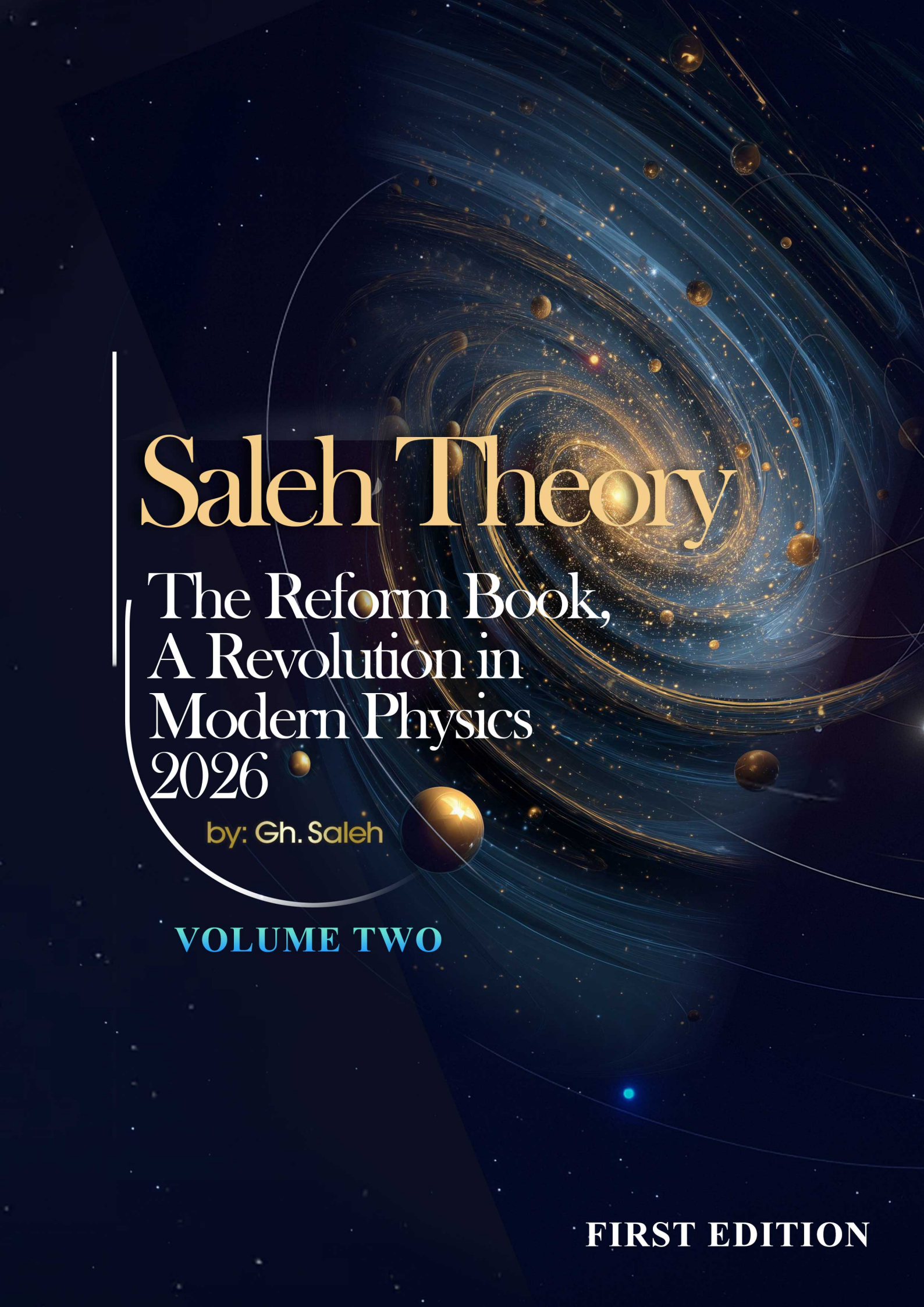

Saleh Theory

The Reform Book, A Revolution in Modern Physics 2026

by: Gh. Saleh

VOLUME TWO

FIRST EDITION

Saleh Theory
The Reform Book, A Revolution in Modern Physics
2026
Volume II

Gh. Saleh

2026

Contents

Chapter 4

Electromagnetic Waves

In this chapter, electromagnetic waves are first discussed in detail, followed by a specific examination and analysis of gravitational and magnetic waves.

4.1 Electromagnetic Waves

4.1.1 Introduction

Electromagnetic waves are among the most fundamental phenomena of nature, shaping the physical structure of the universe. From visible light, perceptible to the human eye, to radio waves, infrared, ultraviolet, and beyond, all represent different forms of a single reality. These waves travel without the need for a material medium and can emit in vacuum at a constant speed, c, which is approximately 3×10^8 metres per second.

The importance of electromagnetic waves lies not only in their physical properties but also in the fact that nearly all cosmic and terrestrial communications are conducted through them. It is by their means that we understand stars, communicate via mobile phones, transfer data, and even study the fundamental nature of matter. The theory of electromagnetism, introduced by Maxwell, demonstrated that a change in an electric field produces a magnetic field, and vice versa.

From an energy perspective, every electromagnetic wave carries energy and momentum; upon interacting with matter, it can heat it, ionise it, or cause the excitation of electrons. Therefore, understanding the characteristics, emition, absorption, and diffraction of electromagnetic waves is essential for comprehending the physical world, designing novel technologies, and interpreting astronomical phenomena.

In summary, electromagnetic waves serve as a bridge between classical and quantum physics; on one hand, they are described by Maxwell's equations, and on the other, they have a particle nature in the form of photons. This wave–particle duality doubles their importance in the study of the structure of matter and energy.

4.1.2 A New Equation for Calculating the Energy of Electromagnetic Waves

The kinetic energy of objects is calculated by the following universally valid relation:

$$E = \frac{1}{2}mv^2 \tag{4.1}$$

And it states that the amount of mass (m) multiplied by the square of the velocity (v) of any object always gives us its kinetic energy (E). It can also be used in electromagnetic waves so that in this relation, the mass is the same as the mass of the photon and the velocity is the same as the velocity of photon. Also, since the mass and velocity of photon are constant values, therefore the relative product of one-half of the mass (m), multiplied by the square of the photon velocity (C), is always a constant value. So the basic energy of electromagnetic waves can be defined using the following equation:

$$E_{\text{basic}} = \frac{1}{2}m_p(4.82c)^2 \tag{4.2}$$

Since this term always is a constant value, we represent it by, “S”. In fact, “S” is the "basic unit of energy of electromagnetic waves". And its value is equal to:

$$\begin{aligned} S &= \frac{1}{2}m_p(4.82c)^2 && (4.3)\\ &= \frac{1}{2}(1.64 \times 10^{-36})(4.82 \times 2.99 \times 10^8)^2 && (4.4)\\ &\simeq 1.70 \times 10^{-18}\, j && (4.5) \end{aligned}$$

Considering that “S” is always a constant value, to calculate the energy of various electromagnetic waves, it is enough to multiply the coefficient of that specific wave “n” by “S”.

$$E = nS \tag{4.6}$$

Where for each wave “n” or the same "energy coefficient of electromagnetic waves" is different. To obtain this coefficient for each electromagnetic wave, we do as follows:

$$E = h\vartheta = nS \Rightarrow n = \frac{h\vartheta}{S} \tag{4.7}$$

For example, we calculate the energy coefficient of electromagnetic wave of green light (n_G) with a frequency of 555 THz:

$$n_G = \frac{h\vartheta_G}{S} \tag{4.8}$$

$$= \frac{(6.62 \times 10^{-34})(555 \times 10^{12})}{1.70 \times 10^{-18}\, j} \tag{4.9}$$

$$\simeq 0.22 \tag{4.10}$$

In the same way "n" can be calculated for all electromagnetic waves.

Notice:

In general, it can be said that the energy of all particles in the universe, from the smallest to the largest ones, even the whole universe, consists of:

$$E = nS = 10^m \times S \quad (n = 10^m) \tag{4.11}$$

4.1.3 A New Explanation for Frequency in Electromagnetic Waves

Consider the diagram of electromagnetic spectrum, which extends from radio waves at its lower end to gamma rays at its upper limit. Within this, lies a narrow band of visible light spectra. Focusing on two specific spectra within this band, the violet spectrum (800 THz) and the red one (400 THz), we can illustrate their wave motion graph as follows:

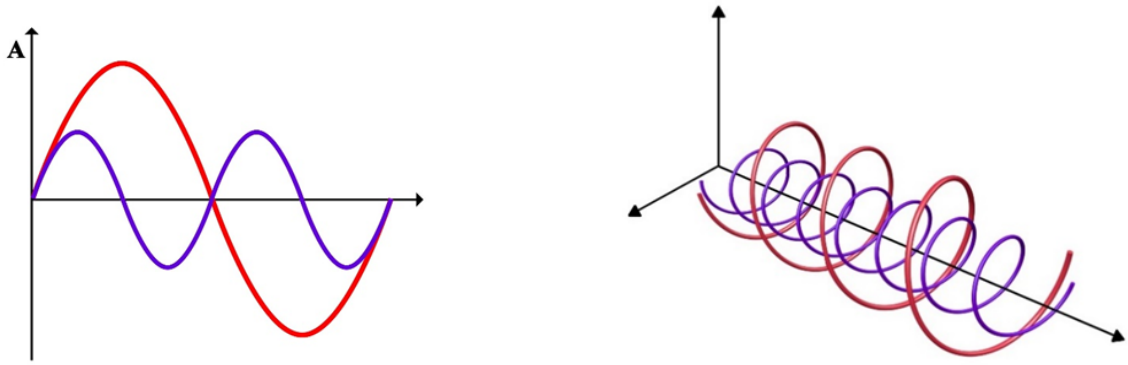

Figure 4.1: Comparison of wave motion between red and violet spectra

In the given example, the wavelength of the red spectrum is approximately twice that of the violet spectrum. Now, let us compare the photons of these two different spectra as they travel a wave-like path over a time interval "t."

If a single photon of the red spectrum traverses this path, then two photons will do the same for the violet spectrum. In other words, in our example, the frequency ratio of the violet to the red spectrum is two, meaning that the number of transmitted photons in the violet spectrum within the same time duration is twice that of the red spectrum.

Consequently, the amount of energy transferred by the violet spectrum will be twice that of the red spectrum.

$$\left.\begin{aligned} E_{\text{red}} &= hf_{\text{red}} \\ E_{\text{violet}} &= hf_{\text{violet}} \end{aligned}\right\} \implies \frac{E_{\text{violet}}}{E_{\text{red}}} = \frac{f_{\text{violet}}}{f_{\text{red}}} \tag{4.12}$$

To define the frequency for visible spectra, and more generally for electromagnetic waves, it can be described as the number of photons that arrive at the destination via wave-like motion within an equal time interval, assuming that the mass and speed of photons are constant.

In other words, the frequency of electromagnetic waves corresponds to the number of photons that impact a surface. For instance, if the wave frequency is 400 Hz, this means that 400 photons impact the target surface per second.

Notice:

It is posited that frequency, as defined herein, is determined by the quantification of photon impacts upon a target surface. Consequently, if a source moves at a fraction of the speed of light "C" in the direction of the photon path, the number of photons impacting the surface increases, resulting in an elevated observed frequency, a phenomenon termed blueshift. Conversely, if the source moves at a fraction of "C" in the opposing direction, the number of photons impacts decreases, leading to a diminished observed frequency, termed redshift.

It is proposed that the wavelength of the emitted waves remains invariant and that the observed frequency variations are solely attributable to alterations in the photon impact rate caused by the source's velocity.

Therefore, variations in source velocity result in corresponding fluctuations in observed frequency, manifesting as color changes. However, the initial wavelength of the light remains unchanged. If we eliminate the relative velocity that alters the speed, then the observed frequency returns to its initial value, and we observe the original color.

For instance, consider an observer is stationary, and a light source moves away from the observer with a velocity of $0.15C$, emitting wave with a frequency of 600 THz. As a result, the resultant velocity, considering the source, the observer, and the propagation of light, is $0.85C$. This change in velocity affects the frequency observed by the stationary observer, causing it to be lower than the original source frequency, leading to a redshift.

If the source's velocity increases further in the same direction, reaching, for example, $0.5C$, the frequency shift becomes so significant that the observer can no longer detect the wave within the visible spectrum; instead, it shifts into the infrared (invisible) range, a phenomenon we refer to as a "lowshift". Furthermore, if the source moves away from the observer with a velocity of C, the relative velocity between the emitted photons and the observer becomes zero. This implies that no photons from this source reach the observer,

a situation we define as a “darkshift”.

Conversely, if the source approaches the stationary observer with a velocity of $0.15C$, the observed frequency increases, resulting in a blueshift. If this velocity reaches $1.5C$, the observer can no longer detect the wave within the visible spectrum, as it shifts into the ultraviolet range, which we term a “highshift”.

Depending on the magnitude and direction of the source’s and observer’s velocities, a wide range of frequency shifts could occur. Assuming that the source emits wave at a frequency of 600 THz, the table below presents the observed frequency based on the resultant velocity of the source, observer, and light.

