

ESSAY 8 Implications Of Finite Photon Mass

Recently the AIAS school of thought has measured the photon mass precisely using the latest and most accurate data from gravitational lensing. The main implication is that the pathology and self-contradiction of Amassless particle@ is eliminated from natural philosophy. The corpuscular or quantum theory of light is made self-consistent because the corpuscles or photons have mass. The mass of the photon is now known to be 2.32 ten power minus thirty eight kilograms, by far the most precise value of photon mass achieved to date. This is the mass of one photon of energy $h \bar{\omega}$ grazing the sun. The latest satellite data show that the photon is deflected by 1.75 plus or minus 0.0005 arc seconds. It has been shown that the original attempt to explain this by Einstein in 1916 or 1917 is incorrect, there are at least four mistakes in the attempt by Einstein, including one glaring error of trying to use the fixed mass M of the sun as a variable of calculus. The fact that this nonsense was accepted at all is probably due to pathology in science, defined by Irving Langmuir as carelessly repeated dogma without any scholarship. It is a pity that the great Albert Einstein made these mistakes because he himself suggested photon mass in about 1905 or 1906.

The major implication of finite photon mass for unified field theory is that it leaves Einstein Cartan Evans (ECE) theory as the only one that we have at present. Notably, the existence of photon mass means that the oft repeated use of $U(1)$ electromagnetic sector symmetry in unified field theory is incorrect. There is a domino effect because this sector symmetry is used in electroweak theory, and so the masses of the bosons in electroweak theory are incorrectly estimated. In fact the confident proclamation of boson masses in the old physics was based on adjustable parameters. I was once told by Lawrence Crowell that the old physics used as many as seventeen adjustable parameters and still failed to create a unified field theory. The use of string theory makes matters much worse by the introduction of other adjustable parameters, called Adimensions@ for the sake of optimism, funding and career only.

Finite photon mass means that all elementary particles have intrinsic mass. The latter is not magically Agiven@ to them by the mythical Higgs boson, the most expensive magic in history. The CERN search for the Agod particle@ is futile, and countries like Austria are right to try to pull out of CERN. The latter is the result of hyper-arrogance, pathology in science is the party line, doctrine or creed, the idols of Bacon=s cave and of Plato=s cave before him. All that has nothing to do with nature. Photon mass means that light behaves in an entirely different way from the standard model, notably there exists the $B(3)$ field, the fundamental and longitudinal magnetic flux density of the photon, known as the photomagneton. By now there exist several $B(3)$ type theories. In general there are four senses of polarization in a four dimensional spacetime, denoted (0), (1), (2) and (3). The old physics used magic to Aremove@ (0) and (3) because these did not fit its idea of zero photon mass. The consequent difficulties were brushed aside. The (0) state is timelike and describes the scalar potential, the (3) state is longitudinal. The other states (1) and (2) are transverse. The whole of $U(1)$ gauge theory and $U(1)$ sector symmetry depended on zero photon mass. Once the latter is properly considered, electromagnetism ceases to be a $U(1)$ gauge theory, and the whole of the theory behind CERN collapses like a pack of cards. The $B(3)$ theories of many authors mean that electromagnetism is general relativity, and part of a unified field theory based on geometry. ECE is the first of such theories, based on a type of geometry by Cartan that correctly includes the two fundamentals of torsion and curvature.

The inference of ECE theory is that electromagnetism is the torsion or twisting of spacetime. The torsion is based on a type of geometry that must be described by a

mathematical object known as the connection. The latter distinguishes the Cartan geometry from the flat spacetime of Minkowski. The spin connection gives a method of extracting electric power from the spacetime around us. More precisely, energy can be transferred to electric devices of all kinds from the energy of spacetime. The latter type of energy is defined by an object known as the hamiltonian, and that hamiltonian is defined directly by the geometry in the format of the metric. If one is not mathematically minded all that need be remembered is that spacetime contains energy, and all forms of energy are inter convertible. The ECE theory is defined as one that conserves the hamiltonian, the total energy and total linear and angular momentum. It is defined also as a theory that conserves charge current density. The spin connection in the Coulomb law for example affects all aspects of computational chemistry and molecular dynamics simulation, biochemistry, nanotechnology and nanomedicine. It is just a matter of using the computer to produce an array of entirely new results.

