New Theory of Quantization and Mass of Waves' Particles

(Electrons Generate Waves and Waves Generate Electrons)

Phoson theory – Part 1

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Abstract

By an alternative interpretation of Compton effect experiment, I concluded that waves generate electrons and that waves are quantized into units of mass (which I called phosons).

A phoson is defined as a fundamental unit of energy carried by a variable mass and the origin of quantization where phosons are the waves' particles which also comprise the electrons' mass.

Photons were just a misinterpretation of the photoelectric experiment and were confused with the waves' power (the waves' energy in one second time) which came in accordance of our measurement units

Keywords

Compton Scattering effect, wave matter interactions, quantization.

Planks Constant unit

One of the definitions of frequency is the number of regularly occurring events in one second where the input and the output of the process are of the same type and have the same unit.

In Planks equation ($E = nhf$), n is a positive multiplication factor (integer) and (f) is the number of repetitions which means (h) is multiplied by two factors to get the energy E and the unit chosen for (h) is (J.s) which is $kg.m^2/s$ (the unit of angular momentum).

There is no logic in understanding this equation as the repetitions of a constant angular momentum multiplied by a positive integer gives energy, (E) and in (h) should be of the same type and have the same unit.

If a wave duration of flow is one second, then its power and energy are the same and if the duration of flow is less than one second, power has no significance.

However, if the time of flow is greater than one second, the energy of the wave in one second is its power

$$P = hf \quad (J.s/s) \qquad 1.1$$

while its energy after a specific time of flow t is

$$E = h.f.t \quad (J.s). \qquad 1.2$$

It is obvious that to get proper units, (Joule) for energy and (Joule/sec) for power, (h) should be measured in (Joules) and we can say: “The energy of one photon of a wave equals to the power of the wave and both are equal to (hf).

In the black body radiation experiment, energy is (E = nhf) where n is a positive integer taking values (1,2, 3….) representing wave amplification in forming standing waves.

In the photoelectric experiment, n = 1, that’s why waves seemed to be quantized into photons of energy (E = hf) while, it’s our measurement units which are quantized into values per second not the wave.

The only way to measure a continually flowing wave of particles which corresponds to the input of an experiment (event) is by its energy per second i.e. its power which was considered as a particle called photon in interpreting the photoelectric experiment.

Accordingly, saying that waves are quantized into photons of energy ($E = hf$) is just like saying that nature follows our manmade measurement units.

Compton Experiment and Waves' Particles Mass

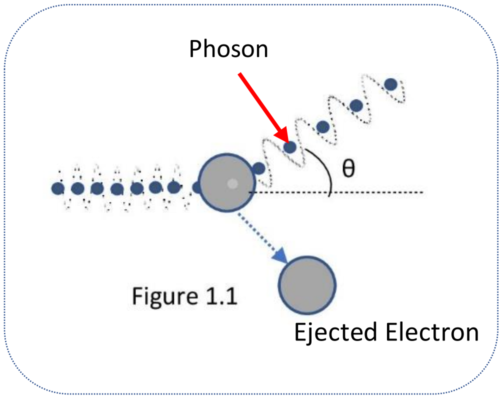

Figure 1.1

This section is to show that electrons and waves are comprised of the same type of particles (for identification and simplicity I'll call it phosons) where phosons are fundamental units of energy carrying particles which have variable mass.

This discussion assumes that any beam of light consists of rays of streams of phosons.

Compton's famous equation for the change in wave length $\Delta\lambda = \frac{h}{m.c}(1 - \cos\theta)$ was the major conclusion of his experiment, (where m is the electron's mass).

This experiment was explained as a collision and scattering physical event using the principle of energy and momentum conservations to prove that light consists of particles which can scatter waves and eject electrons.

The part $(\Delta\lambda = \frac{h}{m.c})$ consists of constants and represents a full value of Δλ when the other part of the equation is equal to one.

If each phoson occupies one wave length, then the frequency of the wave corresponds to the number of phosons in one second of the wave's ray (figure 1.1). Accordingly, the absence of phosons represents an increase in wave length and a decrease in frequency proportional to the number of missing phosons.

The results of Compton experiment gave two peaks of scattered waves, one for the part of the wave which is scattered without being involved in the interaction and the other is for the part of the wave after losing some of its phosons in the interaction at specific scattering angles.

The second peak at 90° and 180° scattering angles corresponds to a full Compton wave length change and consequently a full interaction.

