Surpassing speed of light

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Abstract

Particles do not attain speed of light (c) when they are accelerated using particle accelerator. This paper describes an underlying mechanism which may be responsible for not allowing particles gain the speed of light. It also describes a few concepts which may be helpful in pushing the particles speed beyond speed of light (c).

1. Energy transfer mechanism between electrons and photons

Particles do not attain speed of light when they are accelerated using particle accelerators. To understand the underlying mechanism which does not allow the particle gain the speed of light, this work pays special attention to Photoelectric Effect. Photoelectric Effect is a physical effect in which falling light on a metallic emitter results in emission of electrons from the surface of the metallic emitter. The emitted electrons can be collected with a metallic collector. Many great scientists in past contributed to develop understanding of Photoelectric Effect. Hertz discovered that clean metal surfaces emit charges when they are exposed to ultraviolet rays [5]. Hallwach in year 1888, established that the emitted charges are negative. J. J. Thomson proved that the emitted charges are electrons [4]. In year 1902, Philip Lenard, who was researching the photoelectric effect with intense carbon arc light sources, found out that:

- Electron emitted from the surface of the metallic emitter are with a range of velocities.
- The maximum kinetic energy K_{max} of the emitted electron does not dependent on the intensity of the light which falls on the surface of the metallic emitter.
- K_{max} increases with the frequency of light.

In year 1905, Einstein published three papers which revolutionized the modern sciences [1,2,3]. Einstein was awarded Noble Prize in year 1922 for his contribution to physics by developing his theory about Photoelectric Effect. According to Einstein's theory of photoelectric effect, the relationship between K_{max} and the energy of the photon is given by:

$$K_{max} = hf - \Phi \qquad (1)$$

Where,

K_{max}: Maximum kinetic energy of the emitted electron.

hf: Energy of the photon.

Φ: Work function of the metal.

Φ is described as the minimum energy the electron needs to leave the metal and is given by:

$$\Phi = hf_0 \qquad (2)$$

In 1916, the Robert Millikan from USA reported photoelectric data and determined the value of h with a very high precision. Equation (1) is based on the following relationship between the Energy and the frequency of the photon:

$$E \;\alpha\; f \qquad (3)$$

Assuming a photoelectric experiment, in which only monochrome light source is used to incident photon on the metallic emitter. All the measurable quantities in Equation (1) are constant:

$$K_{max} = C_1 = \text{Constant} \quad (4)$$

$$h = C_2 = \text{Constant} \quad (5)$$

$$f = C_3 = \text{Constant} \quad (6)$$

$$\Phi = C_4 = \text{Constant} \quad (7)$$

Equation (1) can be rewritten as:

$$C_1 = C_2C_3\text{-}C_4 \quad (8)$$

Photons can be both absorbed by both nucleus and the electrons. Electron has a chance of absorbing energy from multiple photons on three different occasions.

- While electron is bound to the metal nucleus.
- While electron is released from the metal surface and is still inside the metal.
- While electron is in the space outside the surface of the metal and moving toward the electron collector in the photoelectric device.

Total probability of electron, meeting photons in a unit time in the photoelectric device can be described by the relationship:

$$p_{collision} = \min(p_1+p_2+p_3,1) \quad (9)$$

Where,

$p_{collision}$: Total probability of electron to meet photons in a unit time in the photoelectric device.

p_1: Probability of electron meeting the photons while it is still bound to the metal nucleus.

p_2: Probability of electron meeting the photons, while electron is released from the nucleus and is moving toward the surface of the metal after gaining energy from photons.

p_3: Probability of electron meeting the photons, while electron is outside the surface of the metal and is moving toward the electron collector in the photoelectric device.

It is obvious that the probability of a single electron colliding photons increases as the number of photons falling on the metallic emitters increase. The relationship can be described as:

$$p_{collision} \ \alpha \ n_{photon} \quad (10)$$

Where,

n_{photon}: Number of photons that falls on the unit surface area of the metallic emitter in a unit time.

