QUANTIZTION OF HEAT
THERMALIONIC EFFECT
FIND THERMALIONIC WORK FUNCTION AND FIND GENERAL THERMAL CONSTANT
((J=$6,854X10^{-23}\,joule/k^0$))

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Abstract

What is the greatest speed that free electron launches in vacuum place which subjected to thermal quantum at a temperature of T=500k^0 ?

In 1883, Edison discovered that the glowing wire issued negative shipments, and this thermionic emission is called the Edison effect. Thompson in 1899 proved that what comes out from metal when you heated is the electrons. When we study this effect, we found that thermionic work function nearly equal to photoelectric – work function and this result it was considered quite satisfactory.

But so far this study remained limited to (thermionic effect) and even the photoelectric effect also, because it does not stem from unified physical theoretical basis, but was interpreted according to the observation the phenomenon. We find five effects theoretically as well as to discover new constant which is general thermal constant (**J**). J= $6{,}854X10^{-23}\,joule/k^0$, and new law in the science of heat: $E = J.T$

Keywords :thermalionic effect, thermalionic work function , general constant thermal

1. introduction

At concluded the law of work function dependent in electrical effect; Einstein describes that by the following:

If a swimmer jumped from a convenient height towards the swimming pool kinetic energy of the swimmer can affect the rest of the swimmers and displace them from their places. But if there was only one swimmer, the energy of swimmer who jumped was reserved and no loss of energy: so the energy can throw the other swimmer out the pool. And why not, this analogy is true and is fit to apply this on other physical phenomenon, such as the phenomenon the fall of light rays on metal surface and were carrying sufficient capacity, they can extract electron from the metal surface. And whether they have sufficient perfect power they can also throw it to the outside surface of the metal and super-fast starts the moment extracted from the metal.

This is the photoelectric effect not be sufficient and valid analogy to conclude the laws of other phenomenon such as the phenomenon of thermionic effect or electro-thermal? It means if sufficient amount of heat effect on the metal and was able to extract electrons from the surface, if Law of work function dependent by Einstein represented by jumper swimmer, how can conclude the dependent law of work function in the thermionic effect such an analogy? In my humble opinion, this analogy is not consistent with the second phenomenon that similar to the first.

In any case, the theory of energy recovery and as usual, can conclude the laws of the photoelectric effect and the thermal came on the basis of the theoretical context without exposure to a particular interpretation of the phenomenon known by accident, for example.

The theory of energy recovery have been able to discover and conclude the previous effective laws in addition to new effect, this theory is revealed, and the previous theories did not identify of ever before, such as the electromagnetic effect. If the amount of heat affected on the material, especially metal and led to heated, the surface electrons absorb thermal energy, which leads to increased kinetic energy which leads to defeating the forces of attraction on the surface of the positive shipments. Thus can get rid of the surface of the metal and sped speed is the biggest moment of the electron to free it from the metal surface.

In the previous theories, there is no clear study for this effect.

From the theory of energy recovery we can clarify the general equalizer

For energy in the case of free particle (electron) which is:

$$E_t = E_o + \Delta E$$

E_t:The total energy

E_o: The static energy

ΔE:The change of kinetic energy (external offered energy to the particle)

$$mC^2 = m_o C^2 + C^2 \Delta m$$

$mC^2 = m_o C^2 + \beta m V^2$ Or:

Where: $\Delta E = C^2 \Delta m = \beta m V^2$

$\beta = \frac{k}{1+k}$, $K = \frac{1}{\sqrt{1-\frac{V^2}{C^2}}}$

2. The three syndromes of energy are:

1. Matter and antimatter.
2. Electricity and magnetism.
3. Heat and radiation.

From general Equalizers for the energy, which are

$$E_t = mC^2 = U_t . e = P.\theta_t = h.f_t = J.T_t$$

$$E_o = m_o C^2 = U_o . e = P.\theta_o = h.f_o = J.T_o$$

$$\Delta E = \beta m V^2 = U.e = P.\theta = h.f = J.T$$

$$\frac{E_o}{E_t} = \frac{m_o}{m} = \frac{U_o}{U_t} = \frac{\theta_o}{\theta_t} = \frac{f_o}{f_t} = \frac{T_o}{T_t} = \gamma$$

If the change in kinetic energy or provided external power leads to move the free particle:

$$\gamma = \frac{1}{K} = \sqrt{1 - \frac{V^2}{C^2}}$$

The function $\boldsymbol{\gamma}$ introduces us on the extent of relation the speed of the particle with energy acquired by an electron, If the speed at which the electron starts less than 10% of the speed of light shall be the value of $\gamma = 1$, the laws of kinetic energy change follow the laws of classical theory but if speed increased from 10% percent they follow the laws of the theory of energy recovery.

$$\gamma = \sqrt{1 - \frac{V^2}{C^2}} = \frac{T_0}{T_t} = \frac{T_0}{T_0 + T} \rightarrow V = C\sqrt{1 - \frac{1}{\left(1 + \frac{T}{T_0}\right)^2}}$$

2.1 Find static heat temperature T_0

It is for the electron, for example, and energy equalizers, we find:

$$E_0 = m_0 C^2 = h.f_0 = J.T_0$$

Since we know the amount of the wavelength of the particle (electron, for example), fromwien's constant we find static heat temperature.

