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Compton was Greatly Mistaken Using the Quantum

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Abstract: *The alleged existence of quantum with momentum in electromagnetic radiation is disputed, this is within the supposed balance of both Einstein's mass-energy equivalent with Planck's radiation energy, we realize this is untrue, except at one energy state represented by a single frequency, from the whole frequency spectrum; this formula is also analyzed and compared with the balance between kinetic energy and the Planck's radiation energy, the energy as well as the momentum for each is derived and showed to relate to an equivalent radiation energy and momentum equivalent to momentums given by mV and mc, which was coined for particle's mass; a momentum derived from the multiplication of Radiation Magnetic Force (F_{mR}) and change in time (Δt), designated as Magnetic Momentum (ρ_M), is related to the Electron Momentum (ρ_E) and both are in odd with the Compton Momentum (ρ_C), which showed great discrepancies with momentum of both the ρ_M and ρ_E, when plotted graphically; the paper established the condition for radiation momentum to remove electron from atom, which is only fulfilled by the Magnetic Momentum (ρ_M), rather than Compton Momentum (ρ_C); thus a conclusion is reached that, the use of the formula by Compton was not justified, it was misleading, and doesn't uphold scientific merit, while the Radiation Magnetic Force (F_{mR}) embedded in the electromagnetic radiation, is the force gives the proper and logical momentum that ejected photoelectrons and carried different mechanism in Compton Effect and others; this attempt aimed at restoring the common sense to the physical world.*

Keywords: *Quantum; Photon; Compton Effect; Compton Momentum (ρ_C); Electron Momentum (ρ_E); Magnetic Momentum (ρ_C) secondary electromagnetic radiation;*

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I. Introduction

Planck was the first to perceive in 1900, the radiation energy as a discrete quantity, composed of integer number of finite equal parts, he suggested energy ε is be proportional to the number of frequency $\boldsymbol{\nu}$ [1], in 1905 Einstein linked electrons "oscillators" with electromagnetic waves, and suggested energy quanta as constituent of incident light, having magnitude $\frac{R\beta\nu}{N}$ [2], Einstein developed quanta from blurred idea into wave-particle duality in 1909, suggesting that, "*the expressions for the mean-square energy and momentum fluctuations split naturally into a wave dominated in the Rayleigh-Jeans low-frequency region of the spectrum and a particle term dominated in the Wien's law high-frequency region*" [3], by this he fills the theoretical gap necessitate photoelectrons removal from the atoms [4], that duality brought the current concept of photon, associating electromagnetic fields of light with singular points, similar to electrostatic fields, and surrounded by *fields of force* that superposed to give the electromagnetic wave of Maxwell's classical theory [5]; Einstein's suggestion was rejected by prominent scientists like Millikan, Lorenz, Planck [6], and Bohr [7]; the rejection persist until Compton claimed solving the scattering of electron by X-rays and γ-rays in 1923 [8], transforming Einstein's explanation of photoelectric effect into an acceptable theory [2], by this turning the illogic into logic; Compton interpretation strengthened the shaky status of *quanta* (*photon*), as it stated that "*scattering is a quantum phenomenon; and a radiation quantum carries with it* ***momentum as well as energy***" [8], Planck rejected the extension of quantum into electromagnetic radiation, stating that "*instead of quantized electromagnetic fields, the problem of the quantum theory should be transfere to the area of interaction between matter and radiation energy*," [5], Planck was correct, as our search in theoretical physics suggested the existence of Radiation Magnetic Force (F_{mR}) embedded in electromagnetic radiation, this also reinterpreted Planck's energy as embedded in the electromagnetic radiation [9], while the Compton effect was explained as an internal reproduction of secondary electromagnetic radiation [10], the Double Slit Experiment is explained as an interaction between two Polarized Wave (PW), in form of Circular Magnetic Fields (*CMF*) [11], a comprehensive mechanism reproducing Electromagnetic Radiation is provided [12], including requirements, analysis of energy and Planck's constant [13], the reason radiation moves with speed of light [10], explanation of Electron Diffraction [14], the Weak force [15], the nature and origin of Planck's constant (*h*) [11], and "*The Faraday Effect Explained*" [16], all these based on the Magnetic Interaction [17], which showed the existence of an alternative solutions to different challenges faced physicists since mid-nineteen centaury, and early twenty century; as formulas 3 and 8 in the Magnetic Interaction [17], were not discovered, and scientists were in hurry

to get any acceptable solutions [18]; such as the inclusion of quanta (photon) and its momentum by Compton, which is reviewed in this paper and found to be extremely odd, controversial and lacking scientific merit, as Compton used two unrelated formulas of energies to derived the momentum of particle with mass, perceived as massless photon! This serious breach reflected Compton's eagerness to attain success [18], without scientific certainty, contrary to Einstein who spent the remaining fifty years of his life, deliberating without success about photon! Till he ascertained that, no physicist knows what photon is [19]! clearly he has doubted the existence of photon, in addition to the strong indications showed light consist of wave rather than a corpuscular [20], as been suggested [12, 13]; this paper analyzed the formations and balance of both Einstein mass-energy equivalent and Planck's energy formula and compared Compton Momentum (ρ_C), Electron Momentum (ρ_E) and the magnetic Momentum (ρ_M) derived from the Radiation Magnetic Force (F_{mR}), a relation is found between the graph of Electron Momentum (ρ_E), and any momentum that should remove electron from atoms, thus a discrepancy is found in the graph of ρ_C, indicating it's not parallel with graph ρ_E, therefore ρ_C is not radiation momentum, thus the postulation made by Compton invalid, and for him to use this formula, as a short cut, was an act of deception, taken into account his denial knowledge of Einstein paper [18], thus the paper is aimed at restoring the common sense into the physical science, diverted by the mathematical description of the natural world!

