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Does the Photoelectric Effect *Really* Explain the Emission of Electrons?

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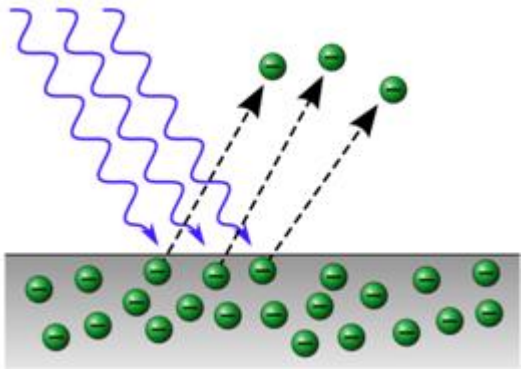
In this paper the question´s relevance investigates, if there can be an alternative explanation[1] and if experiments are biased by the theory.

When light hits a metal surface electrons are emitted. This is supposed to be true, since it has been observed in experiments and has been explained by the theories of Planck and Einstein[2].

According to Planck E = hv, which is the energy of each photon. Einstein developed the theory by adding the work function, i.e. E = W + KE, where W is the work function and KE is the Kinetic Energy of the electron. One photon isneeded to release one electron, and the electron leaves the metal surface or vanishes.

Based on Planck´s and Einstein´s investigations of the photoelectric effect, light quanta, photons, make electrons emission from a metal plate, often illustrated as below:



The two concepts *intensity* and *frequency* are used to find out when an electron is released or not; i.e. if there is enough frequency then the electron will be removed and this is called W, the work function. Energy is defined as the frequency of the photon, i.e. the density of the mass of photons; intensity is defined as the number of photons.

If we now add different surfaces of different materials, e.g. leaves, grass, trees and human skin, can we expect different answers to the question, when applying different intensities and frequencies?

Before we solve the problem by using concepts that directly represent the physical reality, we need a different theoretical approach.

To illuminate the concepts of the theory of the photoelectric effect three postulates are stipulated:

1) Every concept must represent the physical reality directly.
2) Nothing exists in isolation, i.e. everything exists in relations.
3) "Every element of the physical reality must have a counterpart in the physical theory".[3]

Based on the second postulate we conclude that all parts and entities in the Universe hang together.
The concept relation relates to reality by demonstrating that there are relations between all parts in the Universe, formalized as aRb, where:

1) a, b, c … are any system, subsystem, unit, or part, in any field of the Universe, e.g. suns, planets, moons, galaxies, leptons, hadrons, mesons, baryons, nuclei, atoms and molecules.
2) The relation R is a flow of packages, $p_{1\text{-}n}$, e.g. photons and electrons, between a, b, c …, in any field of the Universe.

Based on the postulate - *Nothing exists in isolation, i.e. everything exists in relations* - in combination with 1 and 2 above,The Principle of Relations is X = aRb, where X stands for E (Energy), G (Gravitation) and F (Force).

Between all systems and between all parts of any system, S, there is a continuous flow of packages, and the formula is: $S = ap_{1\text{-}n}b$.

In Einstein´s famous paper concerning "Does the inertia of a body depend upon its energy-content?" the conclusion is: *"If the theory corresponds to the facts, radiation conveys inertia between the emitting and absorbing bodies".*

When we transform Einstein´s conclusion to the photoelectric effect, we notice that there should be an absorbing body, i.e. the inertia is conveyed by radiation.

Now we are back to the important concepts of intensity and frequency of light, L. In combination with the concept package, i.e. $p_{1\text{-}n}$, (quanta, photons and electrons), and with the different materials approached by the light, we will get different results for the photoelectric effect and its emissions and absorptions.

If1-9 below deals with the behaviour of mass:

1. $E = mc^2$
2. $m = L/c^2$
3. $L = p_{1\text{-}n}$
4. $E = hv$
5. $\Psi(t,x) = p_{1\text{-}n}$
6. $E = aRb$
7. $S = ap_{1\text{-}n}b$
8. $aRb = ap_{1\text{-}n}b$
9. $E = mc^2 = aRb = hv$

Then the new interpretation of the photoelectric effect is this formula: $a(\Psi(x,t) = p_{1-n})b$