Green Spectrum f = 600 THz λ = 500 n.m	Resultant Velocity	0 C	0.0005 C	0.5 C	0.666 C	0.85 C	C	1.1 C	1.333 C	2 C	50 C	175 C
		0.0E+00	1.5E+05	1.5E+08	2.0E+08	2.6E+08	3.0E+08	3.3E+08	4.0E+08	6.0E+08	1.5E+10	5.3E+10
	Received Frequency in Detector	000.0E+0	300.0E+9	300.0E+12	400.0E+12	510.0E+12	600.0E+12	660.0E+12	800.0E+12	1.2E+15	3.0E+16	1.1E+17
	Regions	No Waves	Radio	Infrared	Red	Yellow	Green	Blue	Violet	Ultraviolet	Magnetic	X-ray
		Darkshift	Lowshift		Redshift ←		Source Frequency	Blueshift →		Highshift		

Table 4.1: Observed frequency shifts as a function of relative velocity between source and observer (initial frequency: 600 THz)

4.1.4 A New Explanation for the Difference in Frequencies of Visible Light

If we consider the birthplace of light, findings of scientists have demonstrated that a photon detaches from the surface of an electron and is emitted outward. This is the simple definition of how a photon is created in nature. However, electrons spin around their axis and around the nucleus of an atom. So, when photons are about to be emitted from their electron, as they travel in a straight line, a spinning motion is added to their forward movement due to the electron’s rotation around the nucleus.

In fact, one could say that a photon, upon being emitted from an electron, has both a linear, propulsive motion and a rotational motion. It means that while a photon exists or is emitted from an electron, the photon exhibits a motion equal to the sum of two linear and rotational motions, which is known as helical motion.

It is clear that the mass of electrons and their tangential speed around the nuclei are constant. However, since the rotational radius of the valence layer electron (or the electron’s distance from the nucleus) varies in different atoms, the value of the radius for the emitted photon’s rotational motion, ‘R‘, is always different. This is because each element or atom has its own specific atomic radius.

In other words, the difference in atomic radii (or the distance from the atomic nucleus to the outermost electrons from which photons are ejected) in different atoms causes a difference in the rotational radii of the photons, and this difference in the photons’

rotational radii leads to the creation of various frequencies and colours in the different spectrum include visible light spectrum.

Frequency (Hz)	9.00E+14	8.00E+14	7.00E+14	6.50E+14	6.00E+14	5.50E+14	5.00E+14	4.50E+14	4.00E+14	3.00E+14
Wavelengh (m)	3.33E-07	3.75E-07	4.29E-07	4.62E-07	5.00E-07	5.45E-07	6.00E-07	6.67E-07	7.50E-07	1.00E-06
Rotational Radius (m)	1.24E-07	1.43E-07	1.60E-07	1.68E-07	1.75E-07	1.82E-07	1.89E-07	1.96E-07	2.02E-07	2.14E-07

Table 4.2: Frequency, wavelength, and rotational radius in visible light

4.1.5 Proof of Helical Motion of Photons (Electromagnetic Waves) Using the Constant Speed of "C"

The speed of electromagnetic waves is a constant value of "C", measured by various scientific experiments. Therefore, it can be stated that the value of the speed "C" for electromagnetic waves remains constant with no change. No scientist or calculation can alter the value of "C" or, in mathematical and physical terms, it can be said:

$$V_L = C = \text{constant} \tag{4.13}$$

This equation is always valid, and unalterable by both physics and mathematics. Actually, the constancy of the parameter "C" can be considered as a constant law, and a perpetually established value. As stated in the previous sections, it has been demonstrated that the helical motion of photons has not been previously considered, and we have not calculated the helical speed. In those sections, the value of "Vw" has been calculated using physical and mathematical relations, demonstrating that its value is "Vw = 1.57 C", remaining constant. In reality, it can be stated that the wave-like speed of electromagnetic waves in the universe is also consistently constant. Just as the existence of the constant speed "C" in the linear motion of electromagnetic waves is a principle, the existence of a constant wave-like speed of electromagnetic waves (1.57 C) is also a fundamental principle in their wave-like motion. In fact, we possess two principles that, alongside each other, constitute fundamental parameters of electromagnetic waves. In fact, it can be said that the speed of electromagnetic waves regardless of the two linear and wave-like movements is in vain. One of the best explanations for the simultaneous existence of these two motions is the presence of helical motion, where both linear and wave-

like speeds depict images of the helical motion of electromagnetic waves, as shown in the following figure.

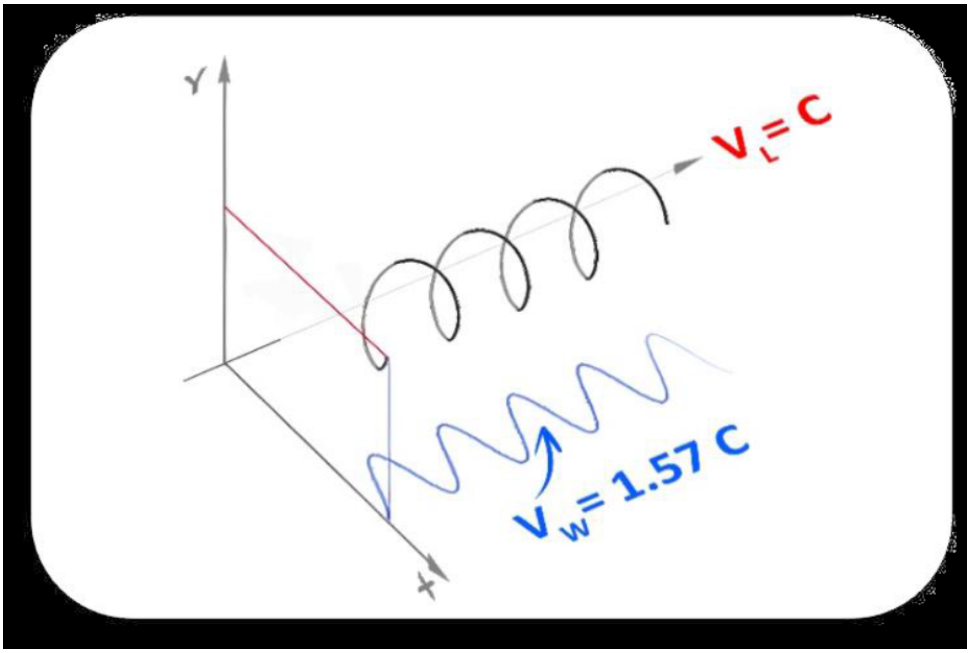

Figure 4.2: Helical motion representation of electromagnetic waves

4.1.6 New Explanation for the Broadening Effect in Electromagnetic Waves

As mentioned in previous chapters, photon (electromagnetic waves) has nested helical paths, as shown in figures.

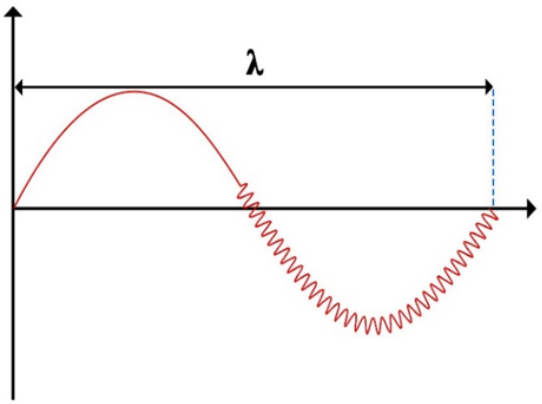

Figure 4.3: Nested helical paths of electromagnetic waves

Left part of the above figure depicts the path of a simple photon (electromagnetic wave) with no additional effects. However, right part illustrates a nested helical path, resulting from the combination of two different paths, a larger helix and a smaller one. In essence, the second helix (small) broadens the first helix (large). This phenomenon observed in various experiments is called the “Broadening Effect”.

4.1.7 New Explanation for the Experiments of MIT and University of Michigan; Breakdown of the Planck's Law at Nanoscale Gaps

Max Planck presented his law in 1900 regarding the relationship between energy and wavelength. This law states that radiation associated with different wavelengths has a linear relationship with energy. However, researchers from the Massachusetts Institute of Technology (MIT) and the University of Michigan have demonstrated that this law holds only at long distances and large scales, and it is violated at short distances. This experiment was conducted by MIT researchers and has recently been repeated by researchers at the University of Michigan. They used a very small metal and glass surface, and an atomic force microscope with high precision to measure thermal changes exchanged between these two objects. As a result, they found that at a 10-nanometer distance, thermal conduction can be up to 100 times greater than the predictions of Planck's law. However, an explanation for this phenomenon has not been provided. Building upon the findings in the first volume, which describe the photon's path as a nested helical trajectory, and by considering 3 nested helixes (that is real and actual in the ideal state), we delve into the examination of photons in the early moments of emitting from electron.

In accordance with Saleh Theory, the mass of photons is a constant value ($m = 1.64 \times 10^{-36}\,\mathrm{kg}$), like their speed ($C$), therefore, the product of half of the mass and the square of the speed ($\frac{1}{2}mv^2$), which is the initial kinetic energy of a photon at the time of $t = 0$, is a constant value. At $t = 0$, this energy is equal for all electromagnetic wave spectra. However, due to the difference in the radius of rotation in the helical path in different spectra, the rotational energy they consume varies ($\frac{1}{2}mr^2\omega^2$). Hence, the translational energy of photons, which is the same as the value obtained in Planck's law ($h\vartheta$), is specific and different for each spectrum with different frequencies.

$$\frac{1}{2}mv^2 - \frac{1}{2}mr^2\omega^2 = h\vartheta \tag{4.14}$$

In fact, it can be said that although different energy values are considered for photons with different frequencies, at $t = 0$ or $t = \varepsilon$ the energy value of all of them is equal because there is no rotational motion at that time.

$$\xrightarrow{t=\varepsilon} \frac{1}{2}mr^2\omega^2 = 0 \tag{4.15}$$

So, we can use the final speed of photons, which is the speed with the presence of 3 nested helixes ($v = C_{\text{new 3}}$), to calculate the initial energy:

$$\xrightarrow{t=\varepsilon} E_0 = \frac{1}{2}mv^2 = \frac{1}{2}mC_{\text{new 3}}^2 \tag{4.16}$$

$$E_0 = \frac{1}{2}(1.64 \times 10^{-36})(4.82C)^2 \tag{4.17}$$

$$E_0 \simeq 1.70 \times 10^{-18}\,\mathrm{J} \tag{4.18}$$

Now, let's calculate the energy for the infrared spectrum ($\vartheta = 4.5 \times 10^{13}\,\mathrm{Hz}$) using Planck's law:

$$E_h = h\vartheta = (6.62 \times 10^{-34})(4.5 \times 10^{13}) = 2.98 \times 10^{-20}\,\mathrm{J} \tag{4.19}$$

$$\frac{E_0}{E_h} = \frac{1.70 \times 10^{-18}}{2.98 \times 10^{-20}} \simeq 57 \quad \Rightarrow \tag{4.20}$$

$$\boxed{E_0 \simeq 57\,E_h} \tag{4.21}$$

Considering the two energy values, the initial energy (E_0) and the frequency-dependent energy predicted by Planck's law (E_h), it can be said that the energy obtained in the early times or short intervals after the emission of photons is almost 57 times the energy obtained from Max Planck's law, and most of the energy of the emitted photon from its associated electron is consumed in the helical motion.

On the other hand, as previously explained, physicists at the University of Michigan demonstrated a violation of Max Planck's law in the case of short distances in the laboratory. They have shown that the translational energy at very short distances (less than 10 nanometers) can be more than 100 times greater than the energy predicted by Planck's law. In fact, it can be said that the experiments conducted at MIT and the University of Michigan are acceptable by using these explanations. And this a confirmation of the validity of the University of Michigan's experiment and the calculations of the Saleh Research Group. In other words, the explanations in this article confirm the experiment and the experiment confirms the explanations.

Note 1 In the calculation of the ratio of the initial kinetic energy of a photon to the experimental Max Planck energy, all parameters are constant, and the main variable is only the frequency. Since the frequency in electromagnetic waves has a very wide range, this ratio will have significant variations. But in some ranges, the result shows a number greater than reality. Given that the experiment of dear Max Planck was performed in the visible light range, for example, the ratio of the initial kinetic energy to the translational energy (Max Planck energy) for 3 specific frequencies in the red, green, and violet spectra is calculated:

$$E_0 = 1.70 \times 10^{-18}\,\mathrm{J} \tag{4.22}$$

$$E_{\text{Red}} = h\vartheta_1 = (6.62 \times 10^{-34})(4.5 \times 10^{14}) = 2.98 \times 10^{-19}\,\text{J} \quad \Rightarrow \tag{4.23}$$

$$E_0 \simeq 5.7 E_{\text{Red}} \tag{4.24}$$

$$E_{\text{Green}} = h\vartheta_2 = (6.62 \times 10^{-34})(5.85 \times 10^{14}) = 3.87 \times 10^{-19}\,\text{J} \quad \Rightarrow \tag{4.25}$$

$$E_0 \simeq 4 E_{\text{Green}} \tag{4.26}$$

$$E_{\text{Violet}} = h\vartheta_3 = (6.62 \times 10^{-34})(6.85 \times 10^{14}) = 4.53 \times 10^{-19}\,\text{J} \quad \Rightarrow \tag{4.27}$$

$$E_0 \simeq 3.7 E_{\text{Violet}} \tag{4.28}$$

The values obtained for the energy ratio in the visible light range are between 3 and 10. It can be said that in the frequency range of visible light spectrums, the value of the ratio of the initial kinetic energy of a photon (E_0) to the Max Planck energy (E_h) has a range between 3 to 10, or the Max Planck energy value is 1/10 to 1/3 of the main (initial) energy value.