II. Mathematics or Mechanism of Energy and Frequency/Wavelength!

Compton [8], started buildup his mathematical formation for the incident X-ray by claiming the *change in wavelength is due to the scattering*, he stated that: "*Imagine, as in Fig. 1 (Fig.1A), that an X-ray quantum of frequency v_o is scattered by an electron of mass m. The momentum of the incident ray will be $\frac{h v_o}{c}$, where c is the velocity of light and h is the Planck's constant, and that of the scattered ray is $\frac{h v_e}{c}$ at an angle θ with the initial momentum.*"

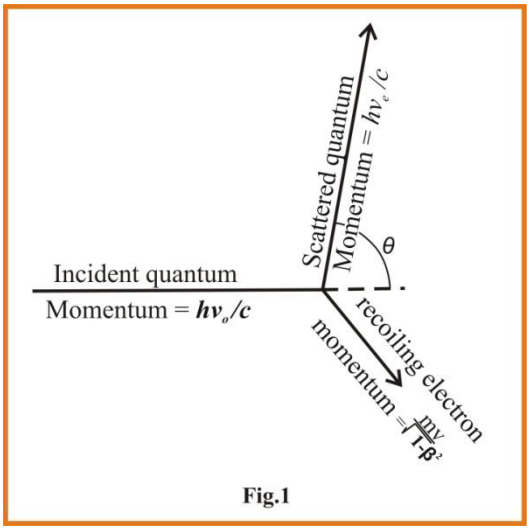

Fig.1. The incident radiation is treated by Compton as a quantum carrying "*momentum*= $\frac{h v_o}{c}$," in which the quantum is scattered by the electron at an angle θ [8].

Compton didn't make any introduction to illustrate how he got the important momentum formula; and despite the importance of this claim he just made the suggestion without giving any evidence, on how he got this momentum, or even the mathematical derivatives, for such claim, but why he did so? Because everyone will know the truth behind it, and since the whole building block of quantum is based on this statement, we will check the root of the alleged "*momentum of the incident ray* $\frac{h v_o}{c}$," shown in Fig.1, and see if it got any merit?

The energy of charge particle with mass *m* and Velocity (V_R), is given by [13]

$$E_R = \frac{mV_R^2}{2} \qquad (1)$$

Where, V_R is electron or proton velocity in $m.s^{-1}$, *m* is the mass in kg. The conclusion reached by Planck that, "*energy element ε is proportional to the number of vibrations v*," giving his famous equation [1], known as Planck's Radiation Energy (E_R) formula

$$E_R = h v \qquad (2)$$

Einstein mass-energy (E_E) equivalent [21], is given by

$$E_E = mc^2 \qquad (3)$$

The equivalent of radiation and mass-energy combining Eq. (2) and Eq. (3) is

$$E = mc^2 = \hbar v \qquad (4)$$

The mass of the charged particle derived from radiation energy given in Eq. (4), is given by

$$m = \frac{\hbar v}{c^2} \qquad (5)$$

As Eq. (5) can be changed slightly, as derived from Eq. (4), the momentum of the mass *m* due to velocity *c* is given by

$$\rho = mc = \frac{\hbar v_o}{c} \qquad (6)$$

But Eq. (6) is the source of Compton formula [22], where he concluded from the extreme parts of Eq. (6), while neglecting or deleting the central part of *mc*, that the momentum of electromagnetic radiation is

$$\rho_C = \frac{\hbar v_o}{c} \qquad (7)$$

Frequency	Radiation=Kinetic Energy	Mass-Energy Equivalent	Velocity	Compton Momentum (ρ_C)		Electron Momentum (ρ_E)	
v	$E_R = hv = \frac{mV^2}{2}$	$E_E = mc^2$	$V = \sqrt{2E/me}$	$\rho_C = mc$	$\rho_C = \frac{hv_o}{c}$	$\rho_E = mV$	$\rho_E = \frac{2hv}{V}$
$1x10^{10}$	$6.626\ x10^{-24}$		$3.814\ x10^{3}$		$2.208\ x10^{-32}$	$3.475\ x10^{-27}$	$3.474\ x10^{-27}$
$1x10^{12}$	$6.626\ x10^{-22}$		$3.814\ x10^{4}$		$2.208\ x10^{-30}$	$3.475\ x10^{-26}$	$3.474\ x10^{-26}$
$1x10^{14}$	$6.626\ x10^{-20}$		$3.814\ x10^{5}$		$2.208\ x10^{-28}$	$3.475\ x10^{-25}$	$3.474\ x10^{-25}$
$1x10^{16}$	$6.626\ x10^{-18}$		$3.814\ x10^{6}$		$2.208\ x10^{-26}$	$3.475\ x10^{-24}$	$3.474\ x10^{-24}$
$1x10^{18}$	$6.626\ x10^{-16}$		$3.814\ x10^{7}$		$2.208\ x10^{-24}$	$3.475\ x10^{-23}$	$3.474\ x10^{-23}$
$1x10^{20}$	$6.626\ x10^{-14}$		$3.814\ x10^{8}$		$2.208\ x10^{-22}$	$3.475\ x10^{-22}$	$3.474\ x10^{-22}$
$1.237\ x10^{20}$	$8.199\ x10^{-14}$	$8.199\ x10^{-14}$	$4.243\ x10^{8}$	$2.733\ x10^{-22}$	$2.733\ x10^{-22}$	$3.865\ x10^{-22}$	$3.865\ x10^{-22}$
$1x10^{22}$	$6.626\ x10^{-12}$		$3.814\ x10^{9}$		$2.208\ x10^{-20}$	$3.475\ x10^{-21}$	$3.474\ x10^{-21}$

Table.1. The comparison between the kinetic energies (E_K) of an electron given by Eq. (1) which equal to radiation Energy (E_R) given by Eq. (2) with the mass-energy equivalent of Einstein (E_E) given by Eq. (3); and another between the two Mass-Energy Momentums given by Eq. (7) and the two Electron Momentum (ρ_E) given by Eq. (9), when the Radiation Frequency (v) is given, also derived is the electron' velocity; therefore from this table $mc^2 \neq \hbar v$, and Eq. (7) is disputable, while the crossing of ρ_C with ρ_E in Fig.3, only occurred at $1.237x10^{20}$ Hz, as given in this table.

