

Hypothesis

Not peer-reviewed version

Quantum Relativity (Electric and Magnetic)

[Ahmed Mohamed Ismail](#) * and [Samira Ezzat Mohamed](#)

Posted Date: 29 October 2024

doi: 10.20944/preprints202410.2238.v1

Keywords: Special relativity; General relativity; Bohr atomic model; the fine-structure constant; photon energy; energy of the total photon; Electron wave by de Broglie; Gravity constant; Quantum jump and Cosmic constants of nature



Preprints.org is a free multidiscipline platform providing preprint service that is dedicated to making early versions of research outputs permanently available and citable. Preprints posted at Preprints.org appear in Web of Science, Crossref, Google Scholar, Scilit, Europe PMC.

Copyright: This is an open access article distributed under the Creative Commons Attribution License which permits unrestricted use, distribution, and reproduction in any medium, provided the original work is properly cited.

Article

Quantum Relativity (Electric and Magnetic)

Ahmed M. Ismail ^{1,*} and Samira E. Mohamed ²

¹ University of Ain Shams, Al-Qubba Bridge, Al-Wayli, 11566, Egypt

² Faculty of Science, Ain Shams University, Al-Qubba Bridge, Al-Wayli, 11566, Egypt

* Correspondence: ahmedmohamed_ismail@agr.asu.edu.eg

Abstract: This research answers the knowledge gap regarding the explanation of the quantum jump of the electron. This scientific paper aims to complete Einstein's research regarding general relativity and attempt to link general relativity to quantum laws.

Keywords: special relativity; general relativity; Bohr atomic model; the fine-structure constant; photon energy; energy of the total photon; electron wave by de Broglie; gravity constant; quantum jump and cosmic constants of nature

1. Introduction

This research was created for the purpose of answering questions about physics phenomena that have not been answered. Such as explaining the phenomenon of the quantum jump of the electron and the phenomenon of cumulative entanglement. What happens in the phenomenon of the quantum jump of the electron is that when we give the electron energy, this energy causes the electron to move from the energy level that it occupies to the higher energy level without crossing the distance between the two orbits, which leads to the occurrence of the phenomenon of the quantum jump of the electron.[1] (Svidzinsky et al., 2014)

The role of this scientific paper is to provide a scientific explanation of how the quantum leap occurs without crossing the distance between the orbits. The theory of quantum entanglement is a connection between two quantum entangled particles. If one particle is observed, the other particle is affected by it at the same moment. This is what Einstein objected to; because when the electron traveled this distance in the same period of time, this would lead to the existence of a speed faster than the speed of light. Einstein proved it in special relativity. The maximum speed in the universe is the speed of light. Therefore, the phenomenon of quantum entanglement does not agree with Einstein's laws. After the validity of quantum laws was proven. There has become a conflict between the laws of relativity that apply to the universe and the quantum laws that apply to atoms. This scientific paper aims to resolve this conflict between the laws of relativity and quantum laws. By establishing a law derived from the laws of relativity to apply to quantum laws. (Equation number 1)

This law in equation 1 is known as quantum relativity because it links the laws of relativity and quantum theory. This law is derived from general relativity. The law works to explain the phenomenon of the quantum leap and the phenomenon of quantum entanglement, as it explains that when energy is given to the atom, the atom does not gain energy, but rather space-time gains that energy. We will discuss the interpretation of this theory in detail later.

- The goal of this scientific research is to answer the explanation of the phenomenon of quantum leap and quantum entanglement and to add some modifications in the Bohr model.

2. Equations

These laws want to explain the results of the final derivation process of this research and what this research wants to prove.

$$E_n = \frac{m_e \times \alpha}{n \times \mu_0 \times \epsilon_0} \quad (1)$$

where E_n energy of the photon, ϵ_0 is the vacuum permittivity, m_e is the electron mass, μ_0 Vacuum permeability, α is the fine-structure constant.