Note 2 If we use the speed $C_{\text{new 1}} \simeq 5.58 \times 10^8\,\text{m/s}$ instead of the speed $C_{\text{new 3}} \simeq 1.446 \times 10^9\,\text{m/s}$ in calculating the initial energy, the result of the calculations becomes in a way that the energy ratio in the visible spectrum range becomes about "0.5":

$$E'_0 = \frac{1}{2}(1.64 \times 10^{-36})(5.58 \times 10^8)^2 \;\Rightarrow\; E'_0 \simeq 2.55 \times 10^{-19}\,\text{J} \tag{4.29}$$

$$E = h\vartheta_4 = (6.62 \times 10^{-34})(7.5 \times 10^{14}) \;\Rightarrow\; E \simeq 4.97 \times 10^{-19}\,\text{J} \tag{4.30}$$

$$E'_0 \simeq 0.5E \tag{4.31}$$

This means the translational energy of Max Planck (E) is greater than the initial energy (E'_0), which is contradictory and impossible. Therefore, the existence and use of the speed "$\text{C}_{\text{new 3}}$" or "$\text{C}_{\text{new 2}}$" is logical and correct.

4.1.8 New Uncomplicated Experiment Under Ordinary Conditions (Time, Place, Sunlight, etc.) With Common Tools (Ordinary Lenses and Thermometers) to Demonstrate and Verify the Planck's Experimental Equation

Utilizing a simple lens, we choose filters at will (red, yellow, green, blue, and violet). Then, we apply the filter to the lens and locate a thermometer at its focal point. It is evident that the temperature shown on the thermometer is lowest when using the red filter, highest with the violet filter, and the green filter falls in the middle.

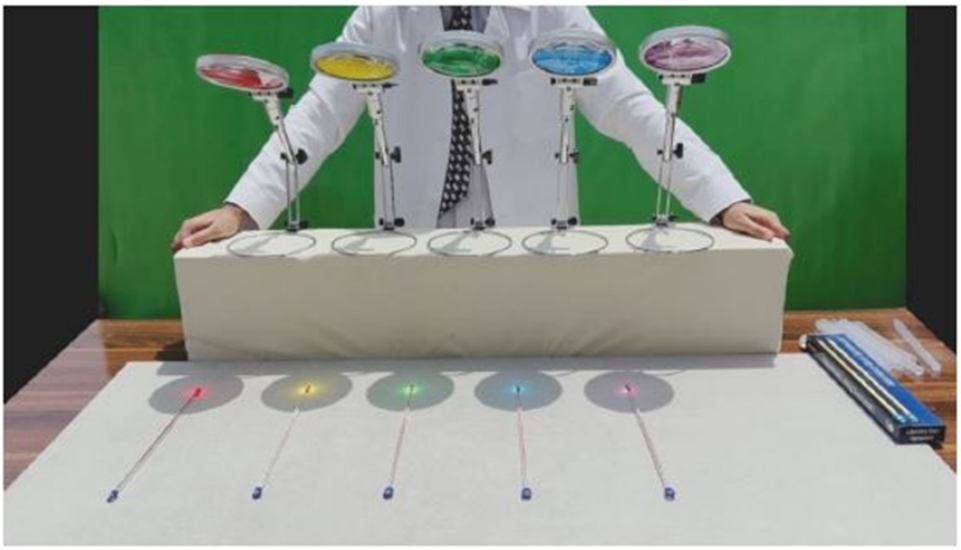

Figure 4.4: Experimental setup using lens, color filters, and thermometer measurements

These results confirm the validity of Planck's universally accepted equation.

Figure 4.5: Observed temperature variation across different visible light filters

Despite our common perception of red light as warm and blue light as cool, the experimental data clearly demonstrate the opposite.

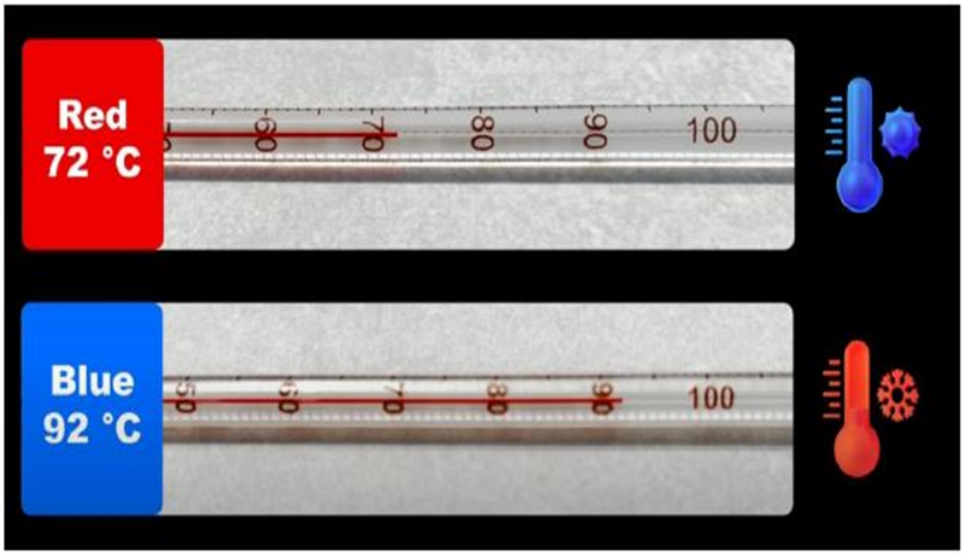

Figure 4.6: Observed temperature difference between red and blue light

Next, we evaluate the results of two experiments conducted by physicists at the University of Michigan and the Massachusetts Institute of Technology. These experiments indicate that Planck's equation does not hold at a very small scale from the light source. The main reason for this is that at very close distances to the source ($d = \varepsilon$ or equivalently at $t = \varepsilon$), the amount of energy significantly exceeds the amount of energy that Max Planck predicted. This is because photons exhibit both linear and rotational motions. In the experiments conducted by the University of Michigan and MIT, the total energy was measured, whereas in Planck's experiment, only the linear energy was measured, not the rotational energy. The discrepancy in energy measurements (between the two university experiments and Planck's experiment) indicates the presence of rotational motion of photons or missing rotational energy.

Now, let's discuss the first question: why does red light appear warmer and blue light cooler?

4.1.9 A New Explanation for Why the Translational Energy (Derived From Planck's Equation and Saleh's Experiment) of Blue Spectrum Is Greater Than That of Red One, While Our Sense of Sight and Touch Perceive Red Light as Warmer, Larger, and Stronger Than Blue Light

Given that the photon traverses in a helical path; it has both linear and rotational motion, the energy of the linear motion (translational energy) can be easily calculated

using Planck's equation and Saleh's experiment. Also, as the frequency of blue light is higher than that of red light, all measuring devices demonstrate the energy of blue light is greater than that of red light based on its frequency. When we observe a wave with a helical motion coming towards us from the front, such as the blue and red spectrum, it's clear that because the frequency of blue light is higher, its wavelength, amplitude, and rotational radius (r_m) are smaller than those of red spectrum. Thus, the cross-section area of the blue spectrum is smaller than that of the red one. Consequently, red light stimulates a larger area on the retina or skin, activating more visual and tactile cells, and is perceived as stronger and warmer.

The internal energy of the red spectrum is greater than that of the blue one, and the translational energy of the red spectrum is less than that of the blue:

$$E_{L_{\text{red}}} < E_{L_{\text{blue}}} \tag{4.32}$$

$$E_{R_{\text{red}}} > E_{R_{\text{blue}}} \tag{4.33}$$

Overall, we perceive blue light as cold because, although the amount of its translational energy is greater, its rotational energy is less than that of red light. Conversely, we perceive red light as warm because, despite having less translational energy compared to blue light, it possesses greater rotational energy.

Notice:

The speed of a photon has been considered to be C, the energy of each photon was considered to be

$$E = m_p C^2 \tag{4.34}$$

and the classical energy of the photon was

$$E = \frac{1}{2} m_p C^2 \tag{4.35}$$

Where m_p is the mass of the photon ($m_p = 1.64 \times 10^{-36}\,\text{kg}$). Recent calculations have shown that the speed of a photon is $3.3C$. Consequently, in the calculation of the photon's kinetic energy, the speed should be considered as $v = 3.3C$. If the new speed is squared, which is 3.3 times the previous speed, the new energy value is approximately 10 times the previous energy. In other words, the new energy value has increased by a factor of 10 compared to the old one, or approximately 1000%, which corresponds to the value obtained in the MIT University experiment at a very small scale from the light source. Hence, the results obtained from the MIT University experiment are also correct and valid.

To enhance comprehension, we will calculate the different energies (translational, rotational, and total) of the end of violet light with a frequency of $f = 900\,\text{THz}$.

$$f = 900\,\text{THz} \quad \begin{cases} E_V = hf = 6.62 \times 10^{-34} \times 9 \times 10^{14} = 5.96 \times 10^{-19}\,\text{J} \\ E_V = \dfrac{1}{2}mv^2 = \dfrac{1}{2}m_pC^2 = 7.38 \times 10^{-20}\,\text{J} \\ E_V = \dfrac{1}{2}mv^2 = \dfrac{1}{2}m_p(3.3C)^2 = 8 \times 10^{-19}\,\text{J} \end{cases} \tag{4.36}$$

In this example, we used a frequency of 900 THz, for which the energy obtained using Planck's method is at its maximum (within the range of 300 to 900 THz) and its value is as follows:

$$E_V = 5.96 \times 10^{-19}\,\text{J} \tag{4.37}$$

The obtained classical energy value, using the speed value of $v = C$, is:

$$E_V = 7.38 \times 10^{-20}\,\text{J} \tag{4.38}$$

These two values show a significant difference. However, the classical energy value, using a speed that is $v = 3.3C$, would be:

$$E_V = 8 \times 10^{-19}\,\text{J} \tag{4.39}$$

If we look at the obtained values, we will demonstrate that the photon's energy at a speed of $v = 3.3C$ is very close to the experimentally calculated energy by that of Planck, with a slight difference due to the rotational energy of the photon, which is not measurable in Planck's experimental method.

Consequently, the rotational energy of the photon is not accounted for in Planck's relation. Therefore, it can be stated that the value of the translational energy of a photon equals the established empirical value by Max Planck, which is valid. On the other hand, the energy value obtained from the MIT experiment and Saleh Theory calculations represents the total energy of the photon, and these two are also accurate, real, and acceptable.

In other words, the MIT University experiment demonstrates the total energy value. The empirical energy calculation method of Max Planck indicates the translational energy value, while Saleh Research Group's calculations show the values of translational, rotational, and total energy.

Figure 4.7: Comparison of energy interpretations in MIT experiments, Planck's relation, and Saleh Research Group calculations.

In previous articles, it was stated that the translational energy (E_L) is a fraction of the total energy (E_T), and this fraction for a electromagnetic wave with a frequency of $f = 900\,\text{THz}$ equals $i_L = \frac{3}{4}$. In other words, its translational energy constitutes 75% of the total energy, while the remaining 25% is attributed to its rotational energy.

$$E_T = \frac{1}{2} m_p (3.3C)^2 = 8 \times 10^{-19}\,\text{J} \tag{4.40}$$

$$E_L = E_T \times i_L = E_T \times \frac{3}{4} = 8 \times 10^{-19} \times \frac{3}{4} = 6 \times 10^{-19}\,\text{J} \tag{4.41}$$

$$E_V = hf = 6.62 \times 10^{-34} \times 9 \times 10^{14} = 5.96 \times 10^{-19}\,\text{J} \tag{4.42}$$

As evidenced by the observations, the value obtained for translational energy matches the energy obtained from the Planck method.

Conclusion:

In this part, through a fresh perspective on the nature of electromagnetic waves, the fundamental characteristics of the photon and the manner of energy propagation across various spectra were examined. It was initially demonstrated that energy of photon can be defined based on a "fundamental unit of energy," which is the product of the photon's constant mass and the square of its velocity. Subsequently, by introducing the helical motion of the photon—a combination of linear and rotational motion—it was explained that a significant portion of observed wave behaviours, including the phenomenon of broadening, wave energy differences, and even the violation of Planck's law at very short distances, may stem from this helical structure.

Furthermore, a new concept of frequency was presented, wherein frequency is defined not as the number of wave oscillations, but as the number of striking photons per unit of time. This definition was able to explain phenomena such as blueshift and redshift based on the change in the number of arriving photons. Additionally, it was clarified that the reason red light is perceived as warmer than blue light is not due to their linear energy,

but rather the difference in their cross-sectional area and rotational energy.

Altogether, the explanation of the photon's helical motion, the new definition of energy and frequency, and the re-analysis of Planck's relations showed that the behaviour of electromagnetic waves can be analysed from a fresh standpoint. This new outlook can provide a basis for a more precise interpretation of recent experiments and a deeper understanding of the structure of the photon and energy within the universe.

4.2 Gravity

Gravitational waves are oscillations in the structure of space-time arising from the accelerated motion of masses. The roots of this discussion trace back to the era of classical gravity, where, in Newtonian theory, gravity was assumed to be an instantaneous force without a mediator. This very characteristic raised an important question: "If gravity cannot be transmitted at infinite speed, then how does its effect spread through space?" Efforts were made by scientists such as Laplace and Mach to understand the propagation speed of gravitational effects, and these classical debates provided the necessary conceptual groundwork for the emergence of the wave theory of gravity.

