International Journal of Sciences: Basic and Applied Research (IJSBAR)

ISSN 2307-4531
(Print & Online)

http://gssrr.org/index.php?journal=JournalOfBasicAndApplied

Quantum Certainty Mechanics

Muhammad Yasin*

Savar,Dhaka,1341,Bangladesh

Email: md.yasin@ymcontents.com

Abstract

Quantum certainty mechanics is a theory for measuring the position and momentum of a particle. Mathematically proven certainty principle from uncertainty principle, which is basically one of the most important formulas of quantum certainty mechanics theory. The principle of uncertainty can be proved by the principle of certainty and why uncertainty comes can also be proved. The principle of certainty can be proved from the theory of relativity and in the uncertainty principle equation, the principle of certainty can be proved by fulfilling the conditions of the principle of uncertainty by multiplying the uncertain constant with the certain values of momentum-position and energy-time. The principle of certainty proves that the calculation of $\theta \geq \pi/2$ between the particle and the wave involved in the particle leads to uncertainty. But calculating with $\theta=0$ does not bring uncertainty. Again, if the total energy E of the particle is measured accurately in the laboratory, the momentum and position can be measured with certainty. Quantum certainty mechanics has been established by combining Newtonian Mechanics, Relativity Theory and Quantum Mechanics. Quantum entanglement can be explained by protecting the conservation law of energy.

Keywords: quantum mechanics; uncertainty principle; quantum entanglement; Planck's radiation law; bohr's atomic model; photoelectric effect; certainty mechanics ; quantum measurement ; Photoelectric effect formula.

1. Introduction

In 1927 Heisenberg invented the principle of uncertainty [1]. The principle of uncertainty is, "It is impossible to determine the position and momentum of a particle at the same time."The more accurately the momentum is measured, the more uncertain the position will be.

----

* Corresponding author.

Just knowing the position would make the momentum uncertain [2]. Einstein was adamant against this principle until his death. He thought that particles have some secret rules. Einstein thought, "The uncertainty principle is incomplete [3]. There is a mistake somewhere that has resulted in uncertainty. Many did not accept Einstein then [4]. But I'm sure Einstein was right then, there are secret rules for particles. Heisenberg's uncertainty principle is also 100% correct [5,6]. There are waves with the particle (The Broglie's wave) [7]. If we calculate $\theta \geq \pi/2$ between waves and particles then uncertainty will appear. But if we calculate $\theta = 0$ then there is no more uncertainty. Again, in the laboratory, when we measure the position and momentum of a particle, the uncertainty will be reduced if the energy of the photon or the force produced by the effect of an instrument is taken into calculation. Then the momentum and position of the particle can be measured with certainty according to the principle of certainty. The purpose of this research paper is to establish Einstein's concept of the secret law, that is, to establish the theory of certainty, to establish the relationship between the principle of certainty and the principle of uncertainty, and to explain why uncertainty occurs. This article will have a total of four formulas including the certainty policy. The formulas together are known as certainty mechanics. Bohr's angular momentum [8] can be proved by certainty mechanics, Bohr's energy radiation formula [8] can be proved, Max Planck's quantum theory [9] , Einstein's photoelectric effect [10] and Heisenberg's law of uncertainty [1] can be proved by certainty mechanics. The formulas are established by protecting the conservation law of energy. The complex problems of quantum mechanics can be solved by quantum certainty mechanics. The essence of the principle of certainty is that at the same time it is possible to accurately determine the position and momentum of electrons. The more accurately the position is known, the more accurately it is possible to determine the momentum. Photons are thrown at electrons while observing electrons by laboratory equipment. As a result, the position and momentum of the electron change. The principle of certainty is established by calculating the energy of that photon. There is a relationship between the principle of certainty and the principle of uncertainty. The principle of uncertainty can be proved by the principle of certainty just as the principle of certainty can be proved by the principle of uncertainty

2. Formulas proved by certainty mechanics

The basic formulas of quantum mechanics can be proved by quantum certainty mechanics. Let's take a look at all the formulas that can be proved from this theory.

- Bohr's formula for angular momentum.
- Planck's quantum formula.
- Bohr's proposal regarding energy radiation.
- "Uncertainty Principle".
- Einstein Photoelectric effect formula.

3. Evidence of the laws of quantum certainty mechanics

There are 4 formulas in quantum certainty mechanics which are based on quantum mechanics. Quantum certainty mechanics is a combination of Newtonian mechanics, quantum mechanics and the theory of relativity. The "principle of certainty" comes from truthful relativity theory.

3.1. Evidence of the second law

From the particle wave duality of The Broglie [7],

$\lambda=\frac{h}{p}$

$=> p=\frac{h}{\lambda}$

$=> P =\frac{h}{c}f$ $\quad\quad$ ($\lambda =\frac{c}{f}$, f= frequency)

$$=> P =\frac{h}{c}f \qquad (1)$$

Equation 1 has a relationship between momentum and frequency. This equation is as true for electrons traveling at the speed of light (c) as it is for large objects. The wavelength λ is involved in its matter wave whenever the object starts moving with P momentum. When an object gains momentum, waves are created due to the momentum, or we can say that Broglie's waves are involved [10]. We are not waves; waves are created when we move. Thus there is a relation between the frequency and the wave created due to the momentum of the object. If a boat runs on the river, waves will be created. The shape of the wave depends on the momentum of the boat. Similarly what kind of waves and frequencies will be created when an object moves with momentum will depend on the momentum of the object. From Equation 1 it is seen that the momentum of an object and the frequency of the waves created or involved due to the momentum are proportional.

If the momentum of an object changes, the frequency of the waves involved due to the momentum will also change.

If the initial momentum is p_1,

$P_1=\frac{h}{c}f_1$

Now, if the momentum changes from P_1 to P_2, the momentum will be,

$P_2=\frac{h}{c}f_2$

So, the change of momentum,

$dp = p_1 – p_2$

$= \frac{h}{c}(f_1 –f_2)$

$$= \frac{h}{c}(df) \qquad (2)$$

Now if the velocity of the particle is v, the form of equation 2 will be,

$dp = \frac{h}{v}(df)$

That is, if the momentum of an object changes, the frequency of the wave created or involved due to the momentum will change.