3. These Laws Have Been Modified from the Mix Planck Laws

$$t_{(p)} = \frac{l_p^3}{l_p^2 \times c} \quad (2)$$

Definition of time: Create a movement on a spatially fixed three-dimensional body that exists on the surface area of space-time at the body's fixed motion speed

$$t_{(p)} = \frac{n}{2 \times v \times \sin(\theta)} \quad (3)$$

Definition of time: Create a movement on a spatially fixed three-dimensional body that exists on the surface area of space-time at the angle at which a stationary body moves

4. Derivation of Equations

$$\mu_0 \times \epsilon_0 = \frac{1}{c^2} \quad (4)$$

Maxwell's equation of electromagnetic dynamics.

$$\mu_0 \times \epsilon_0 = \frac{1}{c^2} \quad \frac{m_e}{m_e} \quad (5)$$

$$E = m \times c^2$$

We associate energy with Maxwell's equation.

$$\mu_0 \times \epsilon_0 = \frac{m_e}{E} \quad \frac{(\alpha)}{(\alpha)} \quad (6)$$

$$E_t = E \times \alpha$$

Then we link equation number (15) to the total energy of the photon.

$$\mu_0 \times \epsilon_0 = \frac{m_e \times \alpha}{E_t} \quad (7)$$

$$E_t = E_n \times n$$

$$\mu_0 \times \epsilon_0 = \frac{m_e \times \alpha}{E_n \times n} \quad (8)$$

Then we link equation number (7) to energy of the photon.

$$E_n = \frac{m_e \times \alpha}{n \times \mu_0 \times \epsilon_0} \quad (9)$$

An equation linking Maxwell's equation of electromagnetic dynamics and photon energy.

5. The Hypothesis on Which the Equation Is Based

Here we will review the most important hypotheses that led to arriving at this equation, the details of the equation, the answers that explain this equation, and the defects that faced the Bohr model and the method of solving it.

- The problems with Bohr model began when it could not explain the following:

How does the electron remain stable in its orbit, since it is assumed that bodies accelerating around the nucleus, such as the electron, emit energy, and this emitted energy carries all wavelengths?

This is something that Bohr could not answer.[2] (Udema, 2017)

- Well, this scientific paper will answer that and will also explain quantum entanglement. As a result of the movement of electrons on the fabric of space-time in a straight line. Because the straight line passes around the nucleus. Then the electron passes, forming a great circle around the nucleus. Therefore, the electron moves in a straight line and the electron does not need to expend energy. This makes the electron not, emit energy and be in a stable state.

$$G_{\mu\nu} + \Lambda g_{\mu\nu} = \frac{((2\pi)^3 \times (r_n)^2) \times 4 \times (m_e)^4 \times Z^2}{(n)^6 \times (\mu_0 \times \epsilon_0)^2 \times \lambda^2} \frac{(\alpha)^4 \times G}{(E_n)^4} T_{\mu\nu} \quad (10)$$

$$G_{\mu\nu} + \Lambda g_{\mu\nu} = \frac{((2\pi)^3 \times (r_n)^2) \times 4 \times (m_e)^2 \times Z^2}{(n)^4 \times \lambda^2} \frac{(\alpha)^2 \times G}{(E_n)^2} T_{\mu\nu}$$

Explanation of the hypothesis of electron quantum jump.

How the quantum jump of occurs?

The electron rotates in the orbit specified for it in the atom at a certain speed proportional to the orbit, so that it is fixed in its orbit and the atom is stable, but the matter is different when energy is added to the atom. What has been measured is that when the atom gains energy, the electrons gain this energy, work to make a quantum jump without crossing the distance between the two orbits. But my equations interpreted this in a way that linked relativity and the quantum world. The interpretation of the law is as follows: When you give energy to the atom, the electron does not gain energy, but rather the fabric of space-time acquires this energy. Then it works on contraction the level with the highest energy until an overlap occurs between the level with the highest energy and the orbit occupied by the electron. So the quantum leap occurs, meaning that the issue is relative between the electron and the electron observer. From, the point of view of the electron, it is moving in position. When interference occurs between the two orbits, the electron does not notice it, but from the point of view of the electron observer, what happens? The electron disappears from the level that it occupies and appears in the upper orbit, that is a quantum jump occurs. This wave interference is achieved through this law.

$$G_{\mu\nu} + \Lambda g_{\mu\nu} = \frac{((2\pi)^3 \times (r_n)^2) \times (m_e \times Z)^2 (e)^4 \times G}{(n \times \lambda)^4 \times (\epsilon_0)^2} \frac{T_{\mu\nu}}{(E_n)^4}$$

Because the equation connects more than one equation into a single equation. As

$$G_{\mu\nu} + \Lambda g_{\mu\nu} = \frac{8\pi \times G}{C^4} T_{\mu\nu}$$

$$\Delta E_n = \frac{h_p \times C}{\lambda}$$

$$n \times \lambda = 2\pi \times r_n$$

$$E_{(p)}^2 = \frac{(n)^4 \times (\mu_0)^3 \times (2)^2}{(2\pi) \times (r_n)^2 \times (m_e \times Z)^2} \frac{(e \times C)^6}{G \times (2\alpha)^5} \quad (11)$$