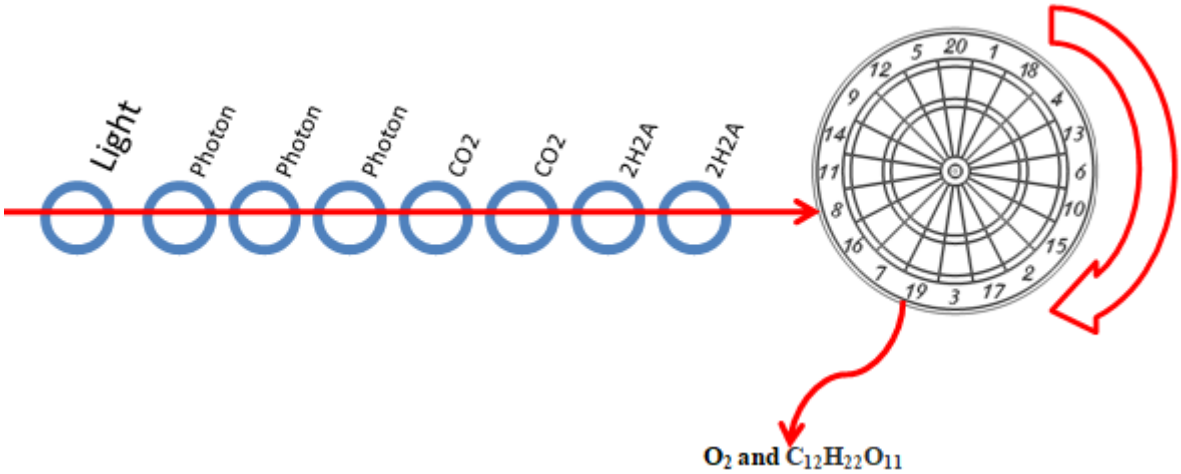
Light (L) is moving packages in Nature, which is the relation between a and b, i.e. the structure of b will be changed by R. L has the function of supporting b with packages needed by b.

This gives a new interpretation of the photoelectric effect, by introducing the concept Transformer and aRb.

The absorption of any flow of packages is guided by a *Transformer*, which is*the mechanism that directs and leads packages*, e.g. protons, electrons, photons and nutrient molecules.

Consequences applying the Principle of Relations and the mechanism of Transformer to the photoelectric effect will then look like this:

Light transport photons, ϒ, and via the transformer in combination with complimentary particles, e.g. CO_2 and $2H_2A$, new molecules occur.

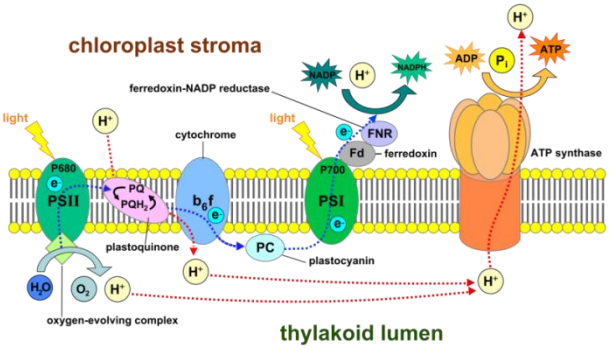


The transformation of photons bya Transformer between systems functions only in combination with complimentary particles. Plants are Transformers and make sugar and oxygen by using water, carbon dioxide and light, i.e. the photosynthesis.

The conclusion it that light does not exist in isolation, i.e. the photoelectric effect is only valid in laboratory experiments and it is not found in nature.
The so-called photoelectric effect is only an imaginary effect, based on invalid postulates and theories of physics and chemistry, but in an artificial laboratory environment it works out.

Now we must study how b is changed by R, i.e. p_{1-n}, coming from a, with different intensities and frequencies for different materials in Nature, and not within an experimental situation.

The best example is photosynthesis, where ***a*** is the Sun and ***b*** is the Plant = Transformer and R is photons.



What will happen if we analyze the photoelectric effect based on The Principle of Relations?

1) We must study how any material in itself will change due tothe impact of different packages.
2) What exactly happens with the material from which the electron moves?
3) We must study how the electrons are released, how photons influence material so electrons can move out.
4) What exactly happens when a photon makes an electron move?
5) We must understand how the process over time changes some aspects of Nature.
6) When the "atoms" of the metal/material lose an electron, does the photon replace the electron?
7) How can we describe the characteristics of the photon and the electron?
8) Where does the electron take its way?
9) If one photon has an impact on the metal, how do billions and billions of photons impact on the metal?

Notes

1) The article is based on the book *The Theoretical Foundation of Physical Reality*. Thomas Nordström. Published by AuthorHOUSE 2020.
2) A. Einstein, Annalen der Physik 17, 132, Photoelectric Effect. 1905
3) Physical Review, May 15, 1935, Volume 47, page 777; Can Quantum-Mechanical Description of Physical Reality be Considered Complete? A. EINSTEIN, B. PODOLSKY and N. ROSEN, *Institute for Advanced Study, Princeton, New Jersey.*