

Energy Equation in Complex Plane

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Abstract

Einstein equation of energy is given as mass into square of speed of light, De Broglie used this energy equation with photon energy to calculate wavelength of particle. Using concept of Certainty principle using complex plane it was known that energy of particle is not real number (as predicted by Einstein) but a complex number. Using concept of Einstein and De Broglie energy of the matter was proved as complex number where real value is equal to Einstein equation of energy and imaginary component of energy is equal to De Broglie wave energy and in case of antimatter vice versa. Both these real and imaginary component are equal to each other in inertial reference frame.

Keywords - Einstein equation of energy, De Broglie Wave

I. INTRODUCTION

In Certainty principle using complex plane^[1] paper it was proved that Energy should be in form of complex number instead of real number. Aim of the paper is to modify Einstein equation of energy for matter, anti-matter and photon in such a way that energy is in complex number.

II. ENERGY EQUATION OF MATTER

In 1905 Einstein proved total energy of matter is equal to $E=mc^2$. Einstein used special theory of relativity to prove $E=mc^2$. And it is proved experimentally correct with help of lot of experiments. This equation only explain the relationship between energy released when there is loss in mass or energy gained when there is gain in mass. This equation does not explain about wave nature of particles. In Certainty principle using complex plane it was proved that energy has to be in complex form hence $E=mc^2$ should not be sufficient to explain true energy of the particle.

Experiments have verified the $E=mc^2$ holds true and below graph has been confirmed with various experiments.

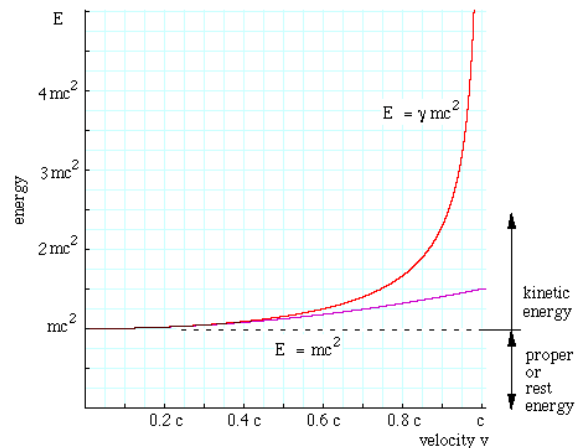


Fig 1: Graph of $E=mc^2$

But this experiments are carried out without tasking wave nature of particle into picture hence only the real component of energy is known from this experiments which holds true for equation of $E=mc^2$.

III. DEBROGLIE WAVELENGTH

DeBroglie equated $\hbar\omega$ to mc^2 to come out with famous equation for wavelength of particle (mentioned below).

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

This too was experimentally verified, experiment's like Davisson-Germer experiment for electrons^[2].

These experiments are based on understanding wave nature of particle but not the particle behavior. When Debroglie equated $\hbar\omega$ to mc^2 it was mere assumption which came out true but the outcome of equation only explains the wave nature of the particle and not the particle behavior.

IV. ENERGY EQUATION OF MATTER

In certainty principle using complex plane it is shown that matter oscillate in imaginary plane and travel in real plane as shown below.

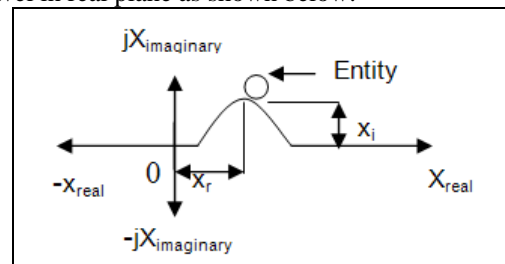


Fig 2: Matter oscillating in complex plane

Einstein talks about real plane which is X_r and De Broglie talks about wave which is equivalent to oscillations in imaginary plane.

In Certainty Principle using Complex plane it was proved that Energy and time are complex entities and thus if we consider the complex part of energy uncertainty vanishes.

We know that as per Einstein equation particle energy is given by $E = mc^2$. But this is not satisfactory because this contain only the real part of the energy.

As discussed earlier matter wave is associated with oscillations in imaginary plane, and matter wave we know that has energy equal to $\hbar\omega$.

This energy is imaginary component of the energy, as it is already proved by De Broglie that $mc^2 = \hbar\omega$.

That means real and imaginary components of energy are always equal to each other.

Hence total energy of the matter should be given as

$$E = mc^2 + i\hbar\omega$$

V. ENERGY EQUATION OF MATTER

Similarly in Fine Structure Decoded [3], anti-matter was shown as particle moving in imaginary plane oscillating in real plane as shown below.

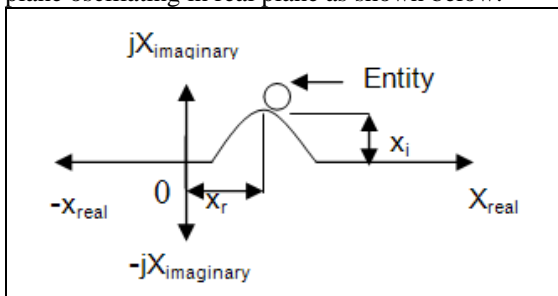


Fig 2: Anti-matter oscillating in complex plane

Hence the energy equation when compared to matter will be different, real part of matter energy and imaginary part of matter energy component will swap for anti-matter and equation will look like this.

$$E = \hbar\omega + imc^2$$

VI. ENERGY EQUATION OF PHOTON

In Fine Structure Decoded paper it was stated that photon travel in both real and imaginary plane and we know that energy of photon is given by $\hbar\omega$. In certainty principle using complex plane it was proved that energy of photon should also be expressed in complex number form. From equation of matter and anti-matter we know that real and

imaginary components should equate hence imaginary component of photon would be $\hbar\omega$ too. Hence energy equation of photon would look like this

$$E = \hbar\omega + i\hbar\omega$$

VII. WHY REAL AND IMAGINARY COMPONENT ARE EQUAL?

When we square the imaginary value of the energy we will get negative energy (because of square of i is -1), thus we can refer imaginary component of energy as negative energy and real component as positive energy. So it can be inferred as when we add this positive and negative energy we get zero energy for any system.

VIII. CONCLUSION

Energy equation of matter, anti-matter and photon should be expressed in form of complex number. This complex number has equal value for real and imaginary part in inertial reference frame.

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