The momentum given by Eq.(7) is what Compton claimed to represent the incident ray, it's originally derived from Eq.(4), which was perceived as an equivalent of both the Planck's energy formula given by Eq. (2) with Einstein's mass-energy formula give by Eq. (3), but both parts in Eq. (4) are not equal, so as to justify this, because when Eq. (4) is claimed to be equal, this means at any variation both parts should be equal, but as given in Table 1, Eq. (4) is only equal in one condition, when both energies E_R=E_E=$8.1985x10^{-14}$ *eV*, at that level, the frequency of radiated energy v=$1.237x10^{20}$ Hz, but can such equality be compared with that of the radiation energy and electron's energy, combining both Eq. (1) and Eq. (2), as given by?

$$E = \frac{mV^2}{2} = \hbar v \qquad (8)$$

For Eq. (8), and as demonstrated in Table.1, the variation of the frequency *v* is related to an equivalent energy variation reflected on the velocity *V* of the charge particle, this is why Eq. (8) can be stated categorically, as equal, but can this be the same for Eq. (4)?

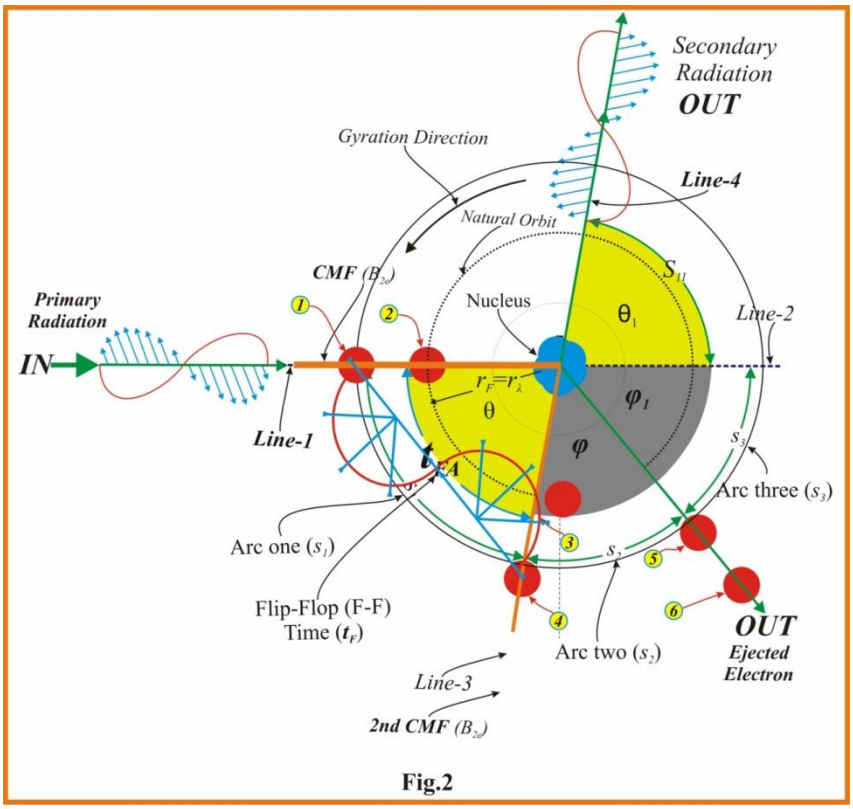

Fig.2

Fig.2. In the Compton Effect Re-visited [10], the Radiation Magnetic Force (F_{mR}) in the incoming electromagnetic radiation forced inter-atomic electron to higher binding energy from point 1 to 2, and the electron carried Flip-Flop (*F-F*) mechanism from point 2 to 3 [12], ended with the produced secondary electromagnetic radiation at 3, pulled towards line-4, and the ejection of the electron at points 6 [10].

As concluded from Table.1, there is no relation between the formula of mass-energy equivalent given by Eq. (3), with Planck's energy formula given by Eq. (2), which is equivalent to kinetic energy given by Eq. (1), because it change with frequency, while Einstein mass-energy equivalent formula only give a single amount of energy, when converted, it gives a single velocity c, while if variable energies are given, this changed the mass, and since Einstein Eq.(3) originated from the statement that, "*if a body gives off the energy E_E (L) in the form of radiation, its mass diminishes by $E_E(L)/c^2$*" [21], and such case occurred only in particles such as pion, which decays into two gamma rays [23], so it gives radiation for only one frequency, but Eq. (4) doesn't give any relation of variation, because the equivalent of Einstein's mass-energy formula doesn't change with velocity, its equal only at one frequency v=1.237x10^{20} Hz, and only one velocity c, as given in Table.1, so what about the other frequencies, does it exists? (This is the odd situation expressed by Compton Momentum (ρ_C) slope in Fig.3).

The same can be stated for the momentum given by Eq. (7), where the *mc* part gives only an equivalent of one momentum as shown in Table.1, in the whole spectrum of the radiation, contrary to sensible Electron Momentum (ρ_E) derived from Eq.(8), as given by

$$\rho_E = mV = \frac{2\hbar v}{V} \qquad (9)$$

In the Electron Momentum (ρ_E), shown in Table.1, the variation of both parts of Eq. (9) is sequential and related to variation of velocity and frequency, while in Mass-Energy momentum, designated as Compton Momentum (ρ_C) such variation doesn't exist, the equivalence only exist at one frequency when v=1.237x10^{20} Hz, then what about other frequencies? And if photon existed, how such photon due to one frequency can be imposed on the whole spectrum?

