficulties, however, which are involved in the assumption of particles acting at a distance with forces which depend on their velocities are such as to prevent me from considering this theory as an ultimate one, though it may have been, and may yet be useful in leading to the coordination of phenomena.” Maxwell had developed his equations using Quaternion mathematics, and computers were not available to facilitate their calculations. It is not

known how Maxwell's decision impacted the accuracy of his equations. In 1876, Maxwell prepared a paper titled, "On Action at a Distance," which appeared in Vol. VII the Proceedings of the Royal Institution of Great Britain.

After Hertz had published his results that proved EM waves could be produced artificially and they propagated just as light, he responded to a question as to what his discovery was good for. His response, "It's of no use whatsoever this is just an experiment that proves Maestro Maxwell was right—we just have these mysterious electromagnetic waves that we cannot see with the naked eye. But they are there."

It is equally mysterious that the "scientific authority structure" (SAS), a Thomas Kuhn term, has not presented a reason for the existence of EM waves. It is readily apparent they exist for the transfer of energy.

Electromagnetic Wave Refraction and Dispersion

Scientists have determined the characteristics of various medium in which EM waves traverse. In an absolute vacuum, EM waves will travel unmodified. If there are molecules or particles present the wave can be dispersed or bent, depending upon the density of the material in which it passes. The Index of Refraction is used to identify the characteristic of the materials that cause light waves to bend. For EM waves other than light, the terms permittivity and permeability are used. These two characteristics have been measured in a vacuum on the Earth's surface and at various altitudes above its surface. The SAS has concluded, without measurement, that space beyond the Earth's surface, closer to the Sun or far out in the solar system has precisely the same characteristics irrespective of the distance from the Sun or altitude above a planets surface. The Sun's characteristics are quite complex and most of this was unknown a century ago.[6]

In a material that allows light or EM waves to transit, EM waves will follow Snell's Law. On the Earth, our atmosphere is denser closer to the surface. It is not called an atmosphere on the Sun, but it is reasonable to expect that the density of the plasma will be higher closer to the Sun's surface. This can cause light reflected from Mercury to be seen before Mercury was actually in a line-of-sight (LOS) position to the Earth. Those that do not account for the bending of light would incorrectly identify the position of Mercury's position. Years ago, a NASA article noted that the telemetry signal from one of their satellites, that was passing behind the Sun, was detected before the satellite was actually in the LOS of the receiving antenna on the Earth.

Whether light waves or EM telemetry signals, the plasma above the Sun's surface provides the conditions that will demonstrate Snell's law.

Action At A Distance

The common voltage sniffer devices detect the presence of a 60 cycle AC electric field. For a wire plugged into a live AC wall outlet, current does not need to be flowing in the wire for the detector to respond to the presence of the electric field. An electrical conductor is an assemblage of electrons that are connected field-to-field in close proximity to each other. The generator that is producing the 60 cycle AC electric field can be hundreds of miles away and the field will have gone through a number of transformers, starting at a lower voltage to higher voltage, and when closer to the user, a high voltage to lower voltage,

Electrons move very slowly during conduction, called drift velocity, but their field-to-field coupling was established at the time the wire was manufactured. Originally, all electrons were coupled field-to-field when they came into existence. We do not have time duration measurement instruments that can accurately measure the field-to-field influence velocity. The basis for such measurement instruments was presented in an IEEE publication titled, "A Methodology to Define Physical Constants Using

Mathematical Constants.”[7] The *Methodology* identified an EM frequency that is based upon the product of two mathematical constants which has essentially unlimited precision.

Electromagnetic Wave Frequency

The frequency of any periodic phenomena is established by identifying the time duration the longest wave fits within. This time duration establishes a frequency of one cycle and as frequency increases it is a linear scale. We now have magnetotelluric devices that are producing EM waves with frequencies that have to be expressed as 0.1 Hz, 0.01 Hz, 0.001 Hz, 0.0001 Hz, etc. This reveals that the time duration selected for EM frequencies produced a nonlinear scale. Any physical law equation that contains a numeric value for frequency or the SOL or an algebraic symbol that represents frequency or the SOL are using a value that is based upon a nonlinear scale.

Dispersion Measure

Radio astronomers found it necessary to apply dispersion measure to specific viewing coordinates because they detected slight modifications to well known spectral frequencies.[8] Optical astronomers do not consider that the space between galaxies contain any particles. Over great distances, very small concentrations of particles will do precisely what radio astronomers experienced, they will alter the frequency of EM waves, giving the appearance of a Doppler shift caused by motion.

Conclusion

Not accounting for a changing material density near the surface of the Sun will result in an incorrect conclusion as to what is causing light waves to be bent. They are being bent by diffraction. Not accounting for miniscule material density in far space can result in improper conclusions

It is irresponsible to make the statement that the speed of EM waves are the same everywhere in space without knowing the permittivity, permeability or refractive index of the space in which they travel.

The SAS should have recognized the EM frequency nonlinear problem when magnetotelluric devices first produced EM waves with frequencies below 1 Hz.

It is necessary to identify what long deceased scientists did not know when they presented theories on how the universe works.

References

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