Newton's second law [11] is,

$$F = \frac{dp}{dt} \tag{3}$$

Now let's set the value of dp from Equation 3,

$F = \frac{h}{c}\frac{df}{dt}$

Therefore,

$$F = \frac{h}{c}\frac{(f1 - f2)}{dt} \tag{4}$$

If the velocity of the particle is v, the formula will be,

$$F = \frac{h}{v}\frac{df}{dt} \tag{5}$$

Note, the difference between the initial velocity and end velocity and dt time of the object in Equation 5 is very small. So we can write v as constant. However, the frequency difference (df) of the waves involved at dt time is comparatively high. Suppose A car with P momentum is moving in a straight line. You are changing the momentum of the vehicle by applying F force or you can say that by applying F force on the car you are changing the frequency of the waves involved due to its momentum. In this way it is possible to reconcile quantum mechanics with classical physics. If we calculate according to quantum mechanics then it can be seen that the energy of an electron changes as a result of the application of force F by a photon .Which means that the application of F force on an electron changes the frequency of the waves involved due to the momentum of the electron. Equations 4 and 5 above are the second law of quantum certainty mechanics, the linguistic form of the second formula will be: -

"The rate of change of the frequency of the waves created or involved due to the p momentum of an object or particle is proportional to the force applied to the object."

$$F \propto \frac{df}{dt} \tag{6}$$

3.2. Proof of the first formula

Let us look at Equation No. 1 again.

$$P=\frac{h}{c}f \tag{7}$$

Equation 7 can be written,

$$f=\frac{c}{h}p \tag{8}$$

Thus it is seen from equation 8 that there is an unbroken relationship between the frequency of the wave created and the momentum. If the momentum is p, $p=0kgms^{-1}$ then the frequency of the wave involved will be f=0Hz. Again if the momentum is a constant number then the frequency will be a constant number. If you do not apply force, the momentum will not change. Similarly, if the force is not applied, the frequency of the wave created due to the momentum of the object will not change. So if the force is not applied, the frequency of the wave created due to the momentum of the object will remain constant for life. So the first law of quantum certainty mechanics stands: -

"If no force is applied, the frequency of the waves involved (created waves) due to the momentum of the object will remain constant."

So if F=0N the frequency f of the wave created due to the momentum of the object will be constant.

Again we get from the second law of quantum certainty mechanics (Equations 4 and 5):-

Let us now calculate from the second law (equations 4 and 5 above) of quantum certainty mechanics by considering external force F=0N .

$$F= \frac{h}{c}(f_1 - f_2)$$

$$\Rightarrow \quad 0=\frac{h}{c}(f_1 - f_2) \qquad (F=0N)$$

Therefore,

$$f_1= f_2 \tag{9}$$

That is, it is also proved from the above equation 9 that if the force F is not applied, the f frequency of the (involved) wave created due to the momentum of the object will remain constant for life.

3.3. Evidence of third law

This law is similar to Newton's third law [11]. Newton has applied his formula for point particles. But this formula applies to all object particles, including electrons. According to the conservation law of energy, energy is never destroyed. Is simply transformed from one form to another. The energy of an electron will change if a photon with $E=h\nu$ energy pushes F force to the electron. As a result of the conservation law of energy the electron will give a reaction force to the photon. These action and reaction forces are equal but opposite.

$$F_1 = -F_2 \tag{10}$$

Equation 10 is the third law of quantum certainty mechanics . Which linguistic form is: the action and reaction of every object are equal and opposite.

3.4. Evidence of the fourth formula: The principle of certainty

One of the principles of quantum certainty mechanics is the principle of certainty. The principle of certainty can be proved from special relativity theory, Broglie's particle wave duality, and the uncertainty principle. Now we will prove the principle of certainty

3.4.1. Method (1)-The Principle of certainty from de Broglie's wave particle dualitty

Heisenberg's uncertainty principle shows that the position and momentum of a particle cannot be measured accurately at the same time [11]. The more accurately we measure one, the more uncertain the other will become. Einstein thought that uncertainty was not entirely right. There is a mistake that has led to uncertainty. The particles follow some secret rule [3]. I will now extract that secret rule from this principle of certainty. One thing we have noticed in Heisenberg's formula is that light has to be emitted on electrons to determine their position. In order to determine the position accurately, it is necessary to emit high frequency light that means more light [12]. But we are not bringing this matter in calculation, we are saying that light of λ wavelength has to be shed. Light is a 'photon' particle. If the photon falls on the electron, it will push the electron with "F" force. That is, light of f frequency will push the electron. But we are not doing that calculation, we can accurately determine the momentum and position by calculating the external impact in the laboratory. If we bring f frequency light in the calculation then the "certainty principle" will come.

The momentum of the particle and the wavelength of the involved wave from the Broglie's equation;

$$\lambda=\frac{h}{mv}$$

therefore,

$$p=\frac{h}{c}f \tag{11}$$

From equation 11 it is clear that when an object moves at a p momentum, waves are involved due to its momentum. Now imagine, an electron is moving at "p" momentum. The momentum of electrons will create a wave that will have a frequency f . Suppose, if the electron moves with velocity v, crosses x distance at t time then the equation will be

$$x=vt \tag{12}$$

Now when the electron moves at a p momentum, the frequency of the wave (involved wave) will be created due to the momentum of the electron according to Equation 11 . From the duality of The Broglie we know that waves are intertwined with electrons. Electrons have a velocity. The wave involved with the electron also has a velocity. The velocity of an electron is called the particle velocity and the wave velocity of the wave associated with the electron is called the phase velocity. But the problem is that the velocity of the wave attached to the electron is not equal to the velocity of the electron .The phase velocity is Va**=fλ .** And the velocity of the particle is **V**

$$V=\frac{h}{m\lambda} \tag{13}$$

The velocity of a particle and the velocity of a wave associated with a particle are not equal, but the velocity of a particle is equal to the velocity of a bunch of waves associated with a particle. Group velocity is - many waves travel in clusters when they are transmitted in the same direction. The velocity of this cluster wave is called group velocity. suppose group velocity is Vg.

$$V_g = \frac{d\omega}{dk} \tag{14}$$

The relationship between group velocity and phase velocity

$$V_g = v_a - \lambda\frac{dv(a)}{d\lambda} \tag{15}$$

Now the velocity of the particle and the group velocity are equal

So, If $\mathbf{V_g=V}$

$$V = v_a - \lambda\frac{dv(a)}{d\lambda} \tag{16}$$

Group velocity and particle velocity are equal but particle velocity and wave velocity are not equal [10]. So Va will not be equal to V . But in this case a work can be done. Let's imagine the currencies of America and Bangladesh. According to the current market, 1 US dollar is equal to 85 Bangladeshi taka. The value of 1 dollar is not 1 taka but one can represent another currency. What can be done with 10 dollars can be done with 850 taka.

How far you can go with 1 dollar by car you can go the same distance in the same country with 85 taka.

t = taka

T= dollar

V=car's velocity

Now if I go with taka by car then I can write

$S=Vt$

Or if I go with dollar by car then I can write

$S=VT$ [$T \neq t$ but we can represent t by T]

(Compared here with two currencies of the same country)

It turns out that money or dollars can go the same distance. So we can represent t instead of T. In exactly the same way we can represent the velocity of a particle with the velocity of a wave.

So here we put the value of Va instead of velocity v at S = vt.

$$V=f\lambda \qquad \text{[represent Va by V]} \tag{17}$$

From 12 no. and 17 no. equation-

$x=f\lambda t$

$\Rightarrow \quad x=\frac{fh}{p}t \qquad [\lambda=\frac{h}{p}]$

(18)

$\Rightarrow \quad xp = hft$

$$\therefore xp=hft \tag{19}$$

Equation 19 is the fourth law of quantum certainty mechanics, the "principle of certainty". By this formula it is possible to accurately determine the momentum and position of an object.