With the advent of the General Theory of Relativity in 1916, Einstein stated that gravity is, in fact, the result of the curvature of space-time, and any accelerated change in mass or energy creates a disturbance that propagates through space-time as a "wave". For a long time, these waves remained merely a theoretical prediction. In 1974, the observation of a pulsar system binary pulsar system by two researchers demonstrated that the energy of this system decreases exactly as expected from the emission of gravitational waves. This provided the first significant empirical evidence for the existence of gravitational waves.

Finally, in 2015, the Gravitational Wave Observatory was able to detect these waves directly for the first time, due to the merger of two black holes. This event is considered the beginning of the era of "gravitational astronomy"; an era in which it is possible to observe phenomena that are not visible with light or other conventional instruments.

Gravitational waves are now recognized as one of the most powerful tools for studying the universe, allowing us to study black holes, neutron stars, cosmic collisions, and even conditions close to the beginning of the universe. In this section, we will discuss the classical and relativistic concepts of gravitational waves, the history of their prediction and discovery, the sources of their production, and the methods for detecting these waves.

4.2.1 New Discoveries About Gravity

a) Calculating the gravitational frequency of solar systems

Usually, gravity is a topic related to stars, planets and their moons. In fact, gravity is the interaction between stars and their planets and also planets and their moons which move in specific orbit with a generally constant speed. Also, they have regular and balanced structures. So, for structures which orbits have been balanced, the following relations can be considered:

> "Summation of forces influencing planets ≡ Summation of forces" influencing stars.

$$\sum_{i=1}^{n} F_{i_{\text{Star}}} \equiv \sum_{i=1}^{n} F_{i_{\text{Planet}}} \tag{4.43}$$

By considering the balance of the planet and the central star, it can be said that the effect of these two forces on each other are always the same and its value is equal to zero (Figure 4.8):

$$F_1 = F_2 \Rightarrow F_1 - F_2 = 0 \tag{4.44}$$

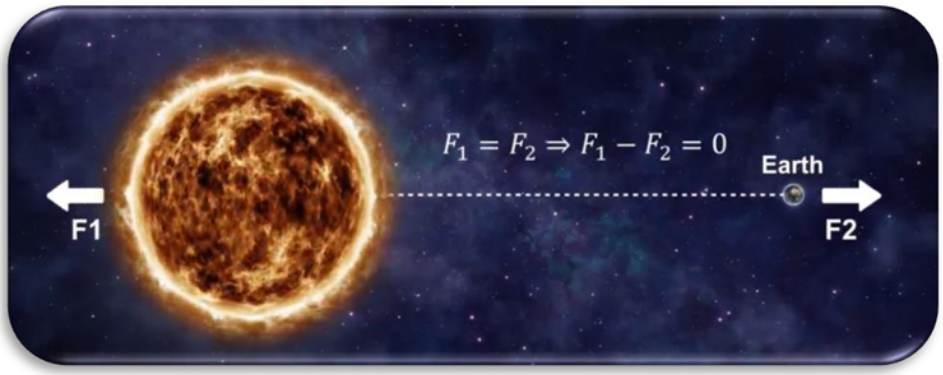

Figure 4.8: Summation of forces between star and planet

This particular state conveys the concept that the balanced structure is due to the effect of gravitational electromagnetic waves between the star and the planet. It means the gravitational electromagnetic waves stabilize this structure.

In fact, it can be said that if there were no gravitational electromagnetic waves, the stability of the structure between the star and the planet would not be like this. So the following special relation can be obtained:

"Kinetic Energy = Energy of Gravitational Waves"

So, the relation between the energy of a planet and electromagnetic waves will be:

$$\frac{1}{2}mv^2 = nh\vartheta \Rightarrow \vartheta = \frac{mv^2}{2nh} \tag{4.45}$$

where n is the number of lines of force that pass through the surface of the sphere(S), which we can get by dividing the surface area of the sphere by the surface area of one photon(S_p):

$$n = \frac{S}{S_p} = \frac{4\pi r^2}{4\pi r_p^2} = \frac{r^2}{r_p^2} \tag{4.46}$$

$$\vartheta = \frac{r_p^2}{2h} \times \frac{mv^2}{r^2} \tag{4.47}$$

$$\frac{r_p^2}{2h} = \text{constant} \approx 1 \times 10^{-1} \tag{4.48}$$

And finally the gravitational frequency will be equal to:

$$\vartheta = \frac{mv^2}{10r^2} \quad \text{or} \quad \vartheta = \frac{E_k}{5r^2} \tag{4.49}$$

Now, according to the last formula, we compute the gravitational frequency between Earth and Sun:

$$\vartheta = \frac{mv^2}{r^2} \times 10^{-1} \;\Rightarrow\; \vartheta_{\text{Earth}} = \frac{(5.97 \times 10^{24})(2.98 \times 10^4)^2}{(6.37 \times 10^6)^2} \times 10^{-1} \tag{4.50}$$

$$\vartheta_{\text{Earth}} \approx 1.3 \times 10^{19}\,\text{Hz} \tag{4.51}$$

And the calculated amount of gravitational frequency between the Sun and the planets of the Solar System should be as follows (Table 4.3):

Planet	Mass (kg)	Radius (m)	Velocity around the Sun (m/s)	Frequency (Hz)
Mercury	3.30E+23	2.44E+06	4.74E+04	1.24E+19
Venus	4.87E+24	6.05E+06	3.50E+04	1.63E+19
Earth	5.97E+24	6.37E+06	2.98E+04	1.30E+19
Mars	6.42E+23	3.39E+06	2.40E+04	3.22E+18
Jupiter	1.90E+27	6.99E+07	1.31E+04	6.63E+18
Saturn	5.68E+26	5.82E+07	9.68E+03	1.57E+18
Uranus	8.68E+25	2.54E+07	6.80E+03	6.24E+17
Neptune	1.02E+26	2.46E+07	5.43E+03	4.98E+17
Moon	7.34E+22	1.74E+06	2.98E+04	2.16E+18

Table 4.3: Gravitational frequency for planets in the Solar System

According to the results, the position of gravitational waves in the electromagnetic wave spectrum will be as follows (Figure 4.9):

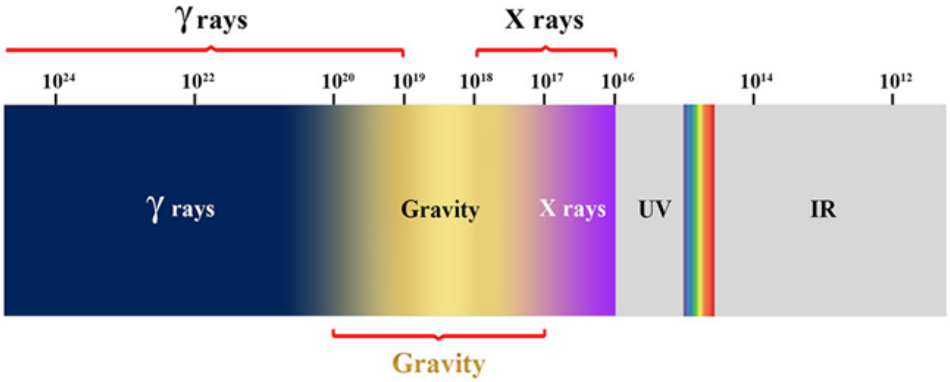

Figure 4.9: Electromagnetic wave spectrum include gravitational wave range

How nice it is to observe the universe through a gravitational eye; in other words, to observe gravitational waves with eyes.

From calculations and electromagnetic spectrum charts, it can be deduced that the frequency of gravitational fluxes is lower than gamma rays and higher than X-ray waves. Therefore, it can be said that anything that is the source of X-rays and gamma rays, can also be an intrinsic source of gravitational waves. If we observe carefully, we can see that the natural sources of X-rays are very large stars, black holes, magnetars, supernova explosions, and neutron stars. As for the source of gamma rays (which are the most powerful, dangerous, and impactful rays), they also come from magnetars, active galactic

nuclei, black holes, and so on. If we look at the electromagnetic spectrum diagram, we find that the visible light range constitutes just a small portion in the middle of the diagram. To introduce a source of radiation light, its origin must be stars. In fact, stars are the only celestial objects capable of producing visible light with high intensity and quantity. The frequency range higher than visible light belongs to the magnetic waves. Considering our solar system, apart from the Sun, which is the primary and powerful source of magnetic waves, only three planets, Earth, Jupiter, and Saturn, have the ability to generate magnetic waves but their magnetic intensity and quantities are extremely low and negligible. One can consider their power and intensity compared to the Sun as close to zero.

Very large stars and black holes are the sources of X-ray generation. We cannot find a planet that has the capability of producing these waves. Also after X-rays in the diagram, we can consider gravity and gamma rays, which their sources can be just considered as stars, black holes, etc.

Important Notes:

1. Although it seems that the characteristics of the central star are not considered in relation to the calculation of the gravitational frequency of the planet, but it should be noted that the effect of the force of the central star on the speed of the planet (v) is considered. In fact, it can be said that the speed of the planets is the effect of the force of the central star.

2. Gravitational waves can be considered as missing, strong, abundant and effective waves, but they are imperceptible.

3. It should be noted that gravitational waves can have a lot of energy and performance, like the conversion of hydrogen to helium in stars. The energy of these gravitational waves can be used on Earth as an energy source.

4. By comparison, a proper level of gravitational fluxes generates as much energy as a nuclear power plant.

5. The existence of a powerful and stable gravity that causes the stability of the existing structure in systems, galaxies, etc., is itself a reason to prove of the existence of black holes.

6. The importance of frequency is that by having the gravitational frequency of planets, stars, black holes, etc., more information about them can be obtained. In fact, we can say that the gravitational frequency of planet, black hole, star, etc., is the alive soul of them. For example, if we can calculate the frequency of a black hole that located at the center of the Milky Way galaxy, we can obtain an overall image

of that black hole. In fact, it can be said that the frequencies of that black hole will show us the images of that black hole. Although visible light cannot be received from the black hole, but in this method 90% of the inner and outer features of the black hole can be seen.

Conclusion:

According to the presented contents, it can be said that the relationship between a star and the surrounding planets is through gravitational waves or the force lines or the gravitational flux that separate from the star, enter the planet and return to the star. This permanent cycle causes a permanent effect. It should be noted that gravitational waves are generated by stars, and we must measure the gravity of planets with stellar gravity. Also, just as there must be two poles in order to have a magnetic field, gravitational waves or gravitational fluxes do not make sense if we only have a single star (sun).

b) Calculating the gravitational frequency between planets and their moons

The following notes should be considered in gravitational waves:

1- Main gravitational waves It can be said to the waves that leave the star, enter the planet of that star and return to the star again. Their frequencies are between 10^{17} Hz to 10^{20} Hz.

2- Sub-gravitational waves It can be said to waves that travel from planet to natural satellite or other planets and return to the planet again. This cycle is planet to planet or planet to natural satellite. It is clear that the frequency of sub-gravitational waves is lower than the frequency of the planet's main gravitational waves.

An example for better understanding, whenever a radiant photon emits from the Sun its velocity is C. But according to environmental conditions, its velocity will decrease. In fact, it can be said that in sub-gravitational waves, the kinetic energy of the waves decreases. As a result, its frequency also seems to decrease. In fact, although the structure of gravitational waves is always constant, but if the kinetic energy decreases, the frequency decreases too. According to above and the proven frequency relation in solar systems:

$$\vartheta = \frac{mv^2}{10r^2} \tag{4.52}$$

Where, the parameters are mass, radius, and velocity of the planet around the central star. The relation between the planet and its moon is as follows:

$$\vartheta = \frac{mv^2}{10kr^2} \tag{4.53}$$

It should be noted that the initial gravity is between sun and planet, which only some part of that, is transferred to the planet's moon. In fact, the main gravity is between the star and the planet and the less one is between the planet and its moons. So, the amount of flux that is transferred from the planet to the moon does not always cover the entire surface of the moon, and only a percentage of the initial gravitational flux passes through the moon. Therefore, to calculate the gravitational waves frequency between moons and planets, we need to define a coefficient called the decreasing coefficient "k", which has included in the denominator of the relation. For example the amounts of gravitational wave frequencies between planets of the Solar System and some of their moons are as follows (Table 4.4) (for all examples $k = 25\%$):

Planet	Natural Satellite	Mass (kg)	Radius (m)	Velocity around the Pelanet (m/s)	Frequency (Hz)
Mars	Phobos	1.06E+16	1.12E+03	2.10E+03	1.49E+16
Earth	Moon	7.30E+22	1.70E+06	1.02E+03	1.05E+16
Uranus	Ariel	1.25E+21	5.79E+05	5.51E+03	4.53E+16
Neptune	Tritan	2.10E+22	1.35E+06	4.39E+03	8.88E+16
Saturn	Titan	1.34E+23	2.57E+06	5.57E+03	2.52E+17
Jupiter	IO	8.93E+22	1.82E+06	1.73E+04	3.23E+18

Table 4.4: Gravitational frequency for natural satellites in the Solar System

c) Gravity frequency of Star to Central Black Hole

In the Saleh theory, the frequency of the gravity is due to the dynamic interaction between the objects and is a function of mass, distance and radius. But in the interaction between the star and the central black hole of the galaxy, this relationship requires a coefficient as a gravitational constant because due to the distance and numerous numbers of stars, all gravitational lines from the black hole do not pass the star. Therefore, the Gravity Star Frequency equation is defined as the following:

$$\vartheta = \frac{mV^2}{10k_{BS}r^2} \tag{4.54}$$

In which "m" is a star mass, "r" is the radius of the star, "V" is the average tangential speed of the star's motion around central black hole of galaxy and "k_{BS}" is gravity coefficient of Saleh Theory. This frequency is the result of the stable star movement around the central black hole of the galaxy and can be used to analyze orbital stability and the amount of gravitation energy transfer.

d) The structure of gravitational waves and their patterns in the space from the most detailed to the most general states

Since the photon is the basis of the universe and every structure is made up of photons, the nature of gravitational waves also is the photon. And its structure is based on the motion of photons.

