

Compton Scattering

by Hamid – January 30, 2014

In my previous article titled: “*A Discussion on the Theory of Everything*”, a definition was given for *Theory of Everything (TOE)*. In order to evaluate that definition, it is intended here to find the logical link(s) between *Diffraction Phenomenon* and *Compton Scattering* that probably the physics of both are related and seems to have similar structure. It is evident that the experimentalists of these fields are much more informed about the physics of these two phenomena. Hence, at the beginning some axiomatic clarifications are provided based on my knowledge and experiences, through them, I tried to draw a methodology for cognition of all natural phenomena:

1. Wave theory of light, which is based on *Young Theory*, is inherently wrong. Any doubt about this claim can be easily wiped out by comparing the pattern of *Thomas Young Wave Theory* with the real pattern of any kind of modern double-slit experiments. For more information, the reader is referred to the article “*The Failure of Thomas Young’s Wave Theory*”, or this one right [here](#), in which some examples are given. In my opinion, this subject is a key and starting point that paves the way for resolving the existing problems in quantum theory, and therefore from theoretical point of view it is not wisely to bypass it.
2. There exist convincing evidences that light behaves like particle, such as: *Photo Electric Effect*, *Compton Effect (Compton Scattering)*, *Blackbody Radiation* and so on, especially double-slit experiment with single photons. In one of my articles titled: “*Against Wave-Particle Duality Concept*” it has been proved that the pattern of double-slit experiment with single electrons in fact represents the distribution of a huge number of electrons according to “*the new probability wave function*”. In my opinion, the result of this analysis is generally also valid for the pattern of that experiment with single photons (light particles). **Light has only particle-like behavior!**
3. On the basis of above-mentioned criteria, when we talk about the pattern of single-slit, double-slit, multiple-slit and also the single-edge experiment (diffraction), it would not be correct to use the term “*interference*” because in physics, it can be used only for “*addition*” or “*superimposition*” of two or more waves. The phenomenon that happens in all of these experiments is *Diffraction (bending, scattering)* only.
4. When there exists a slit or circular aperture on the barrier in front of a light stream, the dispatched photons are categorized in three groups. The first group impacts on the surface of barrier. This group has not any role in our experiment. The second group of photons goes through the aperture without any contact with the cutting edges of aperture, and therefore, these photons have not any opportunity to diffract (to scatter). The shape of the pattern of this group on the second barrier is very small and almost the same as the shape (and dimensions) of aperture. The third group, which has the main role in formation of the pattern of the experiment, consists of those photons that collide with the edges of aperture. I think these photons represent very clearly ***the interaction of light with the matter***, to some extent in accordance with the rules of *Compton Scattering*.

Arthur Holly Compton (1892–1962) was a pioneer in high-energy physics. He was awarded the Nobel Prize in 1927 for his discovery of the *Compton Effect*, which provided convincing evidence for the photon model of light.

The current paradigm about *Compton Effect* is as follows:

“Change in wavelength of X rays and other energetic forms of electromagnetic radiation when they collide with electrons. It is a principal way in which radiant energy is absorbed by matter, and is caused by the transfer of energy from photons to electrons. When photons collide with electrons that are free or loosely bound in atoms, they transfer some of their energy and momentum to the electrons, which then recoil. New photons of less energy and momentum, and hence longer wavelength, are produced; these scatter at various angles, depending on the amount of energy lost to the recoiling electrons. The effect demonstrates the nature of the photon as a true particle with both energy and momentum. Its discovery in 1922 by Arthur Compton was essential to establishing the wave-particle duality of electromagnetic radiation.” Figure 1(a), below:

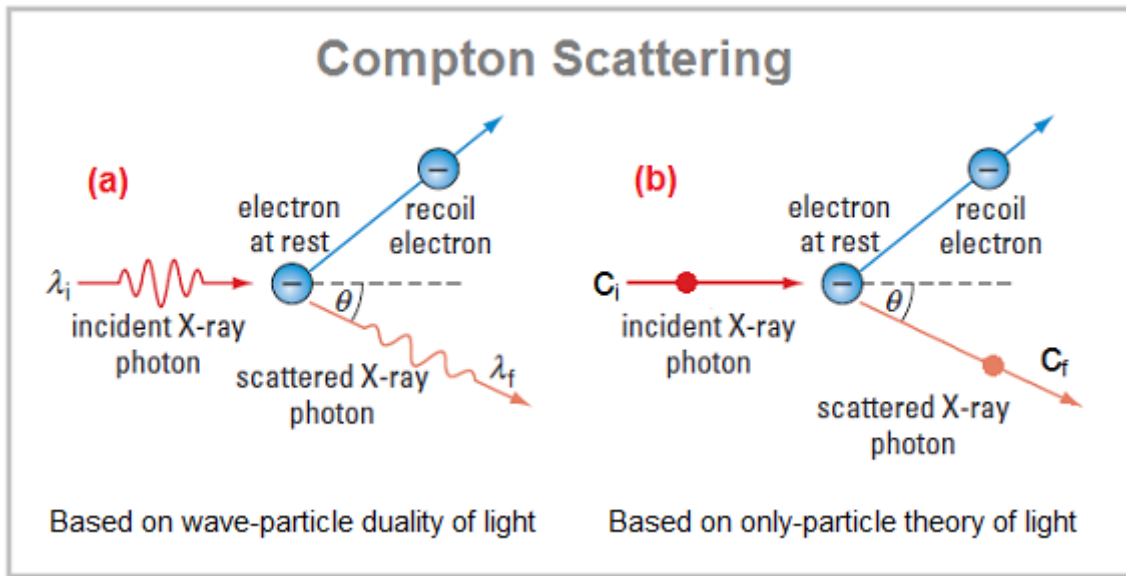


Figure 1- Compton scattering: the scattering of an X ray by an electron

The current dominant paradigm cannot free itself, scientifically or logically, from wave-particle duality of light, because it has an idealistic basis.