3.4.2. Method (2) - principle of certainty according to the theory of relativity

$xp = hft$

The above certainty principle formula is a combination of Newton's formula. Now let us see the proof of the principle of certainty according to the special relativity theory. Suppose your size is equal to an electron. You will go to Dhaka bus stop in a car at fixed velocity. The car you are sitting in is shaped like a hydrogen atom. Your friend is also shaped like an electron and he is standing x meters away from the bus stop. You are going to the bus stop at v velocity. After a while your distance from the bus stop is x meters. That means at that moment you and your friend are at the same distance from the bus stop. The distance and time of the two are being calculated from this very moment. Now the bus stop is x meters away from you and the bus stop is x meters away from your friend. Since then the time for the two of you has started from 00. Your friend is fixed so his position will not change over time. The distance between your friend and the bus stop is x meters. The distance between you and the bus stop will decrease x' over time as you are going at fixed velocity. The distance between you and the bus stop,

$x' = x - vt$

Now the speed of your car may be closer to the speed of light. So according to Lorentz's conversion [14],

$X^o{}_1=\frac{x_1-vt}{\sqrt{1-\frac{v^2}{c^2}}}$

⇨ $X^o{}_1 m_o=\frac{m_o}{\sqrt{1-\frac{v^2}{c^2}}}(x_1- vt)$

⇨ $X^o{}_1\ m_o = m(x_1- vt)$ $\quad (m=\frac{m_o}{\sqrt{1-\frac{v^2}{c^2}}})$

⇨ $X^o{}_1\ m_o = mx_1- mvt$

therefore,

$$X^o{}_1\ m_o+ mvt= mx_1 \tag{20}$$

Multiply by C on both sides of Equation (20).

$X^o{}_1\ m_oc+ mvct= x_1mc$

⇨ $X^o{}_1\ m_oc+ px= x_1mc$ $\quad [mv=p,ct=x]$

Now the bus is going at fixed velocity so,

$t=\frac{x}{v}$

so,

$X^o{}_1\ m_oc+ px= mc\frac{x_1}{v}v$

⇨ $X^o{}_1\ m_oc+ px= pct$ $\quad [t=\frac{x}{v}, p=mv]$

⇨ $X^o{}_1\ m_oc+ px= Et$ $\quad [E=pc]$

Therefore,

$$X^{o}_{1}\, m_{o}c + px = hft \qquad [E=hf] \tag{21}$$

Now the bus was at fixed velocity so,

$X_1 = vt$

$$X_1 - vt = 0 \tag{22}$$

From equations (20) and (22) we get,

$X^{o}_{1} = \frac{x_1 - vt}{\sqrt{1 - \frac{v^2}{c^2}}}$

$X^{o}_{1} = 0 \qquad [x_1 - vt = 0\ ]$

We get from Equation (21), "

$X^{o}_{1}\, m_{o}c + px = hft$

⇨ $px = hft \quad [X^{o}_{1} = 0]$

Therefore,

$$px = hft \tag{23}$$

Equation 23 is the "principle of certainty" which is the fourth law of quantum certainty mechanics.

3.4.3. Method (3) Certainty principle From the principle of uncertainty

Suppose we have two numbers p and q. We do not know the exact value of p and q but we assume that the value of p and q is at least 10 or greater than 10.The higher the value of p and q, the more accurate p and q will be but there is no set value. To say more value can be infinite value But then there will be problems. So we assume for the convenience of calculation that if the value of p and q is close to 10 then it will be close to the correct value. Now we are given an equation. That is the product of p and q is 10 i.e. pq =10. From this equation, if we get closer to the correct value of p, we will move away from the correct value of q. Again, if we get close to the correct value of q, we will move away from the correct value of p. That is, if you know one value, the value of the other will be wrong. The value of the product of p and q can be 10 in many ways,

$pq = 0$

$10\times1=10$

or , $5\times2 = 10$

or ,$1\times10=10$

or , $2\times5=10$

Our equation is,

$pq = 10$

From this equation we will never get the value of p=10 and the value of q=10 at the same time. But if we multiply an additional constant by pq then the values of p and q will be 10 at the same time. Suppose the correct value of p is 10 and the correct value of q is 10.Then pqk = 10 according to the above equation .That is, if p=10, q=10 then k = 1/10. Now if the exact value of p and q is close to 10 then the value of k will go towards uncertainty. If we consider p and q as a fixed value then the value of k will be uncertain. According to the above equation, the product of two packets should be 10, where pq is a packet of fixed value and the remaining indefinite value k is another packet.

$(pq)k = 10$

In this way we will express Heisenberg's uncertainty of principle. According to uncertainty the values of momentum p and position x can never be measured with certainty at the same time [15]. If the momentum is confirmed the position will become uncertain. The indefinite product of the two states will be equal to or greater than the Planck constant that is $\Delta p\Delta x = \hbar$. Now, according to the uncertainty principle, even if one has a value, one has to be uncertain. Now suppose by any means we know Δp and Δx for sure. Whether by observing it or in some other way. Suppose we were able to invent an instrument that could accurately measure the position (Δx) and momentum (Δp) of a particle. Then an additional constant k has to be multiplied to protect the uncertainty principle. k is an ongoing uncertainty value that has been used to protect the uncertainty principle. If $\Delta x\Delta p$ is confirmed then the constant k will be an uncertain value. Then we can write the equation,

$$\Delta p\Delta x k= \hbar \qquad (24)$$

k is an k unknown constant. If k = 1 then the uncertainty formula will be $\Delta x\Delta p=\hbar$. The definite value of momentum and position has been taken as a packet.

Then the equation will be,

$(\Delta x\Delta p) \times k = \hbar$.

One packet is of momentum-position and the other packet is of constant k.Now if k is confirmed $\Delta x\Delta p$ will be uncertain. That is, if k = 1 is confirmed, $\Delta x\Delta p$ will be uncertain. Again, if $\Delta x\Delta p$ is confirmed , k will be uncertain. Now suppose, we are sure $\Delta x\Delta p$ then the value of k is uncertain according to uncertainty.

From $(\Delta x\Delta p)\times k= \hbar$ the uncertainty of energy and time will be:-

We know kinetic energy $E=\frac{1}{2}mv^2$.

Now We get by taking the first derivative of the total E (i. e. kinetic energy) with respect p [16],

$\Delta E= \frac{p}{m}\Delta p$

$\Delta E=v\Delta p$ (25)

We get from Equation 25 and Equation 24,

$\Delta E\Delta xk=v\hbar$

$\Rightarrow(\Delta E\Delta t)k=\hbar$ (26)

From the above equation 26 we can see that imagining energy-time $\Delta E\Delta t$ as a fixed packet will make the k constant uncertain.

Equation 24 is divided by Equation 25.

$$\frac{(\Delta x\Delta p)\times k=\hbar}{(\Delta E\Delta t)k=\hbar} \tag{27}$$

In equation 27 $\Delta x\Delta p$ and $\Delta E\Delta t$ are definite certain values . so we can write,

$$\frac{(xp)\times k=\hbar}{(E\Delta t)k=\hbar} \tag{28}$$

Since Equation 28 comes from Equation 24, the value of k is the same in both cases.