In the gravitational waves, photons are separated from the stars by the gravitational effect of the planets, so that their external motion is intertwined in their internal motion or its superstring state, and form the long continuous series of photons. In fact, it can be said that in the solar plasma environment, the external motion of a photon converges with its internal motion and it leads to converging photons and forms a single superstring structure that is interconnected in a ring–to–ring feature and travels between the star and the planet (Figure 4.10). Toward the linear direction, the gravitational fluxes are firm and steady and to the perpendicular direction, they have curvature property.

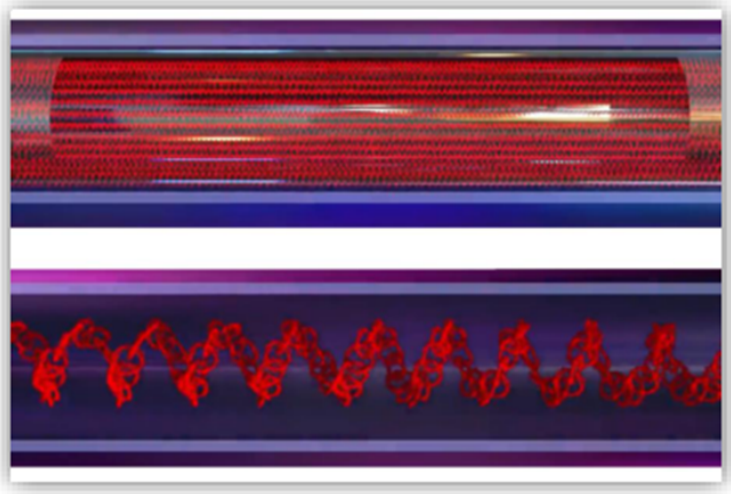

Figure 4.10: Photons are interconnected in a ring–to–ring feature and travel between star and planet

It should be noted that in nature, the production of photons exists only in stars. Sometimes they become visible photons, or in other words, radiant photons, and sometimes intertwined photons, or gravitational photons. Photons with a frequency less than visible spectrum are called infrared and high frequencies are called ultraviolet, and in fact the gravitational waves are the electromagnetic photons with a special property of continuity.

In the distribution of gravitational waves (gravitational fluxes or gravity force lines), most of the gravitational waves are between the star and its planet and a fewer fraction divides between the planet and its moon. It should be noted that gravitational waves have been spread throughout the whole of a system between the sun and planets and

their moons as well as planets between each other. In this way, they have formed an interconnected set of gravitational fluxes (Figure 4.11).

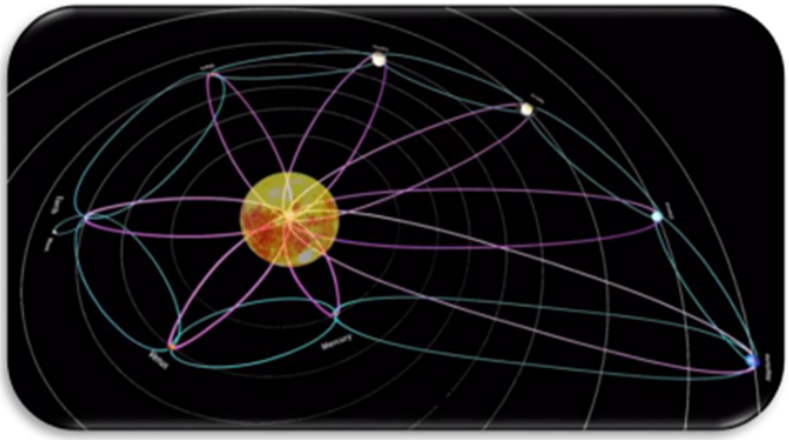

Figure 4.11: Gravitational waves have formed an interconnected set throughout the whole of a system

e) The possibility of data transmission, tens, hundreds, thousands, . . . of times of the light speed in the universe

According to the continuity of gravitational waves in any system, this continuity can be utilized to transmit data. Gravitational force is always present in solar systems, and gravitational fluxes are always connected and continued from the stars to the planets, the planets to the moons and from the planets to the planets. So data can be transmitted by these fluxes to all parts of solar systems, galaxies, etc.

If we could have a suitable transmitter that has the ability to co-frequency with a particular gravitational wave, we can transfer any kind of information from the transmitter to the gravitational waves and receive them on the other side by the receiver.

It can be assumed that the left person is Earth and the right one is Mars. So that, this thin cable can easily withstands two people with a mass of about 100 kg. Suppose this cable is the gravitational flux, which connects the two planets. It is easy to see that the effect that they have on each other is the stable, firm and immortal effect.

The interesting point of this picture is that the gravitational flux cable has the power to transmit data with the least energy and easily. On the other words, due to the continuity of this cable, if we affect anywhere on the path of the gravitational flux cable, it has the power to move and transmit this effect. This cable has the ability to transmit any effect on it, immediately, even in the furthest distance.

The interesting thing about gravitational flux is its continuity and its sensitivity, which makes a bunch of these fluxes to reflect easily, cover the whole path and it could establish a transfer in a fraction of a second.

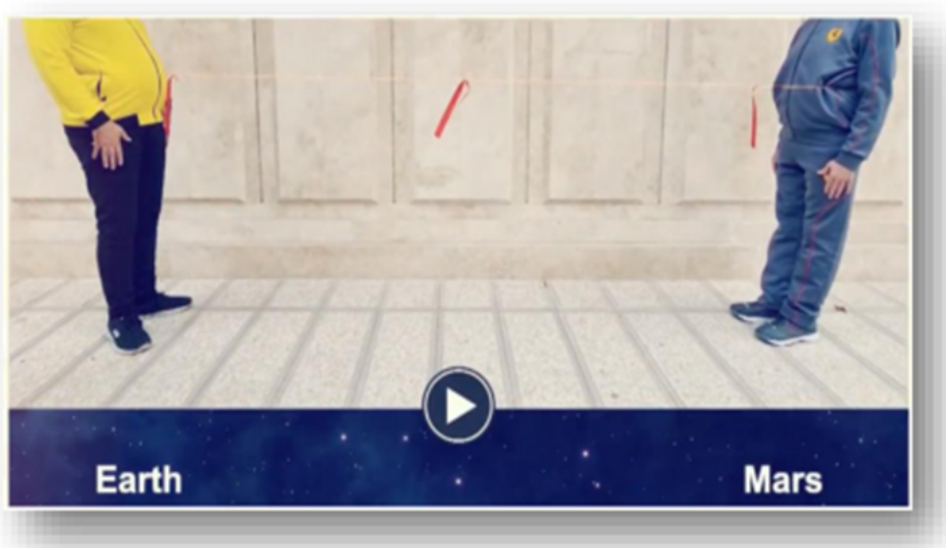

Figure 4.12: The gravitational flux cable

The remarkable thing is that the gravitational waves are continuous and are stretched from planet to planet, like a firm and stable cable. In such a way, that if some information is given to this invisible gravitational cable, it will be transmitted easily in a fraction of a second. It is clear that in this model, even if they are billions of kilometers apart, gravitational waves transmit the given vibrations to these lines, at a speed faster than light.

If we modulate our data on these force lines with intended frequency, we can exchange the data with the speed of light or even tens, hundreds and thousands of times of the light speed. Because the fluxes, force lines, have the property of continuity, and in the whole system and galaxy, the fluxes are related to each other and all the planets and stars are immersed in these fluxes. So that a network structure can be imagined.

As a result of this alive, continuous, and dynamic network, any planet can be a transmitter and another planet a receiver. In addition, a transmitter could be built on Earth that would emit these waves and cover the entire planet. It should be noted that the frequency is between stars and planets as well as planets and planets. So, they have a specific relative frequency to each other, which ranges from 10^{17} Hz to 10^{20} Hz.

f) The possibility of creating a speed close to the speed of light in spacecraft

Due to the gravity flux, or force lines, that have a specific structure, specific circuit and a specific network wherever the spacecraft could be along these force lines and has a favorable frequency or contrary it can move in the direction of the gravitational force lines or gravitational fluxes at a very high speed.

In fact, it can be said that the set of gravity flux lines is an invisible road for spacecraft. As the gravitational force lines or gravity fluxes move at the speed of light, so they can

move the spacecraft at a speed close to the speed of light in a corridor with the size of the surface of a planet.

g) Creating a gravity power plant using gravitational turbines to get strong and clean energy everywhere and everlasting, at any time

Given that the kinetic energy of the planets has the following relation to the gravitational energy:

$$E_k = \frac{1}{2}mv^2 = nh\vartheta \tag{4.55}$$

It can be concluded that the passing energy through the Earth's unit surface is as follows:

$$\frac{\frac{1}{2}mv^2}{4\pi r_e^2} = \frac{2.3 \times 10^{34}}{5.1 \times 10^{14}} = 5 \times 10^{19} \text{ J/m}^2 \tag{4.56}$$

This is actually the passing gravitational wave energy through the Earth's surface in one square meter. It should be noted that this energy is so large and so efficient. If it can be used, the affordable, clean, everlasting energy can be produced everywhere and at any time.

Different methods of using gravitational waves for energy generation:

1- Creating the right obstacle Using metal alloys, a plate can be created that the force lines be able to impulse these plates and generate the energy while passing, such as the wind that strikes turbines and sails.

2- Synchronizing the frequency with the force lines According to the frequency range of gravitational waves, if we can design a device that oscillates or synchronizes with the gravitational lines and their oscillations when moving it can absorb energy and use it.

3- Production of gravitational network Knowing that gravitational waves have a special solid lattice, if we can create a similar lattice that its excitation during the passage of the gravitational wave lattice absorbs energy, we can also generate energy.

h) The Structure of Gravitational Force Lines (Gravitational Fluxes) and Its General Model

The planets have a strong, stable, and coordinated relationship with their suns in such a way that they travel without slight differences in their specific orbit and period (having differences shows inconsistency and irregularity). For example, the number of fluxes that

pass through the Earth is 10^{46} Regarding the size of the sun's surface relative to the Earth, actually a set of 10^{46} force lines (gravitational fluxes) which pass through the Earth, spin and go to the Sun and return again.

Given that a photon has both external and internal motions, and the frequency of electromagnetic waves is in the range of 10 to 10^{20} Hz, the higher the frequency of electromagnetic waves, the more their external motion tends to zero. So, in fact, in very high frequency waves, the external motion of the wave merges with the internal motion (or converges). As a result of this adjoining, each photon forms a ring bond with the other photon. So, the force lines or gravitational flux are a wide loop from one photon to another.

As the nuclei of the suns are so compact and hot, and the atomic structure cannot be imagined for it, therefore, in the suns, a bunch of photons with small external rotational motion are separated from the electrons. In fact, it can be said that the force lines or gravitational fluxes are a kind of continuous chain state of photons.

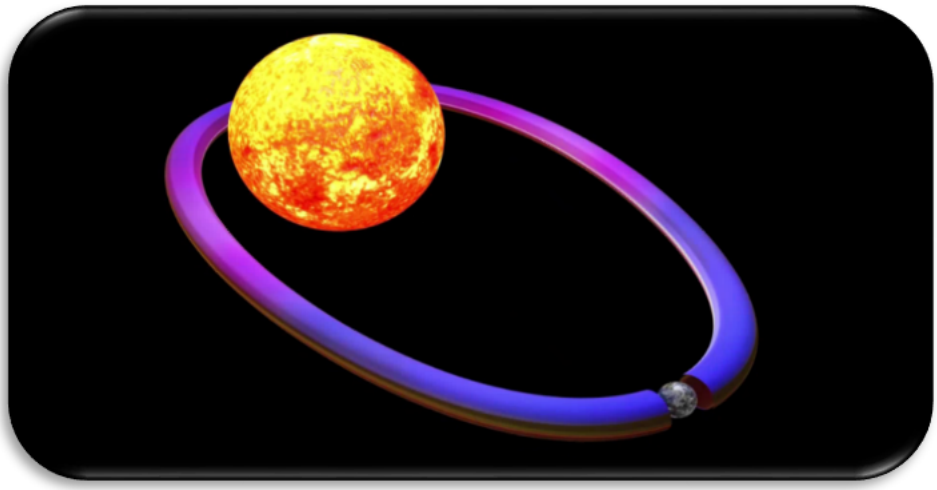

Figure 4.13: The general shape of the gravitational field lines between a star and its planets.

It should be noted that since the gravity extends throughout the whole universe and gravity between the suns and all objects in the universe is conceivable, so these force lines (gravitational fluxes) continue to the end of the universe.

