Introduction

We are concerned with the phenomena called wave particle duality which is taught as mystery. We would seek to understand it as an electromagnetic phenomena explained by our unified theory. In this part, we lay the basis for doing that, but unfortunately have not been able to complete what is a very considerable mathematical challenge.

Our unified theory asserts that:

- Everything in the universe is composed of energy in its two stable forms of electric and magnetic flux.
- Electric flux terminates in displacement charge.
- Magnetic flux comes in closed loops.
- Both are quantised.
- Electric flux exists to enable the creation of elementary charged particles.
- Magnetic flux exists to give these particles the property of inertia.
- Elementary charged particles consist of nothing but spherically symmetric electric flux terminating in an inner surface of displacement charge.
- The electric flux of all elementary charged particles coexist in space forming a background against which the motion of the electric flux of each particle generates a tendency for a magnetic field to form.
- The motion of magnetic flux against the background generates a tendency for an electric field to form.

The tendency for a magnetic field to form is called magnetic intensity $\vec{H}$. The magnetic flux Φ is described by its flux density $\vec{B}$. The tendency for an electric field to form is called electric intensity $\vec{E}$. The electric flux Ψ is described by its flux density $\vec{D}$. In response to the electric intensity, electric flux may form with flux density $\vec{D} = \varepsilon_0 \vec{E}$ and similarly for magnetic flux $\vec{B} = \mu_0 \vec{H}$ where ε_0 is called the permittivity of space and μ_0 the permeability of space. These are historical names and they should rather be thought of as properties of electric and magnetic fields respectively. Together with these, the last two of the above assertions can be written mathematically to give the four equations:

$$\vec{H}_i = v_i \wedge \vec{D}_i \qquad \vec{E}_i = v_i \wedge \vec{B}_i \qquad \vec{B} = \mu_0 \vec{H} \qquad \vec{D} = \varepsilon_0 \vec{E}$$

These have an immediate solution that a bundle of electric and magnetic flux moving at the speed of light can each generate the other. The solution takes two forms, one for radio waves in which each phase has an abundant number of quanta of flux, the other for photons in which each phase has only one quanta of magnetic flux and one of electric flux.

A third solution applies to elementary charged particles. The total flux in their electric fields is fixed, so the electric intensity generated by the motion of the magnetic field generated by their motion cannot bring extra electric flux into existence, but instead acts to cause the flux and its inner surface of charge to contract in the direction of motion producing the Lorentz contraction.

In our unified theory, elementary charged particles, photons and radio waves are all formed from the same substance: energy in its two stable forms of electric and magnetic flux. Only their geometry and velocity differ. Photons are particle like in that they contain a definite amount of energy which is localised. Radio waves are not particle like. But this does not exclude the existence of radio frequency photons.

The original demonstration by Maxwell that light is a form of electromagnetic radiation predates both the

discovery of radio waves and of photons and requires somewhat more difficult mathematics. This takes the four equations known as Maxwell's Equations and combines them to form a wave equation. Maxwell understood electric and magnetic flux to "have their seat" in the "æther" and vary in flux density without moving.

We assert that both our solution and Maxwell's solution describe phenomena which exist in nature. We suggest that Maxwell's solution is valid as a perturbation of existing fields and believe that in the close proximity of matter, the two interact with the effect that particle like photons induce a wave like response which shepherds them into phase with each other and guides them in forming diffraction patterns.

We also believe that this interaction is responsible for forming each photon into a wave train of eight phases just as storm waves are formed into nice neat wave trains as they travel across oceans.