

Essay 14: ATTEMPTS AT FINDING THE PHOTON MASS

These attempts began earlier this year (2010) with UFT 150 and UFT 155 using the idea of light deflection by gravitation and the time delay caused by gravitation. It is now known and widely accepted that the old Einsteinian theory of general relativity is fundamentally incorrect, and in UFT 150 it was found that there were several other problems in the Einstein method. These have been mentioned in some of the previous essays and talks. The central self contradiction in the basic concepts of Einstein is as follows. On the one hand the light is considered to be made up of particles called photons. The deflection and time delay is caused by the gravitational attraction of the mass of these particles to the mass of another object, such as the sun. On the other hand the mass of the photon is considered during the course of the calculation by Einstein as being zero, because he used a null geodesic. UFT 150 and UFT 155 used the orbital theorem of UFT 111 to carry out the calculations self consistently, with finite photon mass throughout, and without using the incorrect Einstein field equation with its missing torsion.

Our method succeeded insofar as a plausible value for the photon mass was found, but little consistency could be found between the light deflection experiment on the one hand and the time delay experiment on the other. The claims to precision in the old literature were discarded from the outset because they are based on a fundamentally false premise, that of a symmetric connection. It is quite obvious that the Einstein field equation failed as long ago as the sixties, when whirlpool galaxies were analysed. As soon as torsion is considered the commutator method isolates the connection, which therefore takes the same antisymmetry as the commutator of covariant derivatives acting on any tensor. The ECE theory with photon mass was able to reproduce the deflection of light by gravitation, giving a plausible value for the photon mass, if the latter indeed exists in nature. Following upon UFT 158 to 163 that is a dubious assumption now because the de Broglie wave particle dualism has failed dramatically. It will take a long time for physicists to come to terms with this.

However, the photon mass given by light deflection in UFT 150 is not consistent with the photon mass given by time delay in UFT 155. The time delay experiment was not found in UFT 155 to be a particularly accurate one, and it has also been criticised for a long time by others such as Marmet and his group in Ottawa. The lack of self consistency between the two values of photon mass was worrying, so it led to a search for a laboratory based measurement of photon mass. In the old physics the latter appeared in the standards tables as being less than some value, usually a value of about ten to the power minus fifty two kilograms is given. This value was used to try to improve the photon mass calculation using the Planck distribution, giving a temperature near the sun's surface. This temperature seems to be satisfactory and to be self consistent for the light deflection experiment considered alone, but when we also consider the time delay, the photon mass is not given consistently.

Therefore it was logical to try to find the cause of this varying photon mass by using the experiment that is usually cited as proving that the photon is a particle: Compton scattering. This experiment was carried out originally using X rays scattered off a metal foil. It was carried out very carefully by Compton, who devised the theory for it. It seems that Debye also devised the theory of Compton scattering independently. It was expected confidently that the de Broglie Einstein equations when used properly in the theory of Compton scattering would give a photon mass. Compton had devised the theory on the usual assumption that the photon mass is zero, so he treated the X rays as waves of no mass, colliding inelastically with electrons of mass considered as particles. The Nobel Prize committee commissioned an in depth study of the work by Compton and in awarding him the Nobel prize concluded that he has not proven that light was particulate. The Nobel Prize

archives of that era are now available via google.

This was the unsatisfactory state of things that we tried to remedy using the complete de Broglie postulate of wave particle dualism. In the textbooks over ninety years this has been confined quite wrongly to the statement that linear momentum is proportional to radiation wave vector via the reduced Planck constant. This is only part of the truth, the whole truth is that de Broglie considered the relativistic momentum of Einstein, in which appears the Lorentz factor γ made up of an expression containing the velocity of the particle, in this case the photon. If the latter is to have a well defined velocity it must have a well defined mass. So the wave particle dualism of de Broglie implies the existence of photon mass. The total relativistic energy of Einstein is also defined by γ multiplied by the rest energy, so this is also defined in terms of finite photon mass. These two postulates of about 1922 to 1924 constitute the complete statement of wave particle dualism as proposed by de Broglie. The loudly trumpeted claims of the old physics to have verified de Broglie collapsed completely in October 2010 as described in previous essays and in UFT 158 to 163. We are now in the midst of developing a third postulate on the covariant mass ratio to try to save what remains of the old physics in order to forge a new physics.

This is in fact the way that physics progresses, it is not a logical sequence of calm discovery, it is more often than not more like a comedy of errors in which something successful emerges almost by accident. The history around them is always difficult to see for contemporaries but at present it seems like an echo of the end of the nineteenth century, when the physics of that time was faced with the perplexing results of the Michelson Morley experiment, the failure of the Rayleigh Jeans law, and the beguiling mysteries of atomic spectra. These were explained by the very same theory that has now collapsed. So there is yet more in nature than meets the human eye.