Hypothesis: An explanation for the great expansion

Hypothesis: An explanation for the great expansion The universe originated at absolute zero temperature in a central region called the event hole. The temperature prevented the movement of particles, but because of the presence of the cosmic event hole, high energy was released, which was virtual particles and a Higgs particle. So the temperature worked to stop these particles. But they retained potential energy as a result of the vibration of the strings inside them. The temperature can only reach the strings if the temperature is. In the event, the temperature is lower than the temperature of the absolute zero, which is impossible. As a result of the presence of these particles in this environment, they behaved as if they were a single atom. These particles worked to release potential energy, forming a fabric known as the fabric of space-time. The fabric of space-time created

movement within it, meaning that this fabric allowed the movement of particles. According to this hypothesis, the universe resembles an hourglass. The hole in the middle is known as the hole of the cosmic event. At one end of this clock is a tissue known as the fabric of dark matter, and the other is known as the fabric of dark antimatter. The cosmic event hole connects the fourth dimension with the fifth dimension. As for the fabric of dark matter, multiple universes exist on it, and the fabric of dark matter works to prevent interaction between the multiple universes with each other. The same applies to the fabric of anti-dark matter. Because it holds multiple anti-universes and works to prevent interaction between them. The Big Bang occurred as a result of the dissolution of this fabric of dark matter, which caused an interaction between one universe with the other, creating this great event. Every universe has distinct properties as a result of this interaction between the two universes, be a universe that contains these properties combined. The universe was energy as a result of this interference. The universe was Planck sized, then it increased in size until it reached the size of the electron, then another big explosion occurred during its expansion.

- *How quantum entanglement occurs?*

What happens is that the electron connects to the other electron through space-time, as space-time acts like a quantum tunnel that connects the two electrons. In this way, the electron does not penetrate the speed of light, But in relation to large objects, you see that it has crossed the speed of light.

- *This hypothesis was based on scientific foundations, the most important of which is:*
 - 1) *the connection between relativity and quantum mechanics occurs via quantum entanglement and loop gravitational entanglement.*
 - 2) *quantum entanglement occurs by the contraction of space-time.*
 - 3) *space-time contraction occurs by space-time absorbing energy.*
 - 4) *the quantum jump of the electron occurs as a result of the contraction of space-time.*

6. Method

My name is Ahmed. I have made a theoretical derivation of the equation of general relativity as explained in this research for the purpose of obtaining an equation that can be applied within the quantum world so that it describes the movement of the electron during the quantum jump in the Bohr model. After that, the researcher Samira reviewed the research and verified it, and then she worked on applying this theory to the movement of the electron during the occurrence of the quantum leap, using previous research and matching it with the results of this equation to determine its validity.

- This part of the research will explain the spectrum of the hydrogen atom in a new way, as the results presented in these tables from previous research match the results extracted from the equation, and this is consistent with the validity of this equation. Because the new equation is consistent with the photon energy equation. We will discuss that part of the research in the results and discussion.
- **Table 5** shows the measurement results tested.[3] (Nanni, 2015)

$$\Delta E = E_{n'} - E_n = h \frac{c}{\lambda} \rightarrow \frac{1}{\lambda} = \frac{4}{B} \left(\frac{1}{n'^2} - \frac{1}{n^2} \right)$$

The way toward the quantum mechanics was definitely opened! The calculated wavelength values vs the experimental ones are listed in table

Spectral Line	Experimental Value	Theoretical Value
-----	(nm)	(nm)
$\lambda(n'=2, n=1)$	121.5	122.0
$\lambda(n'=3, n=1)$	102.5	103.0
$\lambda(n'=4, n=1)$	97.2	97.3
$\lambda(n'=2, n=3)$	656.1	656.3
$\lambda(n'=2, n=4)$	486.0	486.1
$\lambda(n'=3, n=4)$	1874.6	1875.0

- **Table 5** it represents the theoretical and experimental value of the hydrogen atom. Using the photon energy law mentioned above, this table.