$$b = 2{,}9X10^{-3} m.k^0$$

$$m.k^0\ b = T.\lambda_{max} = 2{,}9X10^{-3}$$

$$\rightarrow T = \frac{2{,}9X10^{-3}}{2{,}42444200 5X10^{-12}} = 1{,}96235775X10^9 K^0\ T = \frac{b}{\lambda_{max}}$$

$$T = T_0 = 1{,}96235775X10^9 K^0$$

2.2 Find general thermal constant (J):

The amount of static energy for the particle is given by the following relationship:

$$E_0 = m_0 C^2 = J.T_0$$

After that we have created the amount of static temperature of the particle then we find the amount of general thermal constant (**J**):

$$\rightarrow J = \frac{m_0 C^2}{T_0} = \frac{9.11X10^{-31} X9X10^8}{1,96235775X10^9 K^0} = 6,854X10^{-13}\ joule/k^0$$

$$J = 6,854X10^{-13}\ joule/k^0$$

This is a general thermal constant

Or from the relationship: $\Delta E = \beta m V^2 = h.f = J.T\ ,\ b = T.\lambda_{max} \rightarrow J = \frac{h.c}{b}$

And compensation in this equation we find:

$$J = 6,854X10^{-13}\ joule/k^0$$

3. Thermionic effect of particle (electron)

3.1 Particle (free electron) unlinked with material

Thermionic effect: we study the effect of thermal energy in any particle, for example, Electron and see the possibility of converting the thermal energy into kinetic, and convert it to electrical energy can be benefited from it on the practical level.

If the electron has received the amount of thermal energy (thermal quant), the amount of energy is given by the following mathematical new relation:

$$E_T = E_0 + \Delta E$$

$$J.T_T = J.T_0 + J\Delta T$$

$$J.T_T = J.T_0 + J.T$$

T_t: Total temperature

$\mathbf{T_0}$: A static temperature is the temperature required to form a particle which is resulting temperature from the annihilation of a particle and convert it into thermal energy.

$\Delta T = T_T - T_0 = T$:Changes in the electron temperature is the influential external temperature.

In the case of free particle which is not linked with material, the kinetic energy is equal to the external power absorbed by the electron, since the electron is not linked with material, the spent energy on getting rid of annihilation material $\acute{E} = J.\acute{T} = 0$, so ($\acute{T}$)threshold temperature (is the necessary temperature to make electron get rid of material, and this mean that work dependent in this case kinetic energy is represent only for electron, which means external power that expenses only to move the electron.

$$E = \acute{E} + \Delta E$$

$$E = \Delta E = J\Delta T = J(T - \acute{T}) = J.T = \frac{1}{2}mV^2{}_{max}$$

$E = J.T$:Thermal energy absorbed by the electron.

$\acute{E} = J.\acute{T}$:Thermal energy disbursed to overcome the electron on metal attraction forces of electron, which is non-existent here because the electron is free and not linked with metal.

$\Delta E = \frac{1}{2}mV^2{}_{max}$: Kinetic energy, which electron starts with.

3.2 thermionic effect of the linked particles with the material:

If the particle is linked, this means that the strength of the link affected upon it by neighboring ions from the metal surface, the energy absorbed by the electron is:

$$E = \acute{E} + \Delta E$$

$E = J.T$:Thermal energy absorbed by the electron.

$\acute{E} = J.\acute{T}$:Thermal energy disbursed to overcome the electron on metal attraction forces of electron.

$\Delta E = \frac{1}{2}mV^2{}_{max}$: Kinetic energy, which electron starts with.

$$J.T = J.\acute{T} + \frac{1}{2}mV^2{}_{max}$$

$$\Delta E = J(T - \acute{T}) = \frac{1}{2}mV^2{}_{max}$$

Where: $\acute{\mathbf{T}}$ threshold temperature is a specific for every metal, this mean that it is a necessary temperature to disengage of electron from the metal and V_{max} is the greet speed, which particle starts with.

The amount of spent thermal energy to rid of electron from the metal surface are:

The total energy absorbed by the electron is: E = J.T

4. Results and discussion

1. The general thermal constant has discovered (**J**) which is still unknown so far.
2. Thermal equation has discovered based on finding general thermal constant, and in this case it became easy to study the movement of electron and take advantage of this situation.
3. The amount of heat received by of electron is a quantum amount, and became the quantum thermal at a temperature that is:

   Q = E = J.T.
4. Find a static temperature of the particle, whether an electron or proton is the necessary temperature for the formation of an electron or proton in other words, and the annihilation of an electron leads to the production of a temperature amount $\mathbf{T_0}$, which is a very huge amount.

These equations are very important to now the following:

Production of electric power, or (accelerate particles like electrons or protons) if subjected to a thermal quantum at a temperature of **T** Calvin.

1. Define the greet speed that electron launches after the effect of energetic quantum enough to move the electron.
2. Define the thermal threshold of the metal or material which electron launches by the subject to thermal quantum (amount of heat).

Example:

What is the greatest speed that free electron launches in emptied place which subjected to thermal quantum at a temperature of **T** Calvin?

3. If we compared between the photoelectric effect and thermionic effect, we will find many common factors between them, namely:

- Light and heat both of them can affect charged particles such as electron and the proton, and increase the thermal capacity.
- -If the light energy and heat was sufficient and electron was free, the electron will move quickly and stems superpower.
- If electron is not free and linked with metal, and for make electron to free from the metal, energy must be sufficient to free electron and then move super-fast.
- Each of effects which are work function dependent make electron move very speed.
- For every effect we have effective function to get ride electron from metal, in photoelectric effect there is threshold frequency, electro-thermal effect and there is a threshold temperature.
- Every effects leads to free the electrons from metal and can be grasped another nearby, creating big circuit lead to the generation of electric current directly.

5. Conclusion

The thermionic, discover its equations and its industrial applications will be a breakthrough in the production of long life, small size and silent electric generators which are very high production, which its efficiency exceeds 95%. This also fits for small and large cars, all vehicles, aircraft and ships, all power plants with higher returns and that limit pollution of the environment.

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