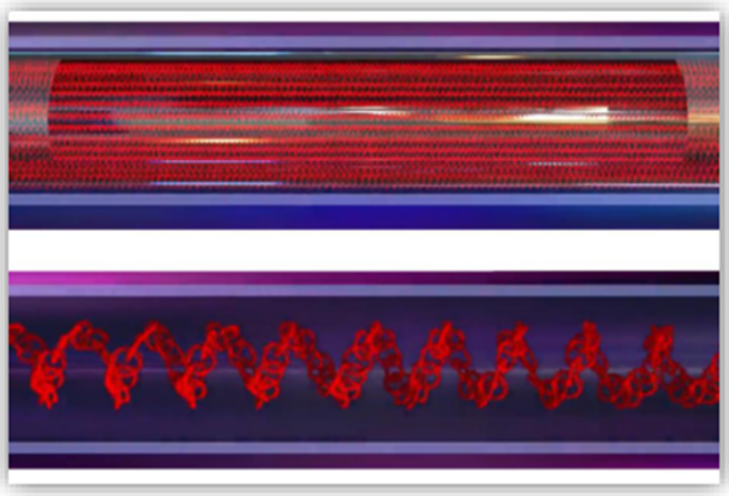

Figure 4.14: Photons are interconnected in a ring–to–ring feature and travel between the star and the planet.

The interesting thing about this model is that the gravitational fluxes pass through everything at the speed of light, they are invisible, and the vertical effect along the flux is so strong that their flexibility in the perpendicular direction is very high. This means that it is inflexible in the direction of the line between the star and the planet, but flexible in the perpendicular direction. 10^{46} is the number of photons that pass through the Earth's surface in an ideal condition. But due to possible empty spaces between the fluxes, this number will be reduced to about 10^{45}. As a result, it can be said that, in reality, the gravitational frequency is less than this value. For example, the actual gravitational frequency of the Earth should be on the order of 10^{18} or 10^{19} Hz.

i) Ten Applications of Various Types of Gravitational Waves in Industry

1. Gravity Power Plants for Clean, Affordable, etc. Energy Generation The passing gravitational energy through the Earth's surface is about $10^{19}\,\mathrm{j/m^2}$. This is actually the passing gravitational wave energy through the Earth's surface in one square meter. It should be noted that this energy is so large and so efficient. If it can be used, the affordable, clean, everlasting energy can be produced everywhere and at any time. So, for using this energy we can create a gravity power plant using gravitational turbines.

2. Generating Artificial Gravity in Space Artificial gravity can be created by manipulating gravitational waves and their frequency to use for different purposes.

3. Manufacturing Anti-Gravity Panels or Constructing Advanced Spacecraft and UFOs Considering the chained structure of both magnetic and gravitational waves, if we can change the frequency of magnetic waves and increase it to about 10^{18} Hz (ap-

proximately 100 times), we can say that we have created artificial gravitational waves; Waves that have the ability to overcome gravity. To create a frequency of 10^{18} Hz, the electrical energy relation can be easily used. If we increase the electric current 10 times, we can increase the frequency as much as a hundred times. By changing the direction of the electric current in the system, gravity or anti-gravity can be created. Using this artificial gravity and anti-gravity, we can use it in the design of UFOs and spaceships, etc.

4. In Designing Dream Houses It can be argued that an ideal house is one that is large in scale, offering a sense of comfort and tranquility, and offering abundant and constant water and energy. Consequently, it is possible to install mini-scale gravity power plants under the building. These power plants can have turbines that operate continuously without requiring any external forces, functioning automatically and with high energy efficiency. They provide residents with essential services, including lighting, energy, water, and car charging. According to these explanations, our dream house can be located anywhere in the world, including underwater. It can be said that this power plant is utilised under the structure, and the building provides all the basic necessities to the residents freely and abundantly. It can be stated that the constant movement of gravitational fluxes in objects is similar to a raging river, which has the ability to move objects. This system enables the movement of special gravity turbines and generators, thus allowing the generation of sufficient and necessary electrical power.

5. Manufacturing Advanced Medical Imaging Devices (Lightweight, Portable, Cost-Effective, Efficient, Safer, ...) The high-frequency gravitational waves are believed to penetrate all matter, surpassing the penetrability of electromagnetic and even X-ray waves by hundreds of times. As a result, devices based on gravitational waves could provide much higher accuracy and efficiency in various applications. Gravitational waves are completely safe. Despite having frequencies comparable to X-rays, they do not cause any harm to living organisms. These devices could be:

- Much lighter than current MRI or CT machines (which typically weigh from hundreds of kilograms to several tons)
- Portable, similar to how laptops replaced bulky desktop computers
- Energy-efficient, due to smaller size and simpler design

6. Transmitting Data at Faster-Than-Light Speeds It should be noted that since the gravity extends throughout the whole universe and gravity between the suns and all objects in the universe is conceivable, so these force lines (gravitational fluxes) continue

to the end of the universe. The gravitational fluxes pass through everything at the speed of light; they are invisible, and the vertical effect along the flux is so strong that their flexibility in the perpendicular direction is very high. This means that it is inflexible in the direction of the line between the star and the planet, but flexible in the perpendicular direction. If we modulate our data on these force lines with the intended frequency, we can exchange the data with the speed of light or even tens, hundreds and thousands of times the speed of light. Because the fluxes, force lines, have the property of continuity, and in the whole system and galaxy, the fluxes are related to each other and all the planets and stars are immersed in these fluxes. So that a network structure can be imagined.

7. Manufacturing Spaceships Capable of Very High-Speed Travel Due to the gravity flux, or force lines, that have a specific structure, specific circuit and a specific network, wherever the spacecraft could be along these force lines and has a favorable frequency or contrary, it can move in the direction of the gravitational force lines or gravitational fluxes at a very high speed. In fact, it can be said that the set of gravity flux lines is an invisible road for spacecraft. As the gravitational force lines or gravity fluxes move at the speed of light, they can move the spacecraft at a speed close to the speed of light in a corridor with the size of the surface of a planet.

8. Manufacturing Wrist-Phones Mobile Antenna is one of the most important parameters in the design of phones. Using gravitational waves, we can design wrist phones that operate in this frequency range. This characteristic ensures that the device is not subject to blind spots, and it is capable of achieving optimal antenna reception in any location.

9. Manufacturing Gravity Lasers to Fission Given the extremely high difference between the rotational radius of electrons (and nuclei) of atoms and the rotational radius of visible lasers, these types of lasers are not suitable for the fission of an atom or a photon. We need to develop a laser with a frequency of at least 10^{18} Hz, as common lasers are not applicable. For the fission of an atoms or photons using this method, we propose using gravitational lasers or electron lasers.

10. Building Seismic-Resistant Structures By using gravitational waves, which have very high energy, earthquake-resistant houses can be designed that lift the building off the ground during an earthquake and lower it after the earthquake has ended.

4.2.2 New Discovery for the Nature of Neutrinos and a Description of Their Structure

Scientists, based on their several years experience and after vast investigations, have found these results about neutrinos:

1. Neutrinos are produced by stars and emitted in all directions

2. Neutrinos have a very small and non-zero rest mass

3. Neutrinos have no electric charge

4. Neutrinos travel at a speed close to the speed of light

5. Neutrinos have very low reactivity, so they can pass through matters easily and almost nothing can stop them

6. Neutrinos are not affected by the magnetic fields directly and easily pass through the strong magnetic fields without any effects

7. Neutrinos enter the Earth from one side and exit from the opposite side without the slightest barrier

8. Neutrinos pass through a square centimeter of the Earth at about 10^{10} per second

9. Neutrinos can be detected by detectors that are located deep underground

10. Neutrinos are the most unachievable fundamental particles in the universe

Now we are going to present some investigative contents about gravity:

It is clear that all stars and planets revolve in orbits around each other which there are gravitational force lines (gravitational fluxes) between them, and the effect of these lines creates stability and balance among planets and stars. In fact, it can be said that the force related to kinetic energy of a planet is always in action with the gravity force lines and causes equilibrium, and the kinetic energy of the planets has been always equal to the energy of the gravitational waves. It also balances the planet in its orbital path that continues its way with a specific velocity and a specific orbit. On the other hand since the photon is the basis of the universe and every structure is made up of photons, the nature of gravitational waves also is the photon and their structure is based on the motion of photons. In fact, it can be said that in the solar plasma environment, the external

motion of a photon converges with its internal motion and it leads to converging photons and forms a single superstring structure that is interconnected in a ring to ring feature and travels between the star and the planet. Gravitational fluxes can be considered as missing, strong, abundant and effective waves in universe.

4.2.3 The Characteristics of Gravitational Fluxes Based on Saleh Theory

1. Gravitational fluxes are made of intertwined photons. The production and intertwine of photons to create this type of chained structure require high temperature and pressure, which is only possible in the core of stars. Therefore, gravitational fluxes are produced only by stars and could emit in all directions of the star. We should note that the production of photons in nature only occurs in stars. Sometimes they become visible photons, or radiant photons, and sometimes intertwined photons, or gravitational fluxes

2. Gravitational fluxes are made of intertwined photons, so each component is a photon and has a very small rest mass

3. Gravitational fluxes are made of photons, so they have no electric charge

4. Gravitational fluxes are made of photons, so they travel at the speed of light

5. Gravitational fluxes react only with special alloys and pass through the rest of materials without any reaction

6. Gravitational fluxes have no charge and are not affected by any magnetic fields

7. Gravitational fluxes, like a belt, enter a planet on one side and exit on the opposite side, keeping the planet stable and steady in its own orbit

8. Gravitational fluxes are made of intertwined photons and according to the calculations; about 10^{14} numbers of them pass in a square centimeter per second

9. Gravitational fluxes pass through the planets, so to detect them; we have to place detectors in the deep underground

10. Gravitational fluxes can only be detected with particular alloys and are difficult to achieve

Considering the above characteristics and comparing the Neutrinos features with the features of gravitational waves that mentioned in the topic of "Gravitational Waves" we can say:

"Neutrino is the same as gravity and gravity is the same as neutrino"

In the following table, the properties of neutrino and gravity fluxes can be seen:

Comparison Between Neutrino & Gravity

Properties	Neutrino	Gravity
Most Production Place	Stars	Stars
Rest Mass	Non-zero	Non-zero
Electric Charge	No	No
Speed	Close to the Speed of Light	Close to the Speed of Light
Reactivity (with matters)	No	No
Affection by Magnetic Fields	No	No
Enter / Exit (From the Earth)	Enter from one side & exit from the opposite side	Enter from one side & exit from the opposite side
Number per Second (pass through a square centimeter of the Earth)	About 10^{10}	10^{14} (Theoretically)
Detectors Location	Deep Underground	Deep Underground
Most Unachievable Fundamental Particles in Universe	✔	✔

Neutrino is the Same as Gravity and Gravity is the Same as Neutrino

Table 4.5: Properties of neutrino and gravity fluxes

Interestingly, the high power of neutrinos is due to their continuous and intertwined structure, which creates its high penetrating power and effectiveness. On the other hand, due to the fact that its frequency is too high and its wavelength is too short, its penetrating power is multiplied.

It should be noted that in visible spectrum and lower frequencies, due to absence of intertwined structure, photons act as single particles and their effects are minor and weaker. But in gravitational waves, duo to the continuous and intertwined structure, their effect multiplies hundreds of times, which the higher penetration and effect than other waves can be imagined.

4.2.4 New explanation for how fluxes are generated at the gravitational source

Given that inside stars, atomic and chemical reactions occur with high intensity, coupled with exceedingly high temperatures and pressures.

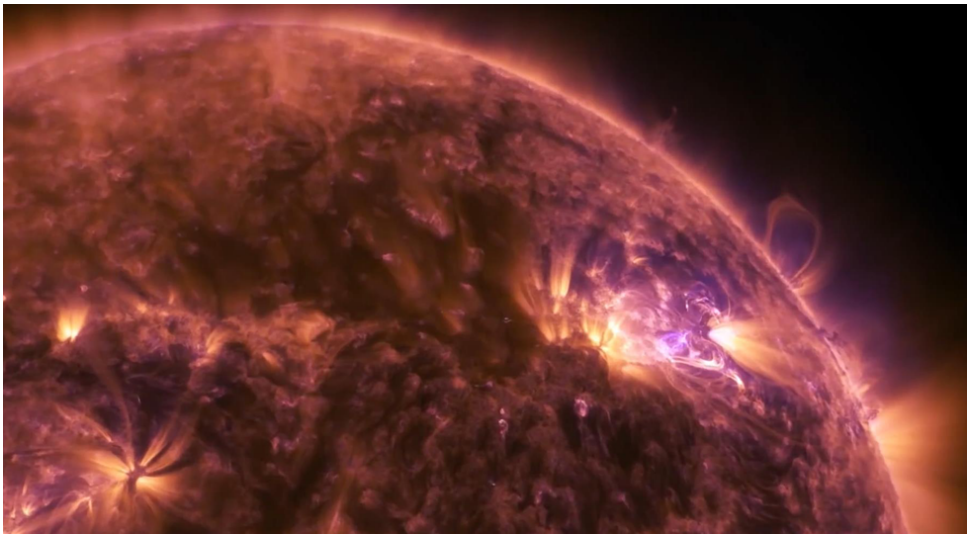

Figure 4.15: Ref: National Geographic

Consequently, stars have the ability to emit a wide range of electromagnetic spectra that span across various ranges, including both the visible spectrum and the invisible one, such as Magnetic waves, X-rays, Gravitational waves, and Gamma rays.

Due to the high pressure and temperature present in the stars, photons become closely packed, their internal and external motions converge, and chained photons are generated. In other words, the chain of linked photons is created as the result of the high pressure and heat in the star. A bundle of these chained photons, like stretched hairs (called gravitational flux.), separate from the star, enter a planet, and return to the star, creating a cyclic rotation (like invisible belts that are big and strong).