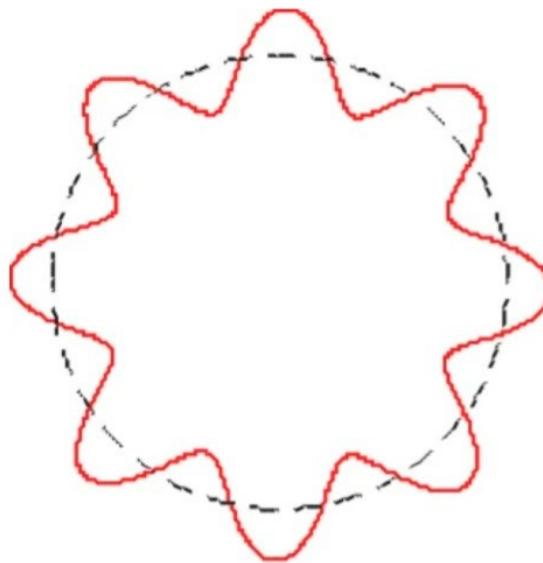


Figure 1. Bohr hydrogen atomic model incorporating de Broglie’s .[4] (Jordan, 2024).

This drawing, taken from previous research, shows how the quantum leap occurs through interference, as my equation showed. When interference occurs between the orbit occupied by the electron and the energy level higher than the electron’s orbit, it occurs in the form of wave interference of this type as a result of a contraction in the fabric of space-time. The black circle represents the orbit occupied by the electron, while the red color represents how interference occurs from the orbit higher to the orbit occupied by the electron in the form of wave interference. In other words, the upper level works to contract, forming a wave equal to the same wave as the level occupied by the electron through the de Broglie equation.

$$n \times \lambda = 2\pi \times r$$

$$G_{\mu\nu} + \Lambda g_{\mu\nu} = \frac{((2\pi)^3 \times (r_n)^2) \times (m_e \times Z)^2 (e)^4 \times G}{(n \times \lambda)^4 \times (\epsilon_0)^2} \frac{T_{\mu\nu}}{(E_n)^4}$$

Because the equation connects more than one equation into a single equation. As

$$G_{\mu\nu} + \Lambda g_{\mu\nu} = \frac{8\pi \times G}{C^4} T_{\mu\nu}$$

$$\Delta E_n = \frac{h_p \times C}{\lambda}$$

$$n \times \lambda = 2\pi \times r_n$$

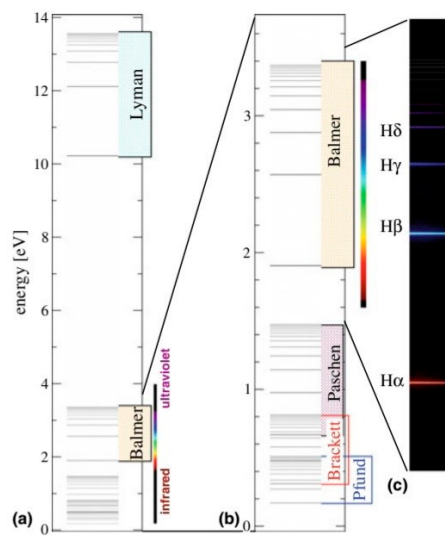


Figure 2. The observed emission line spectrum of atomic hydrogen in chapter 2 atoms.[5] (Manini, 2020).

The 4 lowest-energy series of spectral lines of atomic hydrogen				
name	lower <i>n</i>	lowest energy [eV]	max energy [eV]	spectral region
Lyman series	1	10.2	13.6	UV
Balmer series	2	1.89	3.40	Visible-UV
Paschen series	3	0.66	1.51	IR
Brackett series	4	0.31	0.85	IR

- **Table (6)** shows the measurement results of one of the previous researches related to the spectrum of the hydrogen atom in chapter 2 atoms.[5] (Manini, 2020)
- This shape is a result of the fact that the electron, after a quantum leap occurred as a result of an interference between the orbital that it occupies and the energy level above it, was in an unstable state. Therefore, when the highest level of energy returns to its position, it releases energy in the form of spectral lines. These lines are determined according to the amount of energy, as shown in the picture.

7. Results and Discussion

This scientific research aims to prove a theory by comparing the practical results of this theory with the original results and making the comparison in a table. We will discuss that here .

$$G_{\mu\nu} + \Lambda g_{\mu\nu} = \frac{((2\pi)^3 \times (r_n)^2) \times (m_e \times Z)^2}{(n)^4 \times (\epsilon_0)^2} \frac{(e)^4 \times G}{(h_p \times C)^4} T_{\mu\nu}$$
$$\frac{G_{\mu\nu} + \Lambda g_{\mu\nu}}{T_{\mu\nu}} = \frac{8\pi \times G}{C^4} = 2.0766474428 \times 10^{-43} \tag{64}$$
$$r_n^2 = \frac{2.800285118 \times 10^{-21} \times (n)^4}{(Z)^2}$$

