Clear Explanation of Three Cardinal Mistakes of Physics of the 20th Century.

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Abstract
In this paper author believes that at least three basic concepts of contemporary physics, Millikan's experiments, de Broglie hypotesis and relations E= mc² and E=hν must be reviewed.

1. Misinterpretation of Millikan's experiments

Millikan found in his experiments the proportional increase in kinetic energy of electrons released from a metal surface with the linear frequency increase of photons striking that surface. The Millikan's experiments confirmed proportionality between the stop emission potentials V of electrons with photons frequencies ν at the photoelectric effect in the relation $h\nu = Ve = \frac{1}{2}mv^2 = p^2/2m_o$ and, it is believed, that also with photon energy. But as momentum of a photon is $h\nu/c$ then Millikan's experiments confirmed the same proportionality of energy E and momentum p of a photon with p^2 of an electron. Then momentum p of an electron has to be proportional to the square root of energy $\sqrt{(h\nu)}$ as well as of momentum $\sqrt{(h\nu/c)}$ of a photon. But in Millikan's experiments relation $h\nu = Ve = \frac{1}{2}mv^2$ in fact means that $h\nu$ is merely proportional to $Ve = \frac{1}{2}mv^2$ and observing linearly frequency ν of a photon its energy can be proportional to ν^2. Then we can declare that if we observe linearly frequency ν of a photon its energy compared to energy of electrons is $(h\nu/c)^2 = p^2 = h^2\nu^2/c^2 = \frac{1}{2}mv^2 = p^2/2m_o$ and we can write $h^2\nu^2/c^2 = Ve = \frac{1}{2}mv^2$. The same way as in Millikan's experiments, we observe a linear increase of photon frequency, while the energy of the photon increases quadratically, we in classical physics also observe a linear increase of the speed v of an electron while its energy increases quadratically as $\frac{1}{2}m_o v^2$.

2. Derivation of energy relation E=mc²

In relativistic mechanics (RM) we derive the equation of total relativistic energy from the relation $m = m_o/(1-v^2/c^2)^{1/2}$ and then bringing it to the square $m^2c^2 = m^2v^2 + m_o^2c^2$, we multiply it by c^2. After applying the square root, we get $E = mc^2 = (m^2v^2c^2 + m_o^2c^4)^{1/2}$. But we can declare that the step of multiplying by c^2 is unfounded in physics and is intentional, in order to ensure the dimension of energy after the resulting square root and merely because of that, we determine energy as momentum multiplied by c. Without multiplying $m^2c^2 = m^2v^2 + m_o^2c^2$ by c^2 after applying the square root we obtain the relations for momentum

$$mc = (m^2v^2 + m_o^2c^2)^{1/2} = (m^2c^2v^2/c^2 + m_o^2c^2)^{1/2} = m_oc(v^2/c^2(1-v^2/c^2) + 1)^{1/2} = m_oc\ (v^2/(c^2-v^2) + 1)^{1/2} = mc,$$

$$mv = (m^2c^2 - m_o^2c^2)^{1/2} = m_oc(1/(1-v^2/c^2)-1)^{1/2} = m_oc(v^2/(c^2-v^2))^{1/2} = m_ov(c^2/(c^2-v^2))^{1/2} = mv.$$

Thus we obtain $mc = mv + m_oc$ and mc and m_oc must be identified with a total and rest momentum of particles $p_t = p + p_o$. Consequently, equaly as we use for change in photon's total momentum $p_t = h/\lambda = mc$ the relation $h\nu/c - h\nu_o/c = h/\lambda - h/\lambda_o$, e.g. at Compton's effect, we can write change in total momentum of a particle, so for its momentum, relation $p = p_t - p_o$.