So we can write,

xp = Et

Therefore,

$$xp = hft \tag{29}$$

Equation 29 is the principle of certainty which comes from the principle of uncertainty. From equation 29 position (x), momentum (p), time (t), frequency (f) are the definite values. Thus, knowing the momentum and frequency, the position can be determined after (t) time. The more accurately the momentum can be measured, the more certain the position will be. xp= hft is the principle of certainty by which after knowing the frequency of the waves involved in the electron if we know the momentum we will be able to know the position , and if we know the position we will be able to know the momentum. When we go to see the particle in the laboratory and hit it with a photon, the particle receives hf amount of energy. If we ignore that, we will not be able to know the position and momentum of the particle at the same time. Electrons are particles like a marble(toy) and photons are also particles like a marble(toy). If you hit the marble with the marble, the speed-position is known by calculating the strength of the hit. Similarly, when looking at an electron in a laboratory, it is important to bring in the hf amount of energy in the calculation due to the F force of the photon. In the above equation hf amount of energy is brought and the momentum-position of the particle can be known simultaneously after the t time from the equation. xp=hft, this equation is established by maintaining the condition of uncertainty from the principle of uncertainty.

4. Mathematical proofs of other formulas from quantum certainty mechanics

Quantum certainty mechanics is the unified principle of the special formulas of modern physics. Bohr's angular formula, Max Planck's quantum theory, Bohr's proposition on energy radiation, and the principle of uncertainty can be proved from the quantum certainty mechanics. The principle of uncertainty is the lifeblood of quantum mechanics and the principle of certainty can explain why/how the principle of uncertainty comes about. Important theory of physics can be explained by quantum certainty mechanics

4.1. Bohr's angular momentum formula

Bohr's angular momentum $L = \frac{nh}{2\pi}$; Bohr provided the simple angular momentum formula of quantum theory in 1911 to overcome the limitations of the Rutherford model [8]. Although Bohr provided the formula for angular momentum based only on conjecture. Bohr had no evidence to support this. Drew Broglie later proved the formula for angular momentum from his formula. At that time there was no doubt in Bohr's formula. Now I will try to prove the formula in a different way, by the principle of certainty.

Heisenberg's uncertainty principle, the uncertainty of position and momentum,

$\Delta x \Delta p = \hbar$

Similarly the principle of uncertainty of angular momentum and angular position:

When the object rotates along the radius r of the circle with the velocity p then we can write $\Delta x = \Delta\theta r$ and $\Delta p = \frac{\Delta L}{r}$ if the angular momentum is L= mv.r= p.r and the angular position is $\theta = \frac{x}{r}$. Now the principle of uncertainty of angular position and angular momentum,

$\Delta x \Delta p = \hbar$

$=> \Delta\theta r \frac{\Delta L}{r} = \hbar$

therefore ,

$$\Delta\theta\Delta L = \hbar \qquad (30)$$

In the same process there will be a principle of certainty between the angular momentum and the angular position according to the principle of certainty. If $x=r\theta$ and $p=\frac{L}{r}$ then the certainty principle between angular momentum and angular position will be,

$xp=hft$

$=> \theta r \frac{L}{r} = hft$

therefore ,

$$\theta L = hft \qquad (31)$$

Equation (31) is the principle of certainty between angular momentum and angular position. This time I will prove the formula of Bohr's angular momentum from the certainty principle of angular momentum and angular position. $\theta L = hft$ is the principle of certainty of the angular position and angular momentum of a particle during rotation in a circle. Now we get from here,

$\omega t L = hft$

$$=> \quad \omega L = hf \qquad (32)$$

From equation 32 it can be seen that the product of angular momentum and angular velocity is Planck formula. That is, the product of angular momentum and angular velocity is equal to the energy E . If $v=f\lambda$ then we can arrange the equation,

$$\omega L = hf \qquad (33)$$

$$\Rightarrow \quad \omega L = h\frac{v}{\lambda}$$

If the particle velocity is v and $\omega = \frac{v}{r}$ then ,

$\frac{v}{r}L = \frac{hv}{\lambda}$

therefore,

$$\frac{\lambda}{r}L = h \qquad (34)$$

Now the particle rotates around the circle. So the wavelength of the wave involved with it will be $\lambda=\frac{2\pi r}{n}$ and we get equation 34 ,

$\frac{2\pi r}{nr}$ L=h [$\lambda=\frac{2\pi r}{n}$]

therefore,

$$L=\frac{nh}{2\pi} \tag{35}$$

Equation 35 is the law of angular momentum of Bohr. The law of angular momentum can be determined accurately from the **"principle of certainty".** Thus the laws of physics are intertwined. There is no uncertainty inside Bohr's angular momentum. The principle of certainty is similar to the angular momentum. The more accurately the radius (r) of orbit can be determined from Bohr's law, the more accurately it is possible to determine the momentum of an electron.

4.2. Max Planck formula radiation formula

The formula E = hv of quantum theory can be proved from the principle of certainty. Now we will prove this formula from the principle of certainty. In subject to v let us differentiate $E=\frac{1}{2}mv^2$,

$$\Delta E=mv\Delta v \tag{36}$$

Now let's integrate equation 36 ,

$$E=\frac{1}{2}mv^2 \tag{37}$$

We get from the equation 36,

$\Delta E=p\Delta v$

$$\text{or } p=\frac{\Delta E}{\Delta v}. \tag{38}$$

From the equation 38 we put the value of p at the principle of certainty xp = hft,

$x\frac{\Delta E}{\Delta v}$ = hft

$$x\Delta E = hft\Delta v \tag{39}$$

After differentiating a function f (x) with respect d/dv and then integrating it again with respect dv, the previous f (x) function will be. So by integrating the equation 39, the total energy E will be found.

Now let's integrate equation 39.

Ex = hftv

⇨ $Ex = hfx$ [x=vt]

⇨ $E = hf$ (40)

Equation (40) is the Planck radiation formula that was discovered in 1900 to solve problems related to blackbody radiation [17]. Surprisingly, Planck's radiation formula [18] can be proved from the principle of certainty.

4.3. Bohr's proposal regarding energy radiation

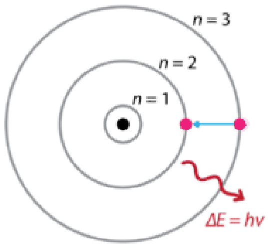

Figure 1: Bohr atom model

The relationship between Einstein's photoelectric effect [19] and Bohr's energy radiation [8] can be established by the quantum certainty mechanics. If an electron is pushed by F force at energy level 1, it will go to 2. The distance between the energy levels 1 and 2 is ds. We get from the second formula,

$F=\frac{h}{c}\frac{df}{dt}$

When the velocity of the object is v,

$F=\frac{h}{v}\frac{df}{dt}$

Now we will find out the total energy through calculus,

$W = \int_u^v Fds$

⇨ $E_k=\frac{h}{v}\int_u^v \frac{df}{dt}\,ds$

⇨ $E_k=\frac{h}{v}\int_u^v \frac{ds}{dt}\,df$

⇨ $E_k=\frac{h}{v}\int_u^v vdf$

⇨ $E_k=h\int_u^v df$

Now we known, $v=\sqrt{\frac{hf}{m}}$. if v=0 then we get f=0 ,if v=v then frequency f_1 , if v=u then frequency f_2

therefore,

$$E_k=h\int_{f2}^{f1} df$$

$$\Rightarrow \quad E_k = h[f]_{f_2}^{f_1}$$

$$E_k=hf_1-hf_2 \tag{41}$$

Now when an electron moves from one energy level to another, the electron will give up or receive $E=h\nu$ amount of energy from the total energy. Then the total energy gains momentum and goes to another energy level. So we can write equation 41 ,

$$E = hf_1 - hf_2$$

therefore,

$$h\nu=E_1-E_2 \tag{42}$$

Equation 41 is Bohr's proposal formula for energy radiation that Bohr invented in 1911. Is this equation related to Einstein's equation? This equation did not come directly from Einstein's equation. This evidence suggests that if F force is pushed by a photon on a particle, the particle will absorb energy and move to another energy level. How much energy an electron will absorb can be calculated from Einstein's photoelectric effect.