Theoretically, K_{max} should increase with increase in the n_{photon}:

$$K_{max} \ \alpha \ p_{collision} \ \alpha \ n_{photon} \quad (11)$$

In photoelectric effect, increasing the intensity or the number of photons falling on the metallic emitter surface does not increase the value of K_{max}. K_{max} is constant when monochrome light falls on the metallic emitter.

$$K_{max} = C_1 \quad (12)$$

This work suggests that electron does not absorb more energy than hf regardless of having a chance to do so.

2. Interaction patterns between electrons and photons

To understand the mechanism of energy transfer between electron and photon, let's assume two patterns of energy transfer interactions between electrons and photons during the photoelectric effect.

Pattern 1: One electron interacts with only one photon.

Pattern 2: One electron interacts with multiple photons.

Let's look at these patterns in details.

Pattern 1: Electron interacts with only one photon

In this pattern, which is much simpler compared to the pattern 2, a single electron absorbs only one photon in a unit time. After the electron has absorbed the energy from photon, it no longer accepts the energy from photons. The electron gets the energy equal to hf when a single photon has transferred all its energy to the electron.

$$K_{\max} = hf - \Phi \qquad (13)$$

This work suggests that the energy transfer between the electron and photon is not an event that is repeated many times, but is a single discrete event which happens only once within a unit time. This pattern can be realized through different ways such as:

1. An electron is capable of absorbing momentum from only one photon in a unit time.
2. A photon collide with only those electrons which have not gained momentum from any other photon in a unit time.
3. An electron and group of photons avoid each other after there has been an energy transfer among an electron and other photons within a unit time.

Reason (2) and (3) above indicates intelligent behavior of electron and photons, in which electron and photons are capable of sensing one another and making intelligent decisions.

The controlled transfer of energy with the surrounding environment is an essential feature of living cells like bacteria. The cytoplasmic membrane of bacteria contains pores through which the nutrients, the wastes and other products of the cell pass through. Cell only takes the amount of the nutrients, it can consume. It is the exactly the behavior of the electrons in the Photoelectric Effect. This work suggests that particles also possess the intelligent environment interaction capability as the one in living cells. The reason the pores on the surface of the electron have not been observed yet can be contributed to the fact that the science has not progressed to the stage where we could directly observe the structure of the particles.

Pattern 2: Electron interacts with multiple photons

In this case, the energy that a single electron accumulates is a sum of energy transfers from multiple photons. Assuming n photons transferred the energy to electron in unit time, and each photon transferred a part of the total energy it has, the total energy transferred to the electron is given as:

$$E_{\text{sum}} = hf\ \Sigma k_i \ \ (i = 1 \text{ to n}) \qquad (14)$$

Here, k_i is the fraction of the total energy of photon i that is transferred to the electron. However, according to Equation (1), the condition below need to be satisfied.

$$hf\,\Sigma k_i - \Phi \leq K_{\max} \quad (i = 1 \text{ to } n) \qquad (15)$$

$$\Sigma k_i \leq \text{Constant} \qquad (16)$$

The above condition can be satisfied, only when the photons and/or electrons have an intelligent behavior or in other words they have intelligence to make complex decisions. Figure (1) shows the simplest intelligent behavior by which Equation (1) could be satisfied.

Group of photons queue before the electron to transfer the energy. Different photons transfer a part of energy to the electron, until it is filled to the level *hf*.

The different intelligent aspects of the energy transfer are:

- Photons are able to determine the current level of stored energy in the electron.
- Electrons are able to acknowledge the current level of energy stored in the electron.
- Electron and photons are able to have a protocol of energy transfer.

The conclusion from the above discussion is that the energy transfer between the particles is a controlled process, in which only limited amount of energy get transferred from photon to electron. Particle accelerator provides huge amount of energy within unit time, however the charged particle are not designed to acquire energy more than a specific limit from charged plates. Another paper from AB Center of Theoretical Sciences explains possible mechanism behind group behavior of particles [6].