Since $v = \frac{c}{\lambda}$, thus substituting this with the variable frequency v in Eq. (8), the equivalent of radiation energy to charged particle kinetic energy, with variable wavelength is given by

$$E_k = \frac{mV^2}{2} = \frac{\hbar c}{\lambda} \qquad (10)$$

While substituting $v = \frac{c}{\lambda}$, with the variable frequency v in Eq. (4), hence Einstein's mass-energy equivalent to radiation is given in variable wavelength by

$$E_E = mc^2 = \frac{\hbar c}{\lambda} \qquad (11)$$

Therefore both Eqs. (10&11) are energy formulas, with variable wavelength in the radiation part. From Eq. (10), the Electron Momentum (ρ_E) is obtained by dividing both parts on *V*, given as

$$\rho_E = mV = \frac{2\hbar c}{V\lambda} \qquad (12)$$

While from Eq. (11), the momentum is obtained by dividing both parts on *c*, given as

$$\rho_C = mc = \frac{\hbar}{\lambda} \qquad (13)$$

Eq. (6) is similar to Eq. (9), except the particle velocity *V* is substituted with the velocity of light c, and since in both parts of Eqs. (6&9), it is the velocity of the mass *m*, which is common and both Eqs. (12) and Eq. (13) are similar, only differ in the particle velocity *V* which is substituted with the velocity of light c; and c in Eq. (13) canceled c existed in Eq. (11), therefore the Electron Momentum (ρ_E) in Eq. (12) has got two value, the first express by *mV* and the equivalent to it derived from radiation $\frac{2\hbar c}{V\lambda}$, while the Compton Momentum (ρ_C) in Eq. (13) has got two value, the first is expressed by *mc* and the equivalent to it express by the radiation parameters $\frac{\hbar}{\lambda}$, hence the momentum $\frac{\hbar v_o}{c}$, in Eq. (6) used by Compton expressed the equivalent magnitude of the momentum using the radiation quantity, if it's understood as the momentum of the radiation, then why not taken the radiation part $\frac{2\hbar c}{V\lambda}$ of Eq. (12) to mean the momentum of the radiation? And what about the mass in Eq. (13)?

v	E	V	λ	B_{CMF}	ρ_C	ρ_E	F_{mR}	ρ_M	$\rho_M \div \rho_E$
$1.0\ x10^{10}$	6.626075 5 x10^{-24}	3.81415683644 002158195654 42948061 x10^{3}	3. x10^{-2}	3.62130703194 5908434560896 1862395 x10^{-20}	2.20869183333 3333333333333 3333333 x10^{-32}	3.47446410000 5131726645265 04467 x10^{-27}	4.36614035669 5037811276075 7142228 x10^{-16}	4.36614 x10^{-26}	12.56637061 43591729538 50573533118
$1.0x10^{12}$	6.626075 5 x10^{-22}	3.81415683644 002158195654 42948061 x10^{4}	3. x10^{-4}	3.62130703194 5908434560896 1862395 x10^{-15}	2.20869183333 3333333333333 3333333 x10^{-30}	3.47446410000 5131726645265 04467 x10^{-26}	4.36614035669 50378113 x10^{-13}	4.36614035669 50378113 x10^{-25}	12.56637061 43591729539 19431017578
$1.0x10^{14}$	6.626075 5 x10^{-20}	3.81415683644 002158195654 42948061 x10^{5}	3. x10^{-6}	3.62130703194 5908434560896 1862395 x10^{-10}	2.20869183333 3333333333333 3333333 x10^{-28}	3.47446410000 5131726645265 04467 x10^{-25}	4.36614035669 50378112761 x10^{-10}	4.36614035669 50378112761 x10^{-24}	12.56637061 43591729538 50643431026
$1.0x10^{16}$	6.626075 5 x10^{-18}	3.81415683644 002158195654 42948061 x10^{6}	3. x10^{-8}	3.62130703194 5908434560896 1862395 x10^{-5}	2.20869183333 3333333333333 3333333 x10^{-26}	3.47446410000 5131726645265 04467 x10^{-24}	4.36614035669 5037811276075 7 x10^{-7}	4.36614035669 5037811276075 7 x10^{-23}	12.56637061 43591729538 50573492183
$1.0x10^{18}$	6.626075 5 x10^{-16}	3.81415683644 002158195654 42948061 x10^{7}	3. x10^{-10}	3.62130703194 5908434560896 1862395 x10^{0}	2.20869183333 3333333333333 3333333 x10^{-24}	3.47446410000 5131726645265 04467 x10^{-23}	4.36614035669 5037811276075 7142 x10^{-4}	4.36614035669 5037811276075 7142 x10^{-22}	12.56637061 43591729538 50573533052
$1.0x10^{20}$	6.626075 5 x10^{-14}	3.81415683644 002158195654 42948061 x10^{8}	3. x10^{-12}	3.62130703194 5908434560896 1862395 x10^{5}	2.20869183333 3333333333333 3333333 x10^{-22}	3.47446410000 5131726645265 04467 x10^{-22}	4.36614035669 5037811276075 7142228 x10^{-1}	4.3661403567 x10^{-21}	12.56637061 43591729538 50573533118
$1.0x10^{22}$	6.626075 5 x10^{-12}	3.81415683644 002158195654 42948061 x10^{9}	3. x10^{-14}	3.62130703194 5908434560896 1862395 x10^{10}	2.20869183333 3333333333333 3333333 x10^{-20}	3.47446410000 5131726645265 04467 x10^{-21}	4.36614035669 5037811276075 7142228 x10^{2}	4.36614035669 5037811276075 7142228 x10^{-20}	12.56637061 43591729538 50573533118
$1.0x10^{24}$	6.626075 5 x10^{-10}	3.81415683644 002158195654 42948061 x10^{10}	3. x10^{-16}	7.14477510681 2060697820820 4881839 x10^{13}	2.20869183333 333 x10^{-18}	3.47446410000 5 x10^{-20}	4.36614035669 5037811276075 7142228 x10^{5}	4.36614035669 5037811276075 7142228 x10^{-19}	12.56637061 43596493800 83955650982
v	E	V	λ	B_{CMF}	ρ_C	ρ_E	F_{mR}	ρ_M	$\rho_M \div \rho_E$

Table.2. Data due to parameters in Eq. (14) and formulas used in this paper, Where, $\rho_C = \frac{\hbar v_o}{c}$ is the Compton Momentum (ρ_C) derived using Eq. (6), $\rho_E = Vm$ is the Electron Momentum derived using Eq. (9 or 23), ρ_M is the Magnetic Momentum using Eq. (25) this momentum is due to F_{mR} using Eq. (24), where $\Delta t = \frac{1}{v}$, and a comparison between momentum due to ρ_E (*mV)* and ρ_M ($\rho_M \div \rho_E$), where ρ_M is greater than ρ_E shown in Fig.3, by a fixed magnitude of 12.566370614359172953850573533118 Kg.m/s.