On the other hand, stars have a rotational motion around their own axis. This stellar rotation imparts the ability for a star to regulate all of its planets in terms of their rotational velocities and other properties. Given this aspect, it can be expected a system with stable, uniform, and consistent rotation.

As a sign, it should be noted that all the planets in the Solar System, even the Kuiper Belt, are situated at approximately the same level of the horizon around the Sun. Indeed, the steadfast and uniform rotation of a star around its axis will lead to the stable and uniform rotation of the planets orbiting around it.

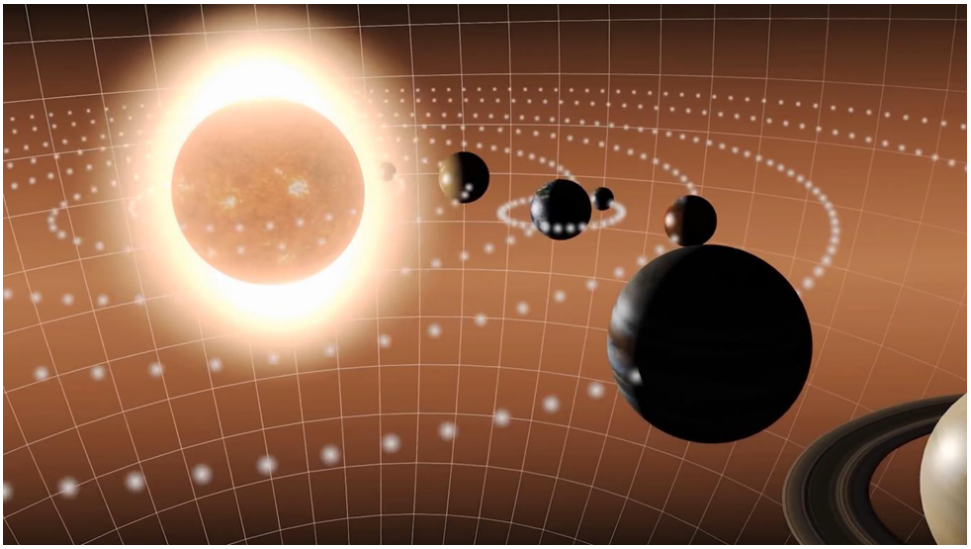

Figure 4.16: Ref: Space Matters

4.2.5 New Discoveries about the Magnetic Fields

a) Calculation of Frequency and Energy of the Magnetic Fields

To calculate the frequency of the magnetic field, we use the following experiment: two annular magnets with identical characteristics are placed facing each other by the same poles. The upper magnet is in equilibrium thanks to the interactions between the force of its weight and the magnetic force of the lower magnet. Therefore, the gravitational potential energy of the upper magnet must be equal to the magnetic energy of the lower magnet. Then we measure the distance between the two magnets.

By multiplying this distance with the mass and the gravitational constant of the Earth ($g = 10$) we obtain the gravitational potential energy of the upper magnet which is equal to the magnetic energy of the lower magnet. On the other hand, we consider the magnetic energy of the magnet as "$nh\vartheta$" and deal with the calculation of the frequency of the magnetic field of the magnet. So we have:

$$E_B = mgd = nh\vartheta \tag{4.57}$$

The above tests are repeated by different magnets.

Case 1: Both the lower and upper magnets are 2.5 grams: The distance between the two magnets is 2.30 cm. Therefore we have:

$$E_{(B_1)} = m_1 g d_1 = n_1 h \vartheta_1 \Rightarrow \tag{4.58}$$

$$E_{(B_1)} = 2.50 \times 10^{-3} \times 10 \times 2.30 \times 10^{-2} = 6.62 \times 10^{-34} \times n_1 \vartheta_1 \Rightarrow \tag{4.59}$$

$$n_1\vartheta_1 = 0.87 \times 10^{30}\,\mathrm{Hz} \tag{4.60}$$

Case 2: Both the lower and upper magnets are 5 grams: The distance between the two magnets is 2.32 cm. Therefore we have:

$$n_2\vartheta_2 = 1.75 \times 10^{30}\,\mathrm{Hz} \tag{4.61}$$

Case 3: Both the lower and upper magnets are 7.5 grams: The distance between the two magnets is 2.33 cm. Therefore we have:

$$n_3\vartheta_3 = 2.64 \times 10^{30}\,\mathrm{Hz} \tag{4.62}$$

We continue the same approach and we have obtained the result that present in Table 4.6. Based on the above experiment, it can be concluded that:

$$n\vartheta = A \times 10^{30}\,\mathrm{Hz} \tag{4.63}$$

In which 10^{30} is our constant and there is a variable coefficient "A".

The Results of Experiment A

	Case 1	Case 2	Case 3	Case 4	Case 5	Case 6	Case 7
m (g)	2.50	5.00	7.50	10.00	12.50	15.00	17.50
d (cm)	2.30	2.32	2.33	2.33	2.33	2.32	2.33
nϑ	0.87E+30	1.75E+30	2.64E+30	3.52E+30	4.40E+30	5.26E+30	6.16E+30
E_B (j)	5.76E-04	1.16E-03	1.75E-03	2.33E-03	2.91E-03	3.48E-03	4.08E-03
$E_B/m\ (j/g)$	2.30E-04	2.32E-04	2.33E-04	2.33E-04	2.33E-04	2.32E-04	2.33E-04

Table 4.6: Magnet expriments

Notice:

As we know, force lines or magnetic fluxes are invisible and on the other hand, they pass through objects. Considering these characteristics, we can certainly say that the frequencies of magnetic fluxes are obviously higher than those of visible waves. It can therefore be deduced that the start of the frequency range of the magnetic field must be

10^{15} Hz. So in this test the amount of "n" is also around 10^{15}. We repeat the experiment with 45 grams magnets and the following results is obtained (Table 4.7:

The Results of Experiment B

	Case 1	Case 2	Case 3
m (g)	45.00	90.00	135.00
d (cm)	3.72	3.62	3.71
$n\vartheta$	25.3E+30	49.2E+30	75.7E+30
E_B (j)	1.67E-02	3.26E-02	5.01E-02
E_B/m ($^j/_g$)	3.72E-04	3.62E-04	3.71E-04

Table 4.7: Table of Results 2

In this experiment, we reach similar results. So, it can be said that logically the beginning of the frequency range of magnetic waves should be 10^{15} Hz, and therefore the beginning of the interval of "n" is 10^{15} too. On the other hand, as you can see, the value of distance "d" is between 2.30 and 3.72 cm. And according to the formula obtained for the magnetic energy of the magnet ($E_B = mgd$) and averaging the energies obtained in the experiments per gram of magnet, the energy of one gram of ordinary laboratory magnet can be considered approximately equal to 3×10^{-4} j/g. We call that as "**Saleh Energy Constant**" ($\mathbf{S_e}$).

$$S_e = 3 \times 10^{-4}\,\mathrm{j/g} \tag{4.64}$$

So the amount of magnetic energy of ordinary laboratory magnet is generally equal to:

$$E_B = S_e \cdot m\,\mathrm{j} \tag{4.65}$$

Where, "m" is mass in units of grams. Therefore, by measuring the mass of a magnet and using this formula, the energy of the magnet can be easily obtained.

Notice:

1. Considering that $n\vartheta$ always has the constant part of 10^{30}, by increasing the magnet mass, the coefficient $n\vartheta$ will change and the value of 10^{30} always will be constant.

2. Although by increasing the mass of magnet, the number of magnetic fluxes "n" and magnetic field frequency will increase but this increase is such that the frequency remains in range of 10^{15} to 10^{16} Hz.

Now we will study the dependency of magnetic frequency ϑ and the number of magnetic fluxes "n" to the mass. As it was said before, the frequency will remain in the range of 10^{15} to 10^{16} Hz. So the number of magnetic fluxes can be defined as follow:

$$n = a \times \vartheta \tag{4.66}$$

Where "a" is between "1" and "10", therefore:

$$n\vartheta = a\vartheta^2, \quad \text{where } 1 \leq a \leq 10 \tag{4.67}$$

On the other hand, we obtained:

$$E_B = S_e \cdot m = nh\vartheta \tag{4.68}$$

$$S_e = 3 \times 10^{-4}\,\mathrm{j/g} \tag{4.69}$$

As a result:

$$E_B = 3 \times 10^{-4} \times m = nh\vartheta = ha\vartheta^2 \Rightarrow \tag{4.70}$$

$$\vartheta = \sqrt{\frac{3 \times 10^{-4} \times m}{ah}} = \sqrt{\frac{m}{a}} \times 0.67 \times 10^{15}\,\mathrm{Hz} \tag{4.71}$$

As we said before:

$$1 \leq a \leq 10 \tag{4.72}$$

So:

$$\frac{1}{10} \leq \frac{1}{a} \leq 1 \tag{4.73}$$

By averaging $1/a$ and putting it in the relation, we have:

$$\vartheta = \sqrt{0.55 \times m} \times 0.67 \times 10^{15} = 0.5 \times 10^{15} \times \sqrt{m}\,\mathrm{Hz} \tag{4.74}$$

The constant value is called "Saleh Frequency Constant" (S_ϑ) and we have:

$$S_\vartheta = 0.5 \times 10^{15}\,\mathrm{Hz/g^{1/2}} \tag{4.75}$$

$$\vartheta = S_\vartheta \cdot \sqrt{m}\,\mathrm{Hz} \tag{4.76}$$

Where "m" is the mass of the magnet in units of grams. Therefore, by measuring the mass of the magnet and using this formula, the magnetic frequency of the magnet can be easily obtained. As a result, the energy and frequency of the magnets can be easily calculated by these two formulae:

$$\text{Magnetic Energy:} \quad E_B = S_e \cdot m\,(\mathrm{j}) \tag{4.77}$$

$$\text{Magnetic Frequency:} \quad \vartheta = S_\vartheta \cdot \sqrt{m}\,(\mathrm{Hz}) \tag{4.78}$$

Notice:

1. It should be noted that as it was said previously, by increasing the magnetic mass, in addition to the frequency, the number of magnetic fluxes will increase accordingly. But considering the limitations of the frequency range of the magnetic field it can be concluded that although the magnetic frequency of magnets is dependent on mass, but it has limitations and always will be remained in an approximate range of 10^{15} to 10^{16} Hz (Figure 4.17). But the magnetic field energy of magnets, considering the wide range of variations for n, may have lower limitations.

2. The accuracy of these formulae is about 97%.

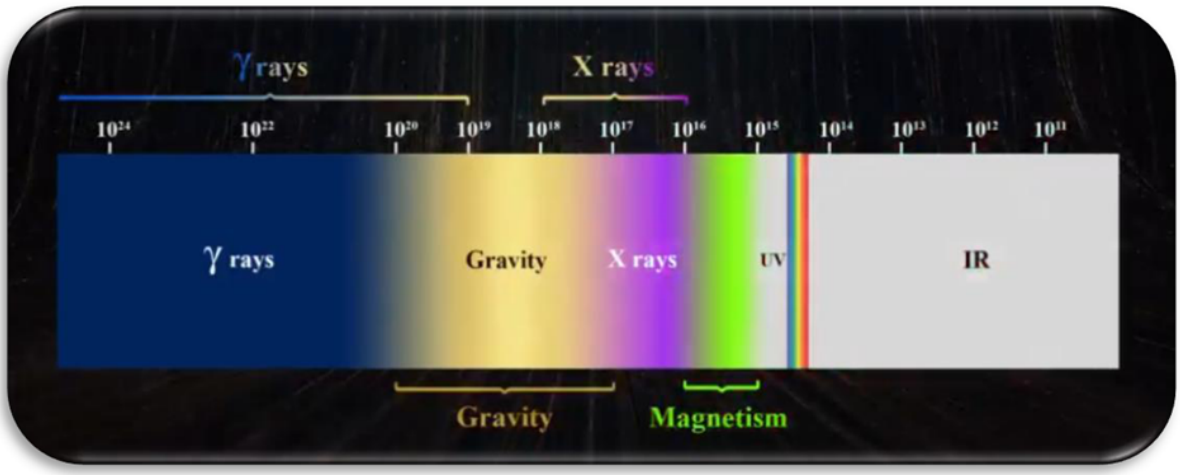

Figure 4.17: Magnetic frequency range

b) New Explanation for the Intense Attraction and Repulsion of the Magnetic Poles

We should note that same as the electricity that electrons from higher potential points transfer to lower potential points, in magnetic fields also magnetic fluxes move from N pole by higher potential to the S pole.