3. Identification of the dimension λ of a photon from relation $\lambda = h/p_t = h/mc$ as the wave of particles $\lambda = h/p = h/mv$, with value $\lambda = \infty$ in the rest state, instead of identification this λ as the dimension of a particle in the rest state with value $\lambda_o = l_o = h/p_t = h/m_o c$

De Broglie introduced the presumptions that the photon's relationships can be transferred onto a particle as $p = h/\lambda = mv$ and $E = h\nu = mc^2$ where the rest energy of a particle is associated with the frequency $h\nu_o = m_o c^2$ and particle momentum is associated with a particle's wavelength $\lambda = h/mv$, whose value is infinite $\lambda = \infty$ for zero momentum $mv = 0$. From these presumptions, de Broglie comes to two different ratios of energy to momentum $E/p = h\nu/h\lambda^{-1} = hc\lambda/h\lambda = \lambda\nu = c$ and, concurrently, $E/p = mc^2/mv = c^2/v$. The paradox is clearly seen if we insert $\lambda = h/mv$ into the total energy relation $E = mc^2 = h\nu = hc/\lambda$, then $E = mc^2 = hc/\lambda = hcmv/h = mvc$, so we get $E = mc^2 = mvc$, which is valid only when $c = v$, so if total energy equals kinetic energy what is also valid for a free particle in quantum mechanics (QM). De Broglie worked out this paradox by the phase velocity $w = c^2/v = \omega/k$ and the group velocity of a particle. Consequently, a phase velocity is always higher than the speed of light c and the phase velocity is infinity for a speed $v = 0$ and, at a speed $v \to c$, the phase velocity approaches from infinity to c.

The entire taking–over the deBroglie's formalism of the wave property of matter by QM leads to the wave function and the wave probability of particles propagation. Up to today, the meaning and role of phase velocity and wave function is unexplained.

But de Broglie discrepancy of a ratio $c = c^2/v$ so $c = v$ results from the simultaneous apparent validity of the ratios $E/p = h\nu/h\lambda^{-1} = c$ and $E/p = mc^2/mv = c^2/v$ instead of real validity of ratios

$E_t/p_t = mc^2/mc = p_t c/p_t = h\nu/h\lambda^{-1} = hc\lambda/h\lambda = \lambda\nu = c$ and

$E_t/p = mc^2/mv = h\nu/(h/\lambda - h/\lambda_o) = hc\lambda^{-1}/h(\lambda_o - \lambda)(\lambda\lambda_o)^{-1} = c\lambda_o/(\lambda_o - \lambda) = c \cdot c/v = c^2/v$.

For ratio of kinetic energy to momentum we get

$E_k/p = (h\nu - h\nu_o)/mv = c(h/\lambda - h/\lambda_o) / (h/\lambda - h/\lambda_o) = (mc^2 - m_o c^2)/mv = mvc/mv = pc/p = c$.

The paradox also disappears if we put in $p_t = h/\lambda = mc$ thus $\lambda = h/mc$ into relationship $E = mc^2 = h\nu = hc/\lambda = hcmc/h = mc^2$ and thus we arrive at $mc^2 = mc^2$.

4. Conclusion

Energies in RM as mc^2, mvc, $m_o c^2$ and energy of a photon $h\nu$ do not represent quantity of energy, but quantity of momentum multiplied by c, so $mc \cdot c$, $mv \cdot c$, $m_o c \cdot c$, $h\nu/c \cdot c$ and merely the dimension of such quantities equals in dimension the quantity of energy.

The wave of matter λ, introduced in the de Broglie hypothesis $h/\lambda = mv$, with value $\lambda = \infty$ in the rest state, must be connected with the real dimension of particle $\lambda = l_o$ in the rest state $h/\lambda_o = m_o c = h\nu_o/c$. The same way a photon is in relation $h/\lambda = mc$ connected with dimension λ of photon and with its total momentum. On this basis, if we carefully consider the relation among total, added, rest energies and momentums, we can derive the fundamental equation of QM that is the Klein-Gordon, Dirac and Schrodinger equation without the necessity of the wave function.

Detail analysis is shown in paper at http://www.vixra.org/abs/1108.0017

References
[1] Sujak P Big Crash of Basic Concepts of Physics of the 20th Century? (2011)
    vixra.org/abs/1108.0017