III. Variation of Energy Parameters

The Planck' energy formula in the ***Electromagnetic Radiation Energy and Planck' Constant*** [13] contained the radiation energy *hv* balanced with Einstein's mass-energy equivalent in addition to other parameters, but both are balanced, with parameters given in Table.2, as

$$h\nu = \frac{B_{CMF}^2 \lambda^4\ m\ c^2}{2\ (4)^4\ q^2} \qquad (14)$$

Rearranging Eq. (14), the *CMF* is obtained as

$$B_{CMF}^2 = \frac{2\,(4)^4\, v\, \hbar\, q^2}{m\, c^2 \lambda^4} \qquad (15)$$

Substituting B_{CMF} in Eq. (15) with $B_{CMF} = \frac{qV}{r^2\, c}$, we get

$$\frac{q^2\, V^2}{r^4\, c^2} = \frac{2\,(4)^4\, v\, q^2 \hbar}{m\, c^2 \lambda^4} \qquad (16)$$

Rearrangement of Eq. (16) we get

$$\frac{q^2\, V^2 m\, c^2 \lambda^4}{2\,(4)^4 r^4\, c^2\, q^2 \hbar} = v \qquad (17)$$

Then the following is obtained

$$v = \frac{V^2 m\, \lambda^4}{2\,(4)^4 r^4\, \hbar} \qquad (18)$$

From Eq. (18) the frequency is

$$v = \frac{(4)^4\, V^2 m\, \lambda^4}{2\,(4)^4\, \lambda^4\, \hbar} \qquad (19)$$

Cancelling similar elements, the frequency is given by

$$v = \frac{V^2 m}{2\, \hbar} \qquad (20)$$

From Eq. (20), the balanced of both the kinetic and radiation energies is given by

$$\frac{mV^2}{2} = \hbar\, v \qquad (21)$$

From Eq. (21), the momentum is given by

$$\rho = mV = \frac{2\hbar v}{V} \qquad (22)$$

Therefore, Eq. (22), is the Electron Momentum (ρ_E) given by Eq. (9), hence, ρ_E is given by

$$\rho_E = mV \qquad (23)$$

Eq. (14) contained Planck' energy, Einstein's mass-energy equivalent, and the wavelength, but it ended in Eq. (23) with the Electron Momentum (ρ_E) given by Eq. (9), *therefore the existence of wavelength and frequency in any formula such as given by Eq. (14), doesn't means the existence of different element or imaginary phenomenon in the formula, it only give the equivalent amount of radiation parameters and mass-energy equivalent that can be used*, this is to show that, the formula used by Compton and given by Eq. (7) and Eq. (13), doesn't means it represents an imaginary factor of the so called quanta (photon), rather it's just an equivalent parameters.

Color	Wavelength (λ)	Frequency (v)	$\Delta t = \frac{1}{v}$	Radiation Force (F_{mR})	Magnetic Momentum (ρ_M)	Electron Momentum (ρ_E)
Red	750nm	4. x10^{14}	2.5 x10^{-15}	3.49291228535603 0249020860571378 3 x10^{-9}	8.73228071x10^{-24}	6.9489282x10^{-25}
	620 nm	4.838709677419354 8387096774193548 x10^{14}	2.06666666 666666667 x10^{-15}	4.64720724499086 0634575874578652 6 x10^{-9}	9.60422831x10^{-24}	7.642802x10^{-25}
Orange	590 nm	5.084745762711864 4067796610169492 x10^{14}	1.96666666 666666667 x10^{-15}	5.00612347649391 7963803307666944 6 x10^{-9}	9.84537617x10^{-24}	7.8347014x10^{-25}
Yellow	570 nm	5.263157894736842 1052631578947368 x10^{14}	1.9 x10^{-15}	5.27190154796351 7979262013736745 1 x10^{-9}	1.001661294x10^{-23}	7.9709673x10^{-25}
Green	495 nm	6.060606060606060 6060606060606061 x10^{14}	1.65 x10^{-15}	6.51436031915912 5415996540718497 4 x10^{-9}	1.074869453x10^{-23}	8.5535393x10^{-25}
Blue	450 nm	6.666666666666666 6666666666666667 x10^{14}	1.5 x10^{-15}	7.51555061719288 5456423868348329 5 x10^{-9}	1.127332593x10^{-23}	8.9710277x10^{-25}
Violet	380 nm	7.894736842105263 1578947368421053 x10^{14}	1.26666666 666666667 x10^{-15}	9.68510157502454 7081489193036228 6 x10^{-9}	1.226779533x10^{-23}	9.7624013x10^{-25}
Ultraviol	360 nm	8.333333333333333	1.2 x10^{-15}	1.05033012927398	1.260396155x10^{-23}	1.00299139x10^{-24}

et		3333333333333333 x10^{14}		6972665815685397 8 x10^{-8}		
	310 nm	9.677419354838709 6774193548387097 x10^{14}	1.03333333 333333333 x10^{-15}	1.31442870260491 6337866110900507 x10^{-8}	1.358242993 x10^{-23}	1.08085543 x10^{-24}
Color	Wavelength (λ)	Frequency (v)	$\Delta t = \frac{1}{v}$	Radiation Force (F_{mR})	Magnetic Momentum (ρ_M)	Electron Momentum (ρ_E)

Table.3. The color part of the light in electromagnetic Radiation, giving the wavelength (λ), frequency (v), time (t), Radiation Magnetic Force (F_{mR}), the Magnetic Momentum (ρ_M), and the Electron Momentum (ρ_E), the photoelectron is ejected by the higher magnitudes of ρ_M nearer the Ultraviolet.