4.4. Mathematical proof of the principle uncertainty from the principle certaint

Many people may feel uncomfortable seeing the principle of certainty. This is very natural because for the last 100 years everyone has come to believe that the principle of uncertainty is actually part of nature. Einstein said, "Something is happening wrong and that's why this uncertainty has come [3]." Now I will tell you why uncertainty comes. Suppose A snake is running in the river. At that time waves are created in the river. Now if I find the snake inside the wave then the position of the snake will be uncertain. But if we consider finding snakes in the waveless river, there will be no uncertainty. A particle is moving. Waves are created or waves are involved because of the motion of the particles. The waves are like beautiful sine waves. Like a snake, we will look for the particle inside the wave, that is, inside the sine function.

The wave is ,

$$\sin(\omega t) \tag{43}$$

Now the principle of certainty is,

$$xp = hft$$

⇨ $xp = \frac{h}{2\pi}\omega t$

⇨ $xp = \hbar\,\omega t$

therefore,

$$\omega t = \frac{xp}{\hbar} \tag{44}$$

From equations (43) and (44) we get;

$$\sin\left(\frac{xp}{\hbar}\right) \tag{45}$$

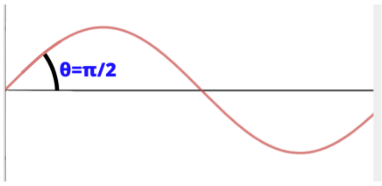

Figure 2: The maximum distance between the electrons and the waves involved in the electrons is θ=$\pi/2$.

The value of the wave is, $-1 \leq \sin(\omega t) \leq 1$

That is,

$\theta \geq 0$

⇨ $\frac{xp}{\hbar} \geq 0$

So hold the distance $\theta = \omega t \geq \frac{\pi}{2}$ between the electron and the wave at the original point and get from equation(44),

$\frac{xp}{\hbar} \geq \frac{\pi}{2}$

⇨ $xp \geq \frac{\pi}{2} \times \frac{h}{2\pi}$

⇨ $xp \geq \frac{h}{4}$

therefore,

$$xp \geq \frac{h}{4} \tag{46}$$

Equation 46 indicates uncertainty. I said a while ago that the principle of certainty is correct. Again I am saying, if the certainty is correct, then the principle of uncertainty is also correct. In fact, the reason for the uncertainty is that I found the electron in sin(θ) at $\theta \geq \pi/2$. That is, when I look for electrons inside the wave, uncertainty will come. If we continue to reduce the value of θ, then the value of uncertainty will continue to decrease. In this way uncertainty can be removed. If the value of θ reduces to 0, that is, if the distance between the electron and the wave created by the electron is $\theta = 0$ then there is nothing to say about uncertainty. What is uncertainty? Is it very important to stay? Can't it be omitted in any way? What is the role of the certainty from which the uncertainty came? Will we not get rid of uncertainty in any way?

For this answer we assume Dolphins are running in the sea. For convenience, there is no wave in the sea.

Now when dolphins run, they create waves. The size of each wave is equal to 10 to 20 floors (imagine, there is nothing wrong with imagining!). Now the dolphin is running through waves equal to 10 to 20 floors. We don't understand where the dolphins are. Now we have to look at the sea waves to identify the dolphins. Then we can say that the bigger the wave, the more likely it is that there will be dolphins. when we can't identify the dolphin, instead we go to identify the dolphin by the waves, then the dolphins are everywhere in the waves of the ocean. Just then the uncertainty will come. Similarly, when we cannot identify the electron, when we go to determine the position of the electron through the created (involved) wave due to the movement of the electron, then uncertainty will come. Whether it's finding the dolphin in the waves of the ocean or finding the electron in the waves created with it. The dolphin or the electron is in a certain position but the waves created with it can be in any position. Just then uncertainty shifts from certainty. And if we do not want to bring uncertainty, then the distance between the electron and the created (involved) wave with the electron must be calculated as $\theta=0$. Then there will be no uncertainty.

I have done a little trick in implementing the principle of uncertainty from the principle of certainty.

$$sin\left(\frac{xp}{\hbar}\right)$$

Here we have calculated holding. $\frac{\mathrm{xp}}{\hbar} \geq \frac{\pi}{2}$

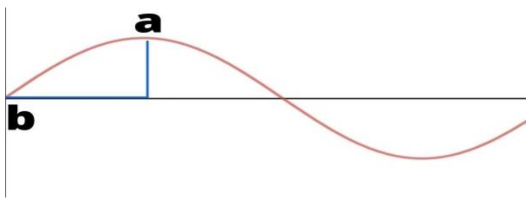

Figure 3: The highest vertex of line b is a

We have calculated from the highest peak in the figure i.e. $\theta = \frac{\pi}{2}$ but we should have calculated from $\theta = 0°$ first.Let's calculate the beginning with $\theta = 0$.I have said before that if you reduce θ, the value of uncertainty will continue to decrease. So what will happen now?

Suppose the distance between an electron and a wave created with an electron is $\theta = 0°$.

$\frac{\Delta x \Delta p}{\hbar} \geq 0$

$$\Rightarrow \quad \Delta x \Delta p \geq 0 \qquad (47)$$

There is no further uncertainty in Equation (47). In fact, uncertainty comes when we calculate the value θ= π /2, but if you calculate the value θ=0 then there is no uncertainty. In the universe, when an object moves with p-momentum, its matter-wave properties are revealed. There is always θ = π / 2 between these waves and particles which leads to uncertainty. If θ=0 ° existed between the particle and the wave associated with the particle, then the uncertainty principle would not work.

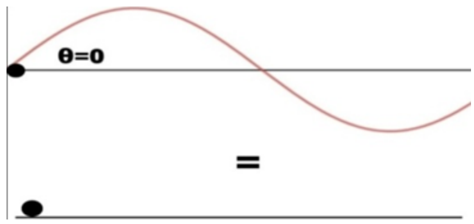

Figure 4: The distance between the electrons and the waves involved in the electrons is θ=0°

4.5. Mathematical proof of the principle uncertainty from the principle certainty (fundamental equation)

Let's find out the general equation of the relationship between the principle of certainty and the principle of uncertainty.