The interactions in this experiment are one of three types, the first is scattering without wave length alteration where phosons are not involved in the interaction, the second is with increased wave length which is a fraction of λc where the wave loses part of its phosons in a partial interaction and the third is at scattering angles 90° or 180° which represents a full interaction where the wave length increment equals to λc or 2λc.

The latter case can have an interpretation other than what Compton gave. The first is the possibility to have a newly generated electron by the wave's phosons and the second is when both the wave and the electron are composed of the same identical number of particles, the wave's phosons replace the electron's phosons while the original electron's phosons being ejected as an electron which leads to the number of phosons in the electron and consequently the number of phosons involved from the wave.

Compton frequency *(fc)* ban be defined as the number of missing phosons in the scattered wave when the increment in wave length is equal to λc or 2λc which contributed in generating a new electron or involved in a full interaction (electron replacement and ejection).

Electron replacement is itself a sort of electron generation which can happen fully to produce an ejected electron or partially to produce a wave with the same number of absorbed phosons.

The number of phosons in the ejected electron and the number of phosons missed from the wave are the same in the generation or full replacement cases where we conclude that mass of the electron equals to the summation of all masses of the wave's phosons involved.

The number of phosons involved equals to the decrease in frequency of the scattered wave

$$fc = c / \lambda c$$
$$fc = (me.c^2) / h$$
$$fc = 1.235589965 \times 10\ 20\ \text{Hz}$$

Compton frequency corresponds to number of phosons involved in the interaction and consequently the phoson's mass is the resultant of dividing the electron mass by this number.

$$m_{phs} = me / fc \qquad 1.3$$
$$m_{phs} = 7.372497201 \times 10^{-51}\ \text{Kg. s} \qquad 1.4$$

Where m_{phs} is the phoson's mass and

$$\lambda_C = h / (m_e.c) = (m_{phs}.\ c^2)/(m_e.c) = c / f_C$$

Using the famous equation ($E = m.c^2$) we can also find the energy and mass of the phoson in an equivalent way where

$$E = h = m_{phs}.c^2 \qquad 1.5$$
$$m_{phs} = h/c^2 \qquad 1.6$$

Therefore, we can say that the ejected electrons in Compton experiment are composed (and can be generated) by *fc* number of phosons and if an electron is emitted fully as a wave (not ejected as an electron) it produces a wave with *fc* frequency and λc Wave length.

Consequently, this implies that waves and Electrons are quantized into phosons .

When we think of the electron mass as composed of *f* number of phosons and can be emitted as a wave with frequency *f*, then we should pay attention to that *f* in the first case is just a unitless number and in the second case is a frequency with unit (*1/s*).

Therefore, when using ($mc^2 = hf$), *f* is a unitless figure representing the number of phosons composing the electron mass with (*h*) in joules.

However, the unit (J.s) should be kept because all the history of quantum mechanics was based on this unit, noting the following:

$$E \text{ (in Joules)} = E_{phs} \text{ (in Joule. Second)}. f = hf$$

Where $E_{phs} \text{ (J.s)} = h \text{ (J.s)}$ 1.7

Conclusions

- Plank's constant is a fundamental unit of energy repeated each wave length of the wave with unit (J.s) which is the unit of angular momentum and was chosen to avoid time involvement in some cases or because it is meaningless in other cases like in the case of standing waves.
- Photons are just the power of waves i.e. its energy in one second.
- Keeping *h* in (J.s) implies that energy and any derived parameter to describe phosons follow the unit (J.s) with the additional unit of time (s) like (Kg. s) instead of Kg.
- Waves can't be quantized into the waves' energy measure in one second, nature does not follow our measurement units.
- As another interpretation of Compton experiment, the wave used generated the ejected electrons or replaced it with the same number of particles (which I called phosons).
- Waves and Electrons are quantized into phosons which are described as discrete fundamental energy carrying variable mass particles.
- Phoson mass is ($m_{phs} = 7.372497201 \text{x} 10\text{-}51$ Kg. s).
- Phoson, *h* or mc^2 have the same meaning and any particle which complies with $E = mc^2$ should be comprised of phosons.
- If an electron is emitted fully as a wave, it will produce a wave with frequency equals to the number of phosons comprising it with a wave length fulfilling the relation $c = f.\lambda$

  The energy of the phoson is equal to $m_o c^2$ only when it is equal to h.

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