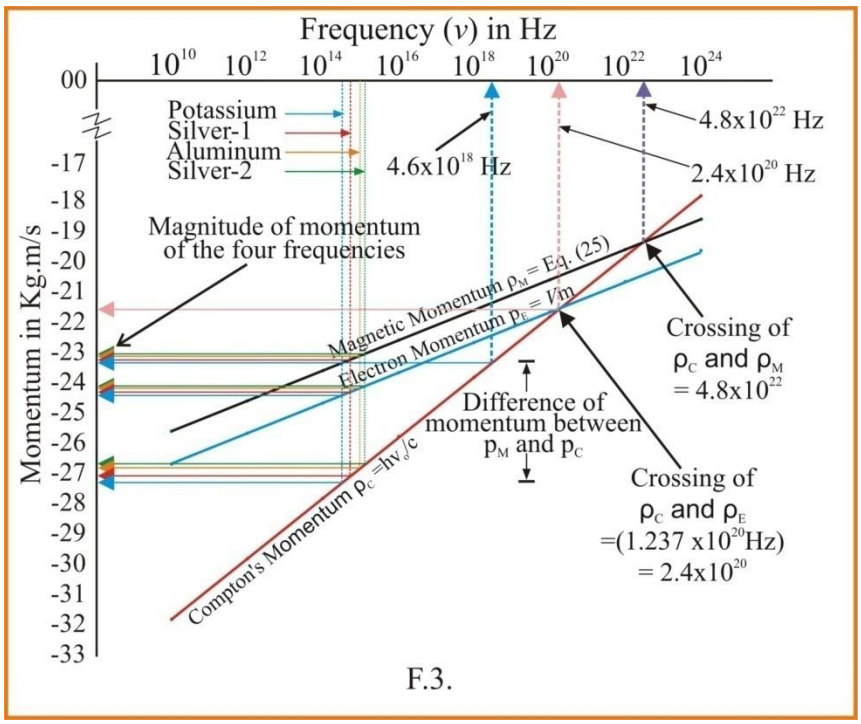

Fig.3. The three momentums in Table.2, plotted to form the Magnetic momentum (ρ_M) in black color obtained from the Radiation Magnetic Force (F_{mR}) using Eq. (25), the Electron Momentum ($\rho_E = Vm$) in cyan color using Eq. (23), and the Compton Momentum (ρ_C) used by Compton in red color using Eq. (6), the slops for both ρ_M and ρ_E varied consistently with constant difference of 12.5664 Kg.m/s, while p_C started at much lower magnitude with different slope; the threshold frequency of potassium, silver-1, aluminum and silver-2 given in Table.4, are drown for ρ_M and ρ_E then extended to ρ_C, thus the graphic slope ρ_E, which is parallel with ρ_M is not parallel with slope ρ_C.

IV. The Magnetic Momentum

The color part of visible light and the ultraviolet in electromagnetic radiation are given in Table.3, it shows the wavelength (λ), frequency (v), time (t), Radiation Magnetic Force (F_{mR}) [9], and the Magnetic Momentum (ρ_M), derived from F_{mR} given by Eq. (24), using Eq. (25), the variation of Magnetic Momentum (ρ_M) in Table.3, from 8.73228071x10^{-24} in the red color to 1.226779533x10^{-23} in the violet is the main factor behind the ejection of electron in the photoelectric effect as assumed by Einstein [2], while the variation of the three momentums given in Table.2, is drown in graph and given in Fig.3, it shows the Compton Momentum (ρ_C) in red color using Eq. (6), the Electron Momentum ($\rho_E = mV$) in cyan color using Eq. (23), and the Magnetic momentum (ρ_M) in black color using Eq. (25), other four lines representing the momentums of potassium, silver-1, aluminum and silver-2, derived from Table.3, are extended to the three slopes of ρ_M, ρ_E and ρ_C, with each related momentum, they are characterized by the follows:

1- The slopes for both the Magnetic Momentum (ρ_M) and the Electron Momentum (ρ_E) are similar, with a constant difference magnitude of 12.566370614359 Kg.m/s.
2- The Compton Momentum (ρ_C) is completely different; it started from lower magnitude at lower frequency, then raise sharply to high magnitude at very high frequency.
3- The threshold Frequency of potassium, silver-1, aluminum and silver-2 [24] given in Table.4, are extended from each related frequency at top to the related magnitude of the Magnetic Momentum (ρ_M), then to the slope of Compton Momentum (ρ_C), across ρ_E.

4- From Fig.3 and Table.4, the threshold frequency of potassium is 5.5613732×10^{14} Hz, giving Magnetic Momentum (ρ_M) equal $1.02964783786 \times 10^{-23}$ Kg.m/s, while the same slope give Compton's Momentum ρ_C with magnitude of $2.6666666666667 \times 10^{-27}$ Kg.m/s, which is great discrepancy.
5- The same discrepancy can be stated for silver-1, aluminum and silver-2.
6- In Fig.3, the magnetic momentum obtained by potassium, which is $1.0296478378581051 8 \times 10^{-23}$ Kg.m/s at frequency of $5.5613731823611125469 \times 10^{14}$ Hz, can only be obtained by Compton's Momentum (ρ_C) at higher x-ray frequency of 4.6×10^{18} Hz, as shown in Fig.3, an extraordinary difference.
7- The above 4.6×10^{18} Hz is a frequency in the range of the 4.237288×10^{18} Hz, used by Compton with wavelength of 0.708 Å.
8- The four horizontal slopes from the Magnetic Momentum (ρ_M) to its magnitude are crowded, due to the acute angle of the slope, while the Compton Momentum (ρ_C) slopes are wide due to great angle.
9- The Compton Momentum (ρ_C) slope cross both the Magnetic Momentum (ρ_M) and Electron Momentum (ρ_E), and no any relation can be established except discrepancy of magnitudes.
10- The crossing of Compton Momentum (ρ_C) with the Electron Momentum (ρ_E) occurred at frequency $v = 1.237 \times 10^{20}$ Hz, this is the only frequency derived by mass-energy equivalent in Table.1.
11- The crossing of Compton Momentum (ρ_C) with the Magnetic Momentum (ρ_M) occurred at frequency $v = 4.8 \times 10^{22}$ Hz, as shown in Fig.3.