Photon mass means that there is no big bang, and indeed big bang has been discarded on the basis of experimental data from the Hubble space telescope and on the basis of many criticisms of it, many by the AIAS school of thought. The arguments against big bang were developed by Louis de Broglie and Jean-Pierre Vigi er over two or three decades of thought, and we find that de Broglie, Vigi er and their school of thought were perfectly right. Big bang was a prime example of Langmuir=s pathological science, other notable examples being epicycles, phlogiston, and indeterminacy, and the most notorious of all, the standard model of physics of the twentieth century. Pathology is easier than ever to blast out over the internet and media, but that does not make it science. Vigi er was my friend and co author, and was invited to work with Albert Einstein, for whom he had high regard. Vigi er was not allowed to enter the United States because he was a member of the French Communist Party, so he went to work with Louis de Broglie, the originator of wave particle dualism. Vigi er was a member of the Legion d=Honneur, France=s highest honour, and a prominent statesman as well as a prominent scientist, and devoted his entire scientific career to photon mass. He accepted B(3) as soon as he came across it, in late 1992 because B(3) is longitudinal and gets rid of the ludicrous dogma of the U(1) sector theory.

In 1934, Proca derived the correct wave and field equations for photon mass, the equation now named after him. I derived the Proca equation from ECE theory a few years ago, along with all the wave equations of physics. The Proca equation for spin one bosons is similar to the Dirac equation for spin half fermions, and similar to the 1928 Klein Gordon equation for zero spin particles. I found that the reason for this similarity of structure is that they are all derived from the most basic property of Cartan=s geometry, the property that a vector field is independent of the coordinate system in which it is expressed. This property is known technically as Athe tetrad postulate@, but it is hardly a postulate, it is very fundamental to mathematics and physics. I developed the tetrad postulate into a wave equation for spacetime itself, and found that all the other wave equations of physics are limits of what is now known as the ECE wave equation. The latter confirms that the photon must have mass, and reduces to the Proca equation. The latter is not gauge invariant, and the pathology of the so called standard model depended on gauge invariance. So photon mass means that there is no U(1) sector symmetry, and electroweak theory collapses, the theory behind CERN collapses. I have begun the task of replacing electroweak theory in earlier papers on ECE on the www.aias.us site.

Photon mass helps to eliminate the Heisenberg indeterminacy and helps to get rid of the pathology known as Aquantum electrodynamics@, again based on adjustable parameters, a theory of tremendous and purposeless complexity that claims quite wrongly to be a precise theory of physics. Jose Croca and his school in the University of Lisbon are followers of de

Broglie and Vigier, and have devised many experiments to get rid of indeterminacy from physics. I have derived the Schroedinger and Heisenberg equations from geometry without making use of indeterminacy at all, and it was Vigier who persuaded de Broglie to oppose the Copenhagen accord on quantum mechanics of 1927. At that Solvay conference Vigier told me rather grimly that de Broglie was Ashouted down@ by Heisenberg. Louis de Broglie proceeded to reject indeterminacy for nearly fifty years, and was still working into his nineties. Judging by the intense interest in ECE theory, there is essentially an unanimous rejection of the obsolete twentieth century pathology, and this is a very healthy thing for science and freedom of thought in general in an age of media saturation. He who controls the media controls minds, and of course, public funding.

Horst Eckardt of AIAS has pointed out that a photon with finite mass cannot vanish after being absorbed in an atom or molecule, and that the background may be made up of photons and neutrinos that have lost velocity. This completely changes our view of cosmology, the dogma of which has been shredded by the various AIAS papers and books now avidly read worldwide. That dogma relied on the existence of an electron plasma, but asserted that photons and neutrinos had no mass. It used a field equation due to Einstein in 1915 which is now known to be completely wrong. A new cosmology has been derived from ECE theory. Eckardt has suggested that the paths of massive photons are determined by diffusion equations, through the process of Brownian motion. Gareth Evans of AIAS has pointed out a massive flaw in the old physics in that the latter violated conservation of energy momentum in absorption processes. It was asserted in the old pathology that a photon sped up to c again after emerging from an absorbing material. This violates conservation of energy and momentum, and the photon with mass travels at $v < c$ as for any particle. When a photon interacts with an electron, the former, being so much lighter than the latter bounces off, but loses some of its velocity v . It cannot regain the speed c by magic after travelling at v in the medium, and in fact never travels at c . The latter in photon mass theory is a universal constant fixed by international treaty in standards laboratories, and is not the speed of light in a vacuum.

There are many other profound changes like this that we are witnessing now in a quiet revolution in natural philosophy, the study of nature. Pathology is Bacon=s idol of the cave, pathology is the very thing warned against by Bacon in late Tudor times and the early seventeenth century.