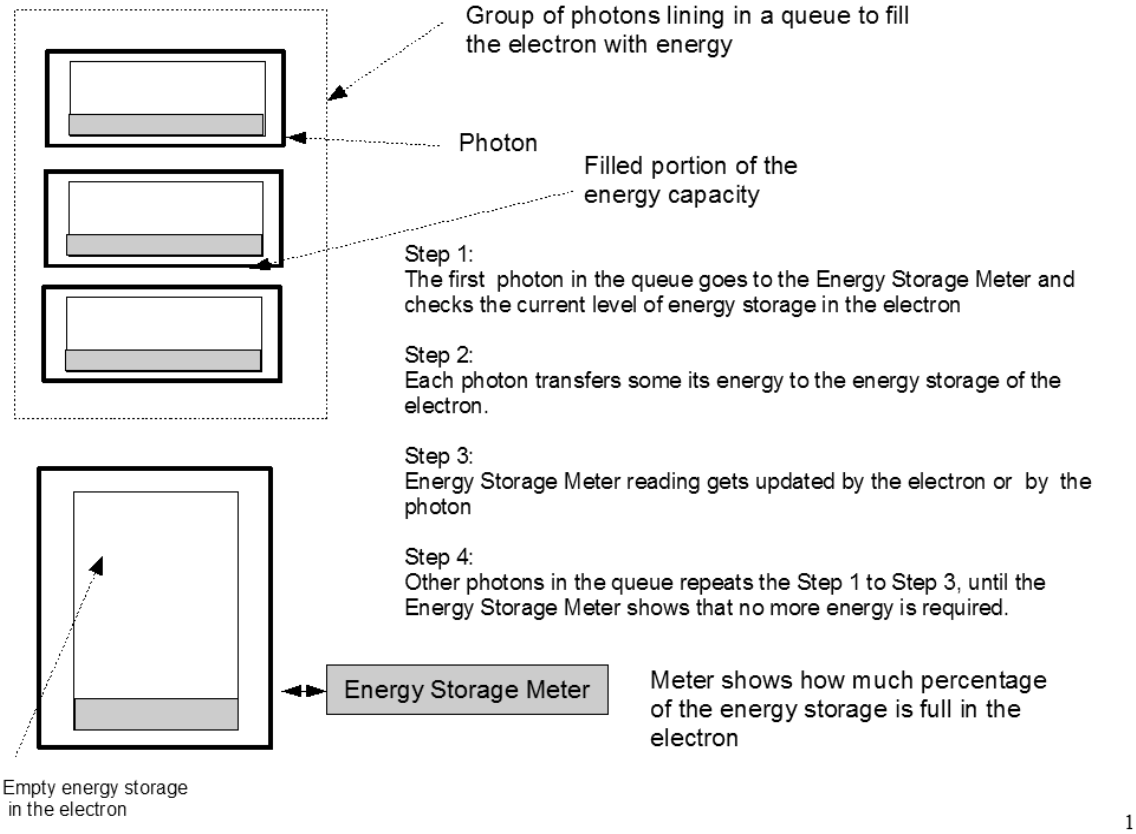

Figure 1: Energy exchange between photons and electrons

3. Surpassing speed of light

Below are described different mechanisms through which the particles may exceed the speed of light.

Applying a huge force on the particle instantly

Particle has a kind of intelligent behavior that enables it to receive field particle only up to a certain level. Like other living organisms, particle may have a reacting time, after which it is able to stop the influx of field particles from charged plates. If very large quantity of force is applied to the particle, in a very short time, the particle may not be able to control the flow of filed particles. It should enable the particle to move at a speed larger than c.

Using appropriate field particles

The particle may have larger capacity to accept field particle of specific types. For example, if any particle has limited capacity to accept photons, it might have larger capacity to accept gravitons. In this case, a very powerful gravitational field may be able to accelerate particles toward itself with speed larger than speed of light. If flow of gravitons is large in great earth's depth, particle accelerators built in great earth's depth might have better efficiency compared to accelerator built on the surface of the earth.

Increasing the energy storage capacity of particle

The only reason that is identified for a particle being unable to exceed the speed of light is their inability to receive more energy than a fixed limit in any unit time from the charged plates. In other words, it can be said that the energy storage of particle is of limited capacity for field particles received through the charged plates. The charged particle needs to consume energy and make a space in its energy storage, before it can obtain further energy. Theoretically, the capacity of the energy storage can be increased by attaching the particle to other type of particles which have larger energy storage capacity from charged plates.

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