From past discussions and the above observations in Fig.3, the followings are extracted:
1- The mc^2 in Eq. (4) is the mass-energy equivalent formula and it is not equal to the radiation energy hv, except in on state, that is when mass is multiplied on square of speed of light, as shown crossing ρ_E in Fig.3, at $v = 1.237 \times 10^{20}$Hz.
2- Compton gave impression that, both parts of Eq. (4) equal to the radiation energy, which is not true, as shown in Table.1.
3- The mass-energy equivalent formula given by Eq. (3) doesn't express radiation energy, given by Eq. (2), except in only one condition, therefore it will never be regarded as equal to Planck' formula.
4- The momentum obtained using Eq.(6) is shown by pink dashed line (2.733×10^{-22} Kg.m/s), is due to one of two:
a. The Multiplication of mass and speed of light or
b. The division of energy by speed of light.

Thus as given in Table.1, both parts of Eq. (6) can't give other form of variation; hence the derived momentum is not correct.
5- Therefore, the momentum given by Eq. (13) is *similar* to the momentum given by Eq. (12), in that they express the momentum of the moving mass, although they are not equal, but both expressed the equivalent of momentum mV or mc with equivalent parameters of electromagnetic radiation.
6- Since Eq. (13) and Eq. (12) are similar in all aspect, they must be treated the same, this means either both momentums formulas are applicable to radiation, or both been rejected.
7- The part used by Compton in Eq. (6), ($\frac{h v_o}{c}$), is energy divided by speed of light, similar to Eq. (9), which is energy multiplied by two and divided by velocity of electron.
8- The Electron Momentum (ρ_E) slope shown in Fig.3, is the true representation of the momentum of electrons orbiting atoms.
9- Since the essence of momentum by Einstein is to knock electron from an atom, therefore for any momentum to knock inter-atomic electron, it must be parallel and greater than the Electron Momentum (ρ_E), shown in Fig.3.
10- Therefore, the Magnetic Momentum (ρ_M) slope in Fig.3, is parallel and greater in magnitude than the Electron's Momentum (ρ_E) slope, and in line with the above condition.
11- The slope obtained using Compton's Momentum (ρ_C) formula, is acute at both ends, it doesn't resembles the Electron's Momentum (ρ_E) slope.
12- The slope of Magnetic Momentum (ρ_M) is greater because it contained the excess momentum removing electron from atom.
13- The success of quantum theory of scattering only in light elements [25], and failed to resolve the heavy atoms, where recoil energy is smaller than the binding energy of scattering electron [26], can be traced to the shape of the ρ_C in Fig.3, where the slope around 1.237×10^{20} Hz is nearly equal to ρ_M.
14- If radiation contained quantum with momentum as described by Compton, the slope of such momentum will be similar to the slope of Electron Momentum (ρ_E).
15- The discrepancy in Compton Secondary Electromagnetic Radiation (S-EM-R) ratio over Prime Electromagnetic Radiation (P-EM-R) at Soft X-rays (SX) which is 99% and 0.13% at end of γ-rays at 3.08 fm [25], are due to the very high forced binding energy (E_{bFE}), can be traced to the ρ_C slope.

In his justification to electron's ejection, Einstein assumed the ionization of a gas by ultraviolet light, is carried by individual light energy quantum [2], this was justified mathematically by Compton's formula, supposing $\rho_C = \frac{h\nu_o}{c}$ [8], but discrepancy between theoretical candle time requirement and the observed instant electron ejection [6], is comparable to the difference between particle speed and the speed of light, indicating the existence of other factor for photoelectron ejection rather than the billiard-ball of quanta (photon), a theoretical shortage fully understood by Raman who stated that, "*the classical wave-principles are not easily reconcilable with Compton effect because they have not been correctly interpreted*," [27]; thus, based on our interpretations and as explained, the Compton Momentum (ρ_C) slope in Fig.3, is in great discrepancy with Electron Momentum (ρ_E) slope, and as the Compton Momentum (ρ_C) slope is obtained from Eq. (6) used by Compton to derive the momentum of electromagnetic radiation, and since the role of momentum in electromagnetic radiation is to remove (knock) electron from atom; hence for any slope of momentum to have such characteristic, *it must be parallel and greater in magnitude* than the slope of Electron Momentum (ρ_E) shown in Fig.3, which includes the inter-atomic momentum of all electrons in periodic table [28], and since slope ρ_C is not parallel with slope ρ_E, therefore the slope of Compton Momentum (ρ_C) in Fig.3, doesn't represents the momentum that can remove inter-atomic electron, and since this slope is obtained from Compton formula, therefore the Compton formula is not justified, and doesn't uphold scientific merit, therefore the formula doesn't expressed the mechanism ejecting the photoelectron from atom, and the slope ρ_C doesn't have any relation with the Electron Momentum slope (ρ_E), thus whatever built upon it should be reviewed; therefore, and as stated before the Radiation Magnetic Force (F_{mR}) is the force embedded in the electromagnetic radiation as given by Eq.(24) [9]

$$F_{mR} = \sqrt{y\, v_R^3} \qquad (24)$$

Where, y is the constant of force with magnitude equal to $1.906318161436107200999984962546 3\times 10^{-61}$ N^2. Hz^{-3} (or $N^2.s^3$.).

Although the mechanism of the Radiation Magnetic Force (F_{mR}) doesn't required momentum to knock electron from the atom, as illustrated in the "*Photoelectric Effects-Radiation Based With Atomic Model*" [9], and "*The Compton Effect Re-Visited*" [10], the mechanism of which is shown in Fig.2, and since momentum $\rho = F\Delta t$, therefore from Eq. (24), the Magnetic Momentum (ρ_M) is given by

$$\rho_M = \left(\sqrt{y\, v_R^3}\right)\Delta t \qquad (25)$$

Where, ρ_M is the Magnetic Momentum due to the Radiation Magnetic Force (F_{mR}), as given in Tables.2, 3&4, $\Delta t = \frac{1}{v}$, the Electron Momentum (ρ_E) using Eq. (23), shown in these tables; and a comparison between both ρ_E and ρ_M showed the later is great by 12.566370614359172953850573533118 Kg.m/s.