My realistic approach for explaining “*the interaction of light with the matter*” has been summarized in Figure1(b). The difference between incident photon and scattered photon lies in their speeds, namely c_i and c_f , and also their direction. I do insist again that quantizing the energy of photons is equivalent to quantizing their speeds. The direction of scattered photon depends on its speed (c_f), or its energy, which is less than the speed (c_i), or energy, of incident photon and follows the rules of “*the new probability wave function*”. More information about the speeds of light can be found in the article “[Exact Planck Length Unveils Quantum Gravity](#)”.

We can suppose that at the moment of collision of incident photon with electron, a new point source of light has been created, because from the view point of energy, speed and direction the scattered photon is different from the incident photon. This source could be named “*secondary point source of light*”. In single-slit, double-slit, multiple-slit and also the single-edge experiment (diffraction), the photons collide with the electrons of atoms of barrier-material at the cutting edges of apertures or of barrier. In these cases, a huge number of point sources at the edges all together make a “*secondary linear source of light*”, that could be straight or curved. This source of light determines the general shape of pattern on the screen.

Generally speaking: the pattern of diffraction experiment and also the patterns of all types of double-slit experiments have the same structure and represent very clearly the **difference** between and also the **classification** of light particles (photons), in accord

with “*the new probability wave function*”. All these patterns are the manifestations of the interaction of light with the matter. In other words, the so called wave theory of light, which is inherently wrong, cannot have any role in the formation of diffraction patterns.

A real pattern of diffraction or scattering of light particles is shown in Figure 2:

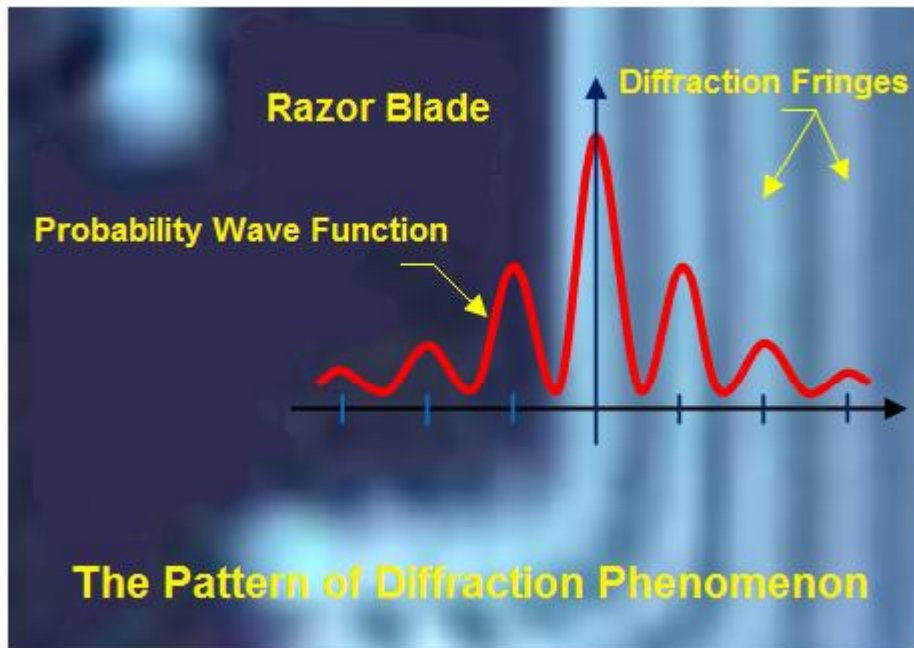
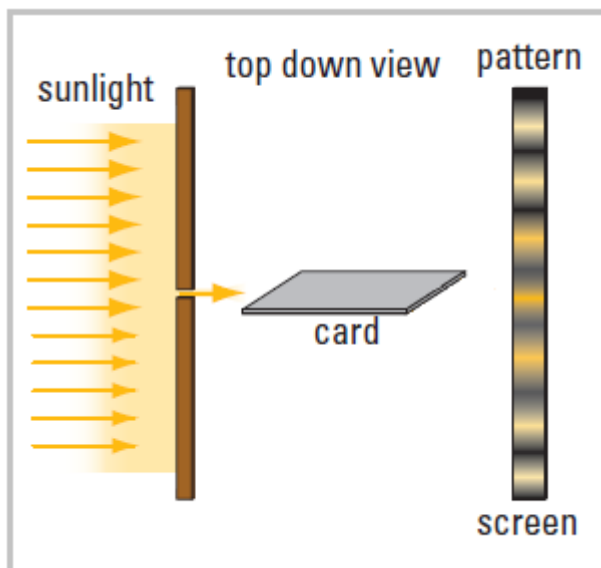


Figure 2- A real pattern of diffraction or scattering of photons

The writer is not sufficiently informed about the details and procedure of diffraction experiment with a razor blade. For example; here it is not clear where the camera is located for photographing the pattern. But it appears that in this photo almost only the right half of the pattern on the screen is observable; the left half of the pattern is hidden behind the blade that is parallel with the screen and lies between the light source and the screen.



It should be remembered again that Young’s double-slit experiment, as demonstrated on November 24, 1803, to the *Royal Society of London*, did not actually use a double slit; instead a narrow beam of sunlight was split by the edge of a thin card, achieving the same result as a double-slit (see Figure 3).

Figure 3- Diffraction experiment with a narrow beam of sunlight (schematic)

On the basis of all above, it could be claimed that: **the cutting edge of reality is stranger than fiction!**