After substituting the constants into equation number 1. This derivation proves that the equation can be applied to the Bohr radius.

$$G_{\mu\nu} + \Lambda g_{\mu\nu} = \frac{((2\pi)^3 \times (r_n)^2) \times (m_e \times Z)^2 (e)^4 \times G}{(n \times \lambda)^4 \times (\epsilon_0)^2} \frac{1}{(E_n)^4} T_{\mu\nu}$$
$$\frac{G_{\mu\nu} + \Lambda g_{\mu\nu}}{T_{\mu\nu}} = \frac{8\pi \times G}{C^4} = 2.0766474428 \times 10^{-43}$$
$$\Delta E_n = 0.17043774059 \text{ eV} \times \frac{(r_n \times Z)^{\frac{2}{4}}}{n \times \lambda} \tag{65}$$

After, that, we linked the equation number (2, 64). The unit of measurement for photon energy is electron volt (eV), the wavelength is (nm), and Bohr radius is a (nm).

$$\Delta E_n = \frac{h_p \times C}{\lambda} = \frac{1239.8419637 \text{ eVnm}}{\lambda} \tag{66}$$

Photon energy equation.
The results of the experimental value were obtained by using the results of previous research on the hydrogen atom. I prove in Table 7 that the results of the equations are identical to their original results in Table 5, which indicates the validity of this law

Table 7. Comparing my theoretical results through my equation with previous results.

Theoretical value (My work)		Experimental value	
Spectral Line	Energy	λ	λ
$\lambda(n^2=2, n=1)$	10.204269824 eV	121.50227162 nm	121.5 nm
$\lambda(n^2=3, n=1)$	12.093949421 eV	102.51754168 nm	102.5 nm
$\lambda(n^2=4, n=1)$	12.75533728 eV	97.201817292 nm	97.20 nm
$\lambda(n^2=3, n=2)$	1.8896795971 eV	656.1122667 nm	656.1 nm
$\lambda(n^2=4, n=2)$	2.5510674561 eV	486.00908641 nm	486.0 nm
$\lambda(n^2=4, n=3)$	0.66138785898 eV	1874.6064763 nm	1874.6 nm

$$\Delta E_n = E_2 - E_1$$
$$\Delta E_n = \frac{-13.605693099 \text{ eV}}{1} \times \left(\frac{(Z)^2}{(n_2)^2} - \frac{(Z)^2}{(n_1)^2} \right)$$
$$\Delta E_n = 0.17043774059 \text{ eV} \times \frac{\left((0.052917720265 \text{ nm} \times (n)^2) \times Z \right)^{\frac{2}{4}}}{n \times \lambda}$$

- These are the results of a relationship between energy and wavelength. The observed results show that whenever the energy increases, the wavelength decreases, as shown by this equation in the hydrogen atom.

8. Conclusions

After the idea of research has been clarified using theoretical and practical scientific evidence to explain the phenomenon of the quantum leap and quantum entanglement from a new perspective, these equations would be used in the following:

- 1) serving humanity in the advancement of scientific research.
- 2) using these equations to explore space and quantum world.

3) using these equations in developing communications machines .

References

1. Svidzinsky, A. Scully, M. Bohr's molecular model, a century later. *Physics T.* 2014, 67, 33-39. <http://dx.doi.org/10.1063/PT.3.2243>
2. Udem, I. I. Renaissance of Bohr's model via derived alternative equation. *American J. Mod. Phys* 2017, 6, 23-31. <https://doi.org/10.11648/j.ajmp.20170602.11>
3. Nanni, L. The hydrogen atom: A review on the birth of modern quantum mechanics. *Physics* 2015. <https://doi.org/10.48550/arXiv.1501.05894>
4. Jordan, R. B. *Principles of Inorganic Chemistry*. Springer N., 2024; pp. 1--18. https://doi.org/10.1007/978-3-031-22926-8_1
5. Manini, N. *Introduction to the physics of matter: basic atomic, molecular, and solid-state physics*. Springer N., 2020; pp. 11--16. https://doi.org/10.1007/978-3-030-57243-3_2

Disclaimer/Publisher's Note: The statements, opinions and data contained in all publications are solely those of the individual author(s) and contributor(s) and not of MDPI and/or the editor(s). MDPI and/or the editor(s) disclaim responsibility for any injury to people or property resulting from any ideas, methods, instructions or products referred to in the content.