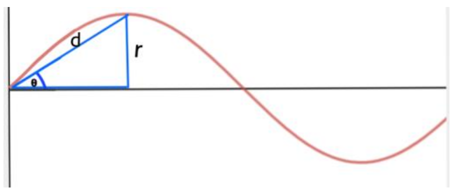

Figure 5: The figure shows the maximum distance r and θ

Notice the figure above which is the graph for sin (θ).Here

$\sin(\theta) = \frac{r}{d}$.

$$\Rightarrow \quad \sin(\omega t)=\frac{r}{d} \qquad (48)$$

Now we know, $\omega t = \frac{xp}{\hbar}$. So we get from equation 48

$\sin\left(\frac{xp}{\hbar}\right) = \frac{r}{d}$

$$\Rightarrow \quad \frac{xp}{\hbar} = \sin^{-1}\left(\frac{r}{d}\right) \tag{49}$$

Now if we assure the momentum p then the uncertainty of position from the equation (49) will be ,

$$\Delta x = \frac{\hbar}{\Delta p} \sin^{-1}\left(\frac{r}{d}\right) \tag{50}$$

The reason for the uncertainty is that if the distance between the electrons and the waves associated with the electrons (created waves) is calculated more, the uncertainty comes. Whether the uncertainty will be more or less will depend on the following equation.

$$\Delta x \propto \sin^{-1}\left(\frac{r}{d}\right) \tag{51}$$

The mystery of whether uncertainty will increase or decrease is hidden in this equation 51.

I already told why the uncertainty come.

Let's take a look at the relationship between the principle of uncertainty and the principle of certainty according to Broglie's particle-wave duality.

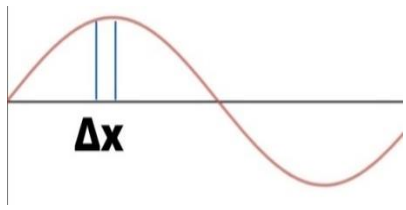

Figure 6: The figure shows the exact position of the electron Δx

If we are sure of Δx then we do not know what will be λ. Then according to the $\lambda = \frac{h}{p}$ formula Δx is sure but the momentum Δp is uncertain.

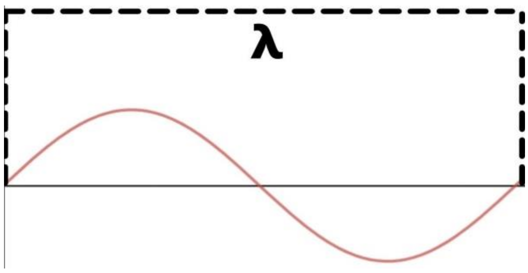

Figure 7: From the Broglie formula, λ is uncertain if Δx is sure

Now λ confirmation means that according to the formula $p = \frac{h}{\lambda}$ the momentum p is certain but Δx is then uncertain. Then what is the matter!

We have seen from the principle of certainty that if it is $\theta \geq \frac{\pi}{2}$ then uncertainty comes. Which means I've been trying to find the electrons inside the waves. λ Confirmation in the Broglie's formula and $\theta \geq \frac{\pi}{2}$ in the principle of certainty is the same thing. Then this is the background behind the coming of uncertainty.

4.6. Experimental proof from certainty to Uncertainty Principles

With the help of the electron deflection system it is possible to prove the principle of uncertainty.

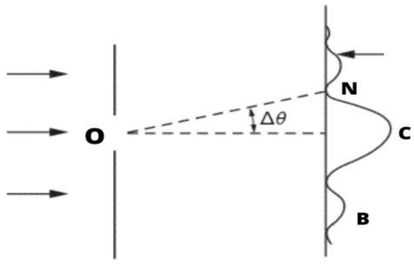

Figure 8: Electron deflection system

The figure above, where a beam of an electron of v_0 velocity is falling on a screen A with a hole of Δx thickness from the left side. In this case the process of deflection will occur due to the wave nature associated with the electron and hence the deflection pattern will be created in screen B placed parallel to it. Suppose the value of the perpendicular (x) component v_x of the velocity of the electron emitted from the hole at point N on the screen B is V_{xN} , which in this case indicates the uncertainty of velocity, i.e. $V_{xN} = \Delta v_x$ .Now you can write from the figure.

$\tan(\frac{\mathrm{CN}}{\mathrm{OC}})$

⇨ $\theta = \frac{(v_{xN})t}{(v_o)t}$

⇨ $\theta = \frac{(v_{xN})}{(v_o)}$

$\therefore \theta = \frac{\Delta v}{v_o}$

(52)

(Because , if θ is small then $\tan(\theta) \cong \theta$)

Now we get multiplied by mc on both sides,

$\theta = \frac{\Delta \mathrm{v} \times \mathrm{mc}}{\mathrm{v_o} \times \mathrm{mc}}$

⇨ $$\theta = \frac{\Delta \mathrm{E}}{\mathrm{E}} \qquad (53)$$

Now according to the principle of certainty, ΔxΔp=hft

$\therefore xp = hft$

⇨ $xp = \frac{h}{2\pi} 2\pi ft$

⇨ $xp = \hbar\ \theta$ [2πft=θ]

⇨ $\theta = \frac{xp}{\hbar}$ (54)

Now we get from Equation (53) and Equation (54),

$\frac{\Delta E}{E} = \frac{xp}{\hbar}$

$$\Delta x \Delta p = \hbar \frac{\Delta E}{E} \quad (55)$$

In equation no 55, The nature of the uncertainty will depend on $\frac{\Delta E}{E}$. E is the total energy of the electron, the static energy and the total energy due to the impact of the photon. ΔE is the erroneous value of measuring E. ΔE=E when the energy of the electron is measured in a 0% certain way i.e. 100% uncertain energy ΔE is measured . Then the momentum and position are 100% uncertain. Again, if we measure the energy of the electron accurately that is, if we measure it 100% surely, 0% will be uncertain, that is, ΔE = 0.Then the uncertainty of momentum and position will be 0% i.e. ΔxΔp = 0. Which means that if the value of energy uncertainty ΔE increases to ΔE = E then ΔxΔp will be completely uncertain. If we can accurately measure the energy of an electron, then the uncertainty of the value of ΔxΔp will continue to decrease. The uncertainty of the energy of the electron at point N in the figure above is ΔE. So the uncertainty of momentum and position exists .When we do experiment to see electrons, the energy of electrons increases under the influence of laboratory instruments. But we do not calculate the value of ΔE. As a result, the value of ΔE is equal to the total energy E of a completely uncertain. Then the uncertainty of ΔxΔp arises.