Type	Work Function	Energy	Frequency	F_{mR}	ρ_C	ρ_E	ρ_M
Potassium	2.3 eV	3.685007859 x10^{-19}	5.561373182361112546936719933239 5 x10^{14}	5.726255872740169236929502112 7861 x10^{-9}	2.666666666 6666666666 6666666666 67 x10^{-27}	8.1936772 x10^{-25}	1.029647837858 10518258306567 09254 x10^{-23}
Silver-1	3.0 eV	4.80653199 x10^{-19}	7.253965020471016365569634695529 8 x10^{14}	8.530232692160296687891758958 4421 x10^{-9}	5 x10^{-26}	9.3578387 x10^{-25}	1.175940698374 97084787676053 07551 x10^{-23}
Aluminum	4.08 eV	6.536883506 4 x10^{-19}	9.865392427840582257174703185920 5 x10^{14}	1.352911040251196769277809112 8487 x10^{-8}	7.666667 x10^{-26}	1.09130215 x10^{-24}	1.371370728683 04844273564514 6929 x10^{-23}
Silver-2	4.75 eV	7.610342317 5 x10^{-19}	1.148544466574577591215192160125 6 x10^{15}	1.699493119281580954810594288 8293 x10^{-8}	6.5 x10^{-26}	1.17750222 x10^{-24}	1.479692929737 94817291240538 96609 x10^{-23}

Table.4. The threshold Frequency of potassium, silver-1, aluminum and silver-2 [24], transformed into energy, frequency, the Radiation Magnetic Force (F_{mR}) using Eq. (24), the Compton Momentum (ρ_C), the Electron Momentum (ρ_E) and Magnetic Momentum (ρ_M), the table also shows the potential of the work function.

V. Results and Discussion

- In science, it is normal to postulate an idea or formula, then to build strong argument around it backed by strong evidence.
- Such as the suggestion by Planck that energy is produced in discrete quantity, composed of integer number of finite equal parts, varied with frequency $\varepsilon=h\nu$ [1].
- Compton used such argument to claim that electromagnetic radiation consist of quantum having *momentum given by* $\frac{h\nu_o}{c}$.

- Compton didn't showed in his work neither the origin of the claimed momentum of the quantum, nor how he got it [8].
- This relation is shown to emerged from Einstein mass-energy eqivalent [21] as $E = mc^2 = \hbar v$ [22]
- The relation between both parts of this formula is shown not to be equal except at an imaginary state when the particle moves with the speed of light c, giving energy E= 8.199 x10^{-14} eV and frequency *v*= 1.237 x10^{20} Hz.
- The two parts in the formula of the momentum $\rho = mc = \frac{\hbar v}{c}$, is illustrated as not equal.
- An example given by Eq. (14) contain the radiation energy *hv* balanced with Einstein's mass-energy equivalent mc^2 in addition to other parameters, all of which resulted in Electron Momentum (ρ_E) given by Eq. (23).
- The three slopes in Fig.3, for the Magnetic Momentum (ρ_M), Electron Momentum (ρ_E) and the Compton Momentum (ρ_C), are derived, it showed great relation between ρ_M and ρ_E, while ρ_C is shown to be in odd with itself and the other two, and it can't be relate to any momentum.
- Momentum in electromagnetic radiation *must be parallel and greater in magnitude* than the slope of Electron Momentum (ρ_E), to remove electron from atoms.
- Since the slope represented by ρ_C in Fig.3, is not parallel with ρ_E, therefore ρ_C is not momentum slope.
- The Electron binding energies for the K 1s, for Hydrogen (H 1) is 13.6 eV = 2.1789611688x10^{-18} J and for Uranium (U 92) is 115,606 eV = 1.8522131241198x10^{-14} J [29], therefore the Ionization Frequency (f_i) which is equivalent to the binding energy [9] is 3.288464142613527419058234395306 8x10^{15} Hz and 2.795339600521907726526810628704 7x10^{19} respectively, they are in line with the Electron Momentum (ρ_E) given in Fig.3.
- Thus, the *momentum formula* $\frac{\hbar v_o}{c}$, given by Compton, upon which quantum is based, is not correct.
- Therefore, neither the *scattering is a quantum phenomenon, nor the radiation quantum exists* and quantum was a big mathematical flawed.
- The Radiation Magnetic Force (F_{mR}) is the force embedded in the electromagnetic radiation as given by Eq. (24) [9], while the Magnetic Momentum (ρ_M) given by Eq. (25) is the correct theoretical expression of the momentum that removed electron from atom.

VI. Conclusion

The mathematical formula of *momentum in the quantum of the incident ray* $\frac{\hbar v_o}{c}$ *used by* Compton, to explain the Compton effect based on the quantum nature of electromagnetic radiation is disputed from its energy formula, which supposed to give the equilibrium between Einstein's mass-energy equivalent and Planck's radiation energy; contrary to this, both equations are found not to be equal, except at one energy state related to the value of mc^2, and the momentum is not equal except at *mc* value, a formula contained mass-energy equivalent, Planck's energy formula and other parameters is analyzed and an Electron Momentum (ρ_E) is derived from it, a graph is established contained three slops of the Magnetic Momentum (ρ_M), Electron Momentum (ρ_E) and the Compton Momentum (ρ_C), they are compared, and great discrepancies found to exist in the Compton Momentum (ρ_C) slope, and a condition is established that, a momentum in electromagnetic radiation *must be parallel and greater in magnitude* than the slope of Electron Momentum (ρ_E), to remove electron from atoms, and since the slope represented by ρ_C is not parallel with ρ_E, therefore ρ_C can't represents momentum slope, and it can't support the idea of the existence of quantum in electromagnetic radiation, operating like billiard-ball to knock electron from atom, therefore the formula by Compton is not justified, therefore the Radiation Magnetic Force (F_{mR}) is embedded in the electromagnetic radiation the manner energy is [9], and a related Magnetic Momentum (ρ_M) is what existed, the paper is aimed at restoring the common sense to science, as its in the Universe, not as kidnapped by the mathematical description of the natural world!

Finally, although Einstein introduced quanta (photon) to solve the photoelectric effect, but this imaginary particle cost scientists a lot of mental efforts, where Einstein alone as a thinker with great consciousness spent 50 years thinking about photon in vain, he wrote before his death in 1955 that; "*All the fifty years of conscious brooding have brought me no closer to the answer to the question: What are light quanta? Of course today every rascal thinks he knows the answer, but he is deluding himself.*" [19]

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