5. The basic from of the principle of certainty due to the energy of photons in laboratory

During the experiment in the laboratory, we determine the position of an electron by holding an electron stationary that is, by calculating the initial velocity zero (0) and throwing a photon. If the energy of the incident photon is (E1) and the energy of the scattered photon is (E2) and their difference is zero then the photon will not affect the position of the electron i.e. if E1-E2 = 0 then the photon will not be responsible for changing the position of the electron. And if E1-E2 > 0 then the position of the electron will change due to the energy of the photon. Initially the electron was stationary so the momentum was zero and later the momentum of the electron became $p_e = \frac{h}{v} f$ due to the impact of the photon. The momentum of a photon before hitting an electron is , $p_{ph1} = \frac{h}{c} \upsilon_1$, the momentum of a photon after hitting an electron is $p_{ph2} = \frac{h}{c} \upsilon_2$. According to the conservation law of momentum,

$P_2 - P_1 = P_{ph1} - P_{ph2}$

⇨ $\frac{h}{v} f - 0 = \frac{h}{c} v_1 - \frac{h}{c} v_2$

⇨ $hf = \frac{v}{c}(hv_1 - hv_2)$

$$\therefore hf = \frac{v}{c}(E_1 - E_2) \qquad (56)$$

According to the principle of certainty,

$$xp = hft \qquad (57)$$

Here 'f' is the frequency of the waves involved with the electrons. Now we get from Equation (56) and Equation (57),

$$xp = \frac{vt}{c}(E_1 - E_2) \qquad (58)$$

=> $xmv = \frac{vt}{c}(E_1 - E_2)$

$$\therefore x = \frac{t}{mc}(E_1 - E_2) \qquad (59)$$

Equation 59 is the equation of the position of electrons for the difference between the incident and radiated energy of a photon. Again, let us determine the equation of momentum,

$xp = \frac{vt}{c}(E_1 - E_2)$

⇨ $xp = \frac{x}{c}(E_1 - E_2)$

⇨ $$p = \frac{(E_1 - E_2)}{c} \qquad (60)$$

Equation 60 relates the difference in the energy of a photon with the momentum of an electron. Significantly, Equations 59 and 60 are another form of the principle of certainty which is related to the change in photon energy. According to Equation 59, if the energy of the photon after hitting the electron is ΔE = E1-E2 = 0, then the position of the electron will not change due to the impact of the photon and according to Equation 60, the electron will not gain momentum. If E1-E2 >0 then the position of the electron will change due to photon impact and the electron will gain momentum. But according to the experimental results, the energy of the photon decreases after the photon hits the electron, which is also seen to be a Compton effect. According to Compton's effect, the difference between the photon's incident ray (λ) and the scattered ray (λ ') is noticeable. According to Compton's effect λ '> λ, so the difference between the energy of the incident photon and the energy of the scattered photon will be E1-E2> 0. Thus the impact of the photon will change the position of the electron and electron will gain momentum.

We known, $k = \frac{1}{2}mv^2$ or $p = \sqrt{2mk}$

Now let us determine the equation of kinetic energy of an electron,

$$p = \frac{(E_1 - E_2)}{c}$$

⇨ $\sqrt{2mk} = \frac{(E_1 - E_2)}{c}$

⇨ $2mk = \frac{(E_1 - E_2)^2}{c^2}$

$$\therefore k = \frac{(E_1 - E_2)^2}{2mc^2} \tag{61}$$

Now according to the eternity of energy,

$hf - hf' = mc^2 - m_0c^2$

or , E_1-E_2=E_e-E_e^o

Now calculate 61 equation

$$k = \frac{(mc^2 - mc^2)^2}{2mc^2}$$

⇨ $k = \frac{(E_e - E_e^o)^2}{2E_e}$

⇨ $$2kE = (E_e - E_e^o)^2 \tag{62}$$

Taking the first derivative of the equation 62 with respect **E_e** we get,

$$2kE = (E_e - E_e^o)^2$$

⇨ $2k\frac{dE_e}{dE_e} = \frac{d}{dE_e}(E_e - E_e^o)^2$

⇨ $2k = 2(E_e - E_e^o)\frac{d}{dE_e}(E_e - E_e^o)$

⇨ $2k = 2(E_e - E_e^o)(1 - 0)$

$$\therefore k = (E_e - E_e^o) \tag{63}$$

Equation 63 shows that when the energy of a photon changes (E1 - E2) after the photon hits the electron, the kinetic energy of the electron is K=(E1-E2).If the energy of the photon changes after the photon hits the electron is (E1 - E2) = hv-0 = hv, then the kinetic energy of the electron will be K = hv (holding W_0 = 0, which indicates Einstein's photoelectric effect formula [19]).

6. Result

The result given here is explained according to the principle of certainty using theoretical values. The results have been analyzed through Compton effect [20] and photoelectric effect [19]. It is possible to determine the wavelength λ' of a scattered photon by knowing the incidental wavelength λ and scattered angle θ from the Compton effect. Thus, by determining the incident energy and scattered energy of a photon from Compton's effect, it is possible to determine the change in the momentum and position of the electron by placing it in Equation 59 and Equation 60.Shown in the table below:

Table 1: The experimental results of certainty principle from the photoelectric effect

The wavelength and energy of the incident photon	Scattering angle(θ)	The wavelength and energy of the incident photon	$x = \frac{t}{mc}(E_1 - E_2)$	$p = \frac{(E_1-E_2)}{c}$
$\lambda = 0.25\times10^{-9}$m $E=7.956\times10^{-16}$J	θ=90°	$\lambda'=0.25245\times10^{-9}$m $E'=7.874\times10^{-16}$J	x=(28579.83)t m	$p=2.573\times10^{-26}$
$\lambda = 0.25\times10^{-9}$m $E=7.956\times10^{-16}$J	θ=60°	$\lambda'=0.2512\times10^{-9}$m $E'=7.918\times10^{-16}$J	x=(14074.074)t m	$p=1.267\times10^{-26}$
$\lambda = 0.25\times10^{-9}$m $E=7.956\times10^{-16}$J	θ=0°	$\lambda = 0.25\times10^{-9}$m $E=7.956\times10^{-16}$J	x=0 m	p=0
$\lambda = 0.25\times10^{-9}$m $E=7.956\times10^{-16}$J	θ=180°	$\lambda'=0.25486\times10^{-9}$m $E=7.995\times10^{-16}$J	x=(57298.081)t m	5.2134×10^{-26}

If the phenomenon is observed from the point of view of photoelectric effect then the electron will absorb the full amount of energy (E1 - E2) = hν-0 = hν. Then the equations 59 and 60 will be like 64 and 65 respectively,

$$x = \frac{h\nu}{mc}t \tag{64}$$

$$p = \frac{h\nu}{c} \tag{65}$$

We get from the photoelectric effect and equations 64 and 65

Table 2: The experimental results of certainty principle from the photoelectric effect

The wavelength and energy of the photon	$x = \frac{h\upsilon}{mc}t$	$p = \frac{E}{c}$
$\lambda=4\times10^{-7}$m (violet light) $E=4.96\times10^{-19}$ J	x=(1816.84)t m	$p=1.65\times10^{-27}$ kgms^{-1}
$\lambda=7\times10^{-7}$m(red light) $E=2.83\times10^{-19}$ J	x=(1036.63)t m	p=9 43×10^{-28} kgms^{-1}

From Table 2, if λ = 4 × 10-7m (violet light) E = 4.96 × 10-19 J then x = (1816.84) t m. Numerous photons hit the electrons one after the other. As a result of the collision of numerous photons on the electron, the electron moves away x = (1816.84) dt m every dt time.Table 2 above shows that when light of a purple wavelength is emitted on an electron, it can be located at a greater dt time distance from the wavelength of red light. The position of the electron changes due to the energy of the photon.

7. Decision

If the distance between the electron and the wave created by the electron is θ=0 then there will be no more uncertainty . Uncertainty increases when the distance difference between the electron and the generated wave increases. For certainty we need to take the distance θ = 0° between the electrons and the waves involved due to the movement of electrons. When we look for particles inside the wave then we will not know where the particle's position is. Then you just have to figure out the possibility of where the particle will be from Schrodinger's equation. If we know the momentum of the particle and the frequency of the waves created with it, we will be able to determine the position of the particle after t times from the principle of certainty. Does the principle of certainty prove the principle of uncertainty wrong ? The answer is no. If the distance between the particle and the wave is $\theta \geq \pi/2$ then uncertainty will come. According to the experimental results, the momentum and position of the particle become uncertain due to the uncertainty of the total energy (ΔE) of the particle. In fact, the principle of certainty defends the principle of uncertainty. In fact, the principle of uncertainty got a new life. Why the uncertainty comes is now sure . .According to the experimental results, the more accurately the total energy of the particle E can be measured, the lower the value of energy uncertainty will be. And according to equation (x) the uncertainty of momentum (Δp) and the uncertainty of position (Δx) will decrease. Then the total energy E of the particle can be confirmed and the momentum and position can be measured with certainty according to the certainty principle xp = hft or xp = Et. Quantum entanglement [21] has a faster effect than light to determine the momentum and position of two particles [22]. Now let's try to solve this problem from quantum certainty mechanics. Firstly, electrons begin to move with a certain momentum So the waves get involved with the particles. When no external force is applied, the frequency of the waves associated with the particle remains constant. The frequency of the waves involved is constant after the two particles collide with each other. So even though many light-years away, the behavior of the two particles is similarly inverse due to the fact that the frequency is constant. After applying force to each other, the particle's momentum and position will behave according to the conservation law of energy at a distance of many light years. In this case, Super Determinism [23] will be proved wrong .Through the conservation law of energy in quantum entanglement , it is possible to determine the results of two particles many light years away. Electrons are particles and when electrons move with the momentum p then waves are created with them (or waves are involved). Quantum mechanics can be protected from terrible stems by calculating the waves and particles involved in the electrons separately. At the time of observing the electrons in the laboratory, if we calculate the external force by the laboratory instrument, then the definite momentum and position can be determined.

8. Conclusion

Quantum certainty mechanics is a theory that can mathematically prove many principles of quantum mechanics, including the Uncertainty principle, Max Planck's quantum theory. Einstein said until his death that there was a reason behind the uncertainty. Uncertainty comes from what can be perfectly explained by the principle of certainty. Uncertainty is an important formula of quantum mechanics which is 100% correct and if uncertainty principle is 100% correct then certainty principle is also correct. The principle of uncertainty has not been proved wrong by the principle of certainty but the principle of certainty has revived the principle of uncertainty. The principle of certainty and the principle of uncertainty complement each other. Certainty mechanics has been invented to protect quantum mechanics from terrible shoots. There is a clear idea from the mechanics of certainty that calculating $\theta \geq \pi/2$ leads to uncertainty. The most complex problems in quantum mechanics can be solved from quantum certainty mechanics. Quantum certainty mechanics gives an idea of how much energy a photon changes due to electron displacement. The essence of certainty mechanics is, "Knowing the frequency of the waves involved in a particle, the momentum and position can be determined simultaneously over time."

Reference

[1]. W Heisenberg, "Über den anschaulichen Inhalt der quantentheoretischen Kinematik und Mechanik," Z. Physik, vol. 43, pp. 172–198, March 1927.

[2]. P. Busch & T. Heinonen & P. Lahti. (2006, Sep) Heisenberg's Uncertainty Principle. [Online].

[3]. A. & Podolsky, B. & Rosen, N Einstein, "Can Quantum-Mechanical Description of Physical Reality Be Considered Complete?," Phys. Rev, vol. 47, pp. 777--780, May 1935.

[4]. N Bohr, "Can Quantum-Mechanical Description of Physical Reality be Considered Complete?," Phys. Rev, vol. 48, pp. 696--702, Oct 1935.

[5]. J. S Bell, "On the Einstein Podolsky Rosen paradox," Physics Physique Fizika, vol. 1, pp. 195--200, Nov 1964.

[6]. Aspect & Alain and Grangier & Philippe and Roger & G\'erard, "Experimental Tests of Realistic Local Theories via Bell's Theorem," Phys. Rev. Lett, vol. 47, pp. 460-463, Aug 1981.

[7]. L. de Broglie, "XXXV. A tentative theory of light quanta," The London, Edinburgh, and Dublin Philosophical Magazine and Journal of Science, vol. 47, pp. 446-458, 1924.

[8]. N. Bohr, "LXXIII. On the constitution of," Philosophical Magazine Series 6, vol. 26, pp. 857-875, 1913.

[9]. Planck.M, "Ueber irreversible Strahlungsvorgänge.," Annalen der Physik, vol. 306, pp. 69-122, 1900.

[10]. Einstein.A, "Über einen die Erzeugung und Verwandlung des Lichtes betreffenden heuristischen Gesichtspunkt," Annalen der Physik, vol. 322, pp. 132-148, 1905.

[11]. Weinberg.S, Lectures on Quantum Mechanics. Cambridge: Cambridge University Press, 2013.

[12]. Newton.I, philosophiae naturalis principia mathematica. London: Londini, Jussu Societatis Regiæ ac Typis Josephi Streater. Prostat apud plures Bibliopolas, 1726.

[13]. W Heisenberg, The Physical Principles of the Quantum Theory.: Chicago: Ill., The University of Chicago Press, 1930.

[14]. M Ozawa, Noise and disturbance in quantum measurements and operations.: Society of Photo-Optical Instrumentation Engineers (SPIE) Conference Series, 2006.

[15]. Einstein.A, "Zur Elektrodynamik bewegter Körper," Annalen der Physik, vol. 322, pp. 891-921, 1905.

[16]. Uffink.J.B.M, "The uncertainty principle, doctoral thesis," University of Utrecht, doctoral thesis, 1900.

[17]. Premović.P. I. (2018, March) The Energy-position and the momentum-time uncertainty expressions.

[18]. Kuhn. T.S, Black-Body Theory and the Quantum Discontinuity, 1987th ed.

[19]. M. Nauenberg, "Max Planck and the birth of the quantum hypothesis," American Journal of Physics, vol. 84, pp. 709-720, 2016.

[20]. Compton A.H., "A Quantum Theory of the Scattering of X-rays by Light Elements," Physical Review, vol. 21, pp. 483--502, May 1923.

[21]. Kurzyk.D, "Introduction to Quantum Entanglement," Theoretical and Applied Informatics, vol. 24, pp. 135–150, August 2012.

[22]. Bohr. N, "Can Quantum-Mechanical Description of Physical Reality be Considered Complete?," Physical Review, vol. 48, pp. 696--702, Oct 1935.

[23]. Hossenfelder.S, "Testing superdeterministic conspiracy," Journal of Physics: Conference Series, vol. 504, p. 012018, April 2014.