If magnetic poles be opposite, they will attract each other intensely and if the poles be alike, they repel each other intensely. Generally, it can be concluded that like poles repel each other with a force equal to the sum of the two values of those forces, and opposite poles attract each other with a force equal to the sum of the two values of those forces (Fig. 4.18):

$$\sum F = F_N + F_S \tag{4.79}$$

$$\sum F = -(2F_N = 2F_S) \tag{4.80}$$

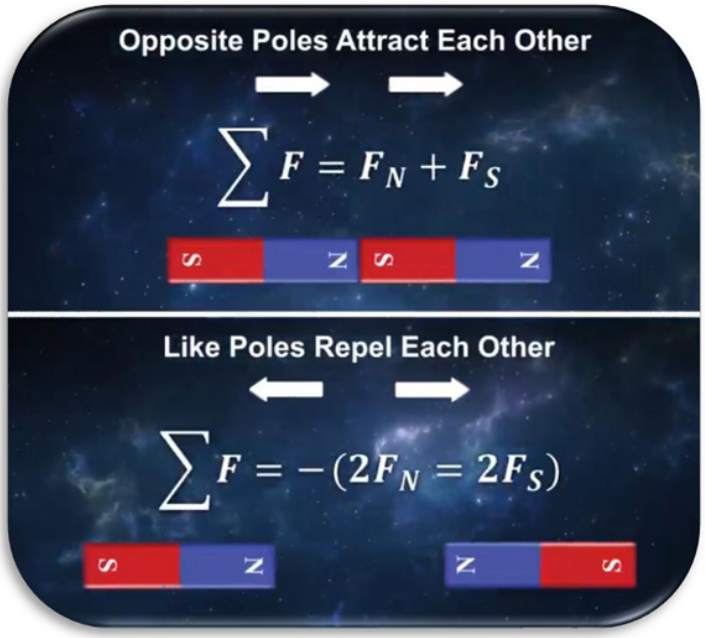

Figure 4.18: Attraction and repulsion of magnetic poles

c) Nature and Structure of Magnetic Fluxes

According to relative penetrability of magnetic fields and its special and beautiful state, it can be said that magnetic waves are not single photons. Rather, they are a group of photons that are joined together in a chained state. For better conception it can be said whenever we bring two like poles of the magnet closer to each other, the contrary effect is seen, as if we have placed two invisible springs between them and we are squeezing the

springs. These springs are the same as continuous magnetic fluxes.

Due to this special form, it can be said that the structure of the magnetic field is similar to the structure of gravity flux and chained photons. Since in this model, toward the linear direction, the fluxes are firm and steady and to the perpendicular direction, they have curvature property. These magnetic fluxes are made of photons, but the placement and structure of these photons are interconnected like chains. In fact, magnetic fluxes bend and compact and again return to their original shape. So it can be said that the magnetic field fluxes, similar to gravity fluxes, are made of interconnected like photons.

4.2.6 The Existence of Invisible Cables in the Universe

Examination of our surrounding environment reveals the ground beneath our feet, the sky overhead, and the air that surrounds us. Air, however, is colourless and invisible. It's a mixture of gases such as oxygen, nitrogen, etc., which is itself one of the essential foundations of life in our world.

Observation of a conventional pane of glass (commonly found in windows)—especially high-quality glass—shows it's an object so exceptionally transparent that its presence cannot even be discerned from a few metres away. Furthermore, ultra-transparent polymers are also difficult to see, given their elasticity and high tensile strength.

These examples can help us better comprehend the invisible strings that exist between the North (N) and South (S) poles. The presence of these invisible strings, which are capable of transmitting force, can either oppose or support a moving force. Generally, it can be stated that these invisible strings possess a tangible existence, although we cannot see or feel them.

If we place two poles, N and S, opposite each other, the magnetic flux is sufficiently strong to cause intense attraction or repulsion. However, the interesting point is that these lines of force and magnetic flux are neither seen nor felt. In effect, our senses are incapable of perceiving their existence.

The same principle holds true for X-rays and gravitational waves. Without being able to touch or see them, we can still discern their effects throughout the universe. From a simple glass that strikes the ground to large celestial objects like the Earth that revolve around their central star to form solar systems, the existence of these invisible cables is what facilitates the formation of these existing structures. Indeed, these very structures also serve to prove that these invisible cables exist in the cosmos.

4.2.7 The structure, model and mechanism of electromagnetic waves

Visible light, emitted from our own star (the Sun), can be divided into seven distinct groups, commonly known as the seven colors of the spectrum that begins with red and ends with violet. While each color group possesses its own unique wavelength and frequency, all of these and, in general, all electromagnetic spectra fundamentally consist of photons.

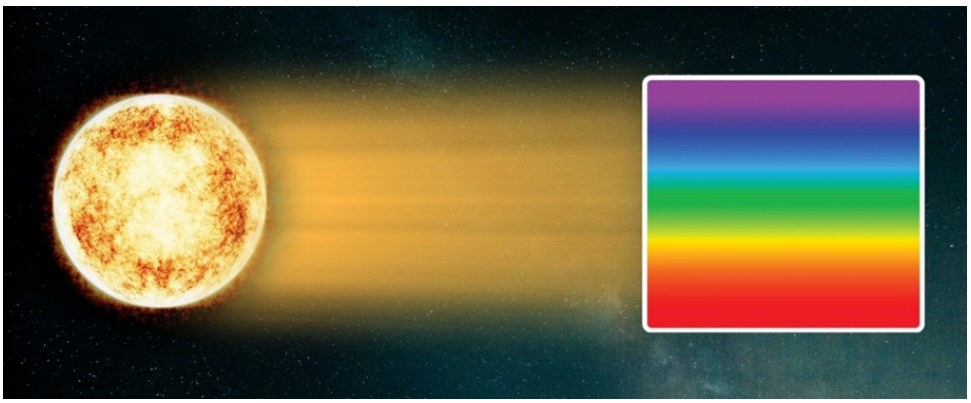

Figure 4.19: Visible light spectrum from red to violet

If we consider the redshift effect on the wavelength of red light, we observe a decrease in frequency, resulting in a fundamental change in its color. This redshift, occurring due to alterations in the velocity, causes the red light to shift towards the infrared region. Although the initial red light cannot be directly observed, its underlying nature remains that of a photon. Likewise, violet light is subject to the same principle. The redshift, blueshift, high shift, and low shift phenomena can induce shifts in the frequency of violet light, leading it towards either lower or higher frequencies. Despite these frequency changes, the fundamental nature of violet light, characterized by its photon composition, remains intact.

In fact, the basis of all electromagnetic waves is a photon that has a specific wavelength and frequency.

Therefore, we can conclude that the basis of all electromagnetic spectrum is the photon, each having a distinct wavelength and frequency.

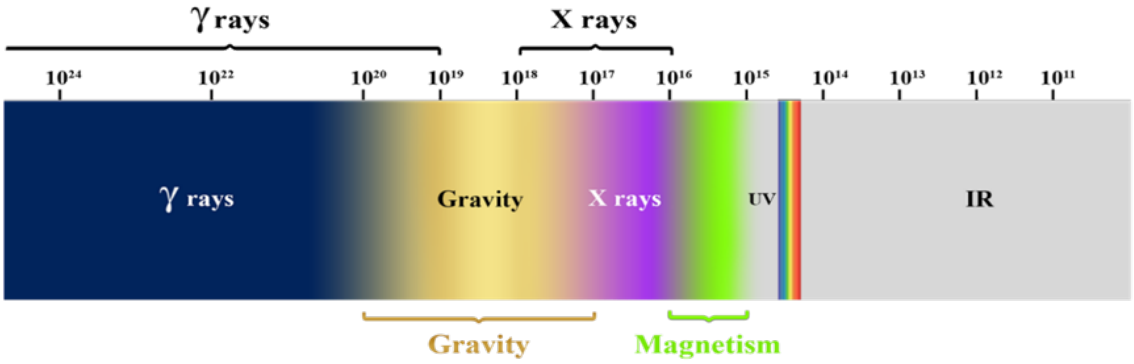

Figure 4.20: Electromagnetic spectrum showing γ rays, X rays, UV, IR, and the relative regions of gravity and magnetism

If we consider magnetic fields (which our Sun possesses and the Earth itself can weakly generate), we will observe that they are, in fact, comprised of chained photons or the same magnetic flux that travels from the North pole to the South pole and then return from the South pole to the North pole.

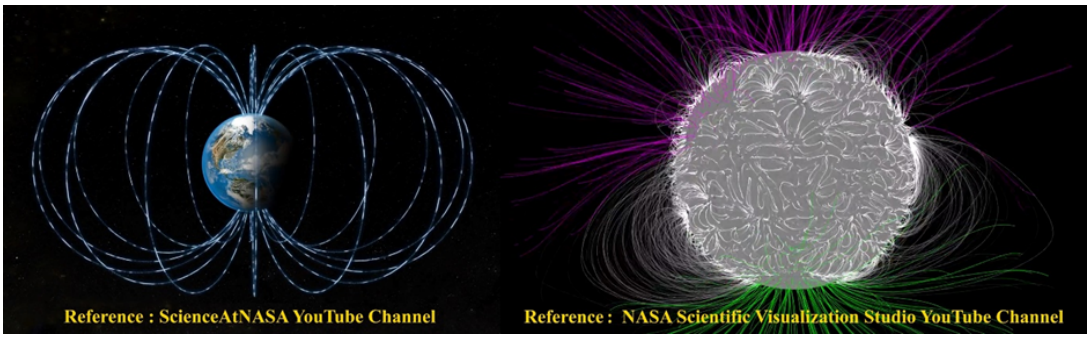

Figure 4.21: Magnetic flux lines traveling from the North pole to the South pole and returning

Based on the calculations, the magnetic frequency is approximately 10^{15} Hz, the model and structure of gravitational fluxes are similar to those of a magnetic field. Considering that the gravitational frequency is significantly higher (approximately 1000 times).

In fact, electromagnetic and gravitational waves share similarities in their generation, structure, and effect, with the main difference lying in their vastly higher frequencies for gravity waves. In other words, electromagnetic waves can be considered weak and short-range, while gravitational fluxes are strong and long-range.

Conclusion:

In this section, the nature of gravitational waves and their role in the structure of the universe were examined. It was initially demonstrated how, according to the Saleh Theory, gravitational waves are composed of interwoven photons that oscillate between stars and planets, and it is these continuous fluxes that ensure the stability of cosmic

orbits. Subsequently, the frequency of gravitational waves for solar systems, planets, natural satellites, and even stars with a central black hole was calculated, and the concept of primary and secondary gravitational waves was introduced.

Subsequently, the networked and continuous characteristics of gravity fluxes were explained, and wide-ranging applications were proposed for them; these include faster-than-light data transmission, the construction of high-speed spacecraft, the creation of artificial gravity, gravity power plants, novel imaging systems, and resilient structures. Finally, by comparing the properties of neutrinos and gravity waves—such as negligible mass, lack of charge, high penetration, and the ability to pass through matter—the conclusion was put forward that "the neutrino is gravity and gravity is the same neutrino."

A significant portion of this discussion was also dedicated to the investigation and calculation of the frequency of magnetic waves. Through a simple experiment on magnets, formulae for the energy and frequency of magnetic fields were derived, and two important constants (the Saleh Energy Constant and the Saleh Frequency Constant) were introduced. It was also explained that the structure of magnetic fluxes, like gravitational fluxes, consists of continuous photons. Overall, this section provides a comprehensive and unified picture of the photonic structure of gravitational and magnetic waves and their role in the universe.

Chapter 5

Dark Energy and Dark Matter

5.1 An Introduction to Dark Energy and Dark Matter

Understanding the structure of the cosmos is not possible solely by observing stars, galaxies, and visible matter; what we perceive with the naked eye or optical instruments constitutes only a small fraction of universal reality. Astronomical research in the 20th and 21st centuries has demonstrated that the gravitational behaviour of the cosmos, the rotational speed of galaxies, the distribution of galaxy clusters, and the accelerating expansion of the universe cannot be explained by ordinary matter alone. This is where the concepts of Dark Matter and Dark Energy enter the fray; two fundamental yet unknown phenomena that play the primary roles in the gravitational structure of the universe and the rate of cosmic expansion, respectively.

According to the theory of scientists, although Dark Matter is invisible and emits no radiation, it reveals its presence through its gravitational effects on the movement of stars and galaxies. Without it, many cosmic structures would be unable to maintain their stability. In contrast, Dark Energy is a mysterious force that acts in opposition to gravity, causing the expansion of the universe to accelerate over time rather than decelerate. This characteristic makes it one of the most fundamental enigmas of modern science.

In total, approximately 5% of the universe is composed of ordinary matter, while the remaining 95% belongs to these two invisible components. Therefore, to truly comprehend the nature of cosmic energies, forces, and structures, one must investigate these two phenomena—phenomena which play a key role not only in cosmology but also in modern theories regarding dark energy, linear and rotational motions, the stability of matter, and cyclic models of the universe.

This chapter seeks to provide a clear picture of Dark Matter and Dark Energy based on physical principles and supplementary theoretical perspectives, examining their roles in the formation and evolution of the universe.

5.2 Dark energy and the universe expansion

Initially, we give a brief explanation of the Big Bang theory. The Big Bang is the greatest theory in explanation of universe genesis. According to this theory, the universe creation has been started by a huge explosion and continued by the generation of electrons, protons, neutrons, atoms, substances, planets, stars and galaxies by consuming the energy of this massive explosion. Concurrently, some of this energy made all these masses scattering. It's expected after a while of this great event the velocity of masses reduces until they stop. However, it has not happened yet, but also their expansion accelerates. The only solution that scientists provided to explain, was the probability of the presence of unspecified energy in the universe that potentiates this cosmic acceleration and since they were unaware of its origin called it dark energy. So a major question in physics came to the existence: What the dark energy is and what its specifications are?

Figure 5.1: What the dark energy is?

Saleh Theory calculates the released energy of the Big Bang in a different way. Accordingly, we can imagine the whole universe as a sphere which its volume is one cubic meter and made up of neutrons. We calculate the reserved energy in this neutron star by Monte Carlo technique. The binding energy of the neutron star calculates by this experimental equation:

$$E_1(\rho) = a\left(\frac{\rho}{\rho_0}\right)^{\alpha} + b\left(\frac{\rho}{\rho_0}\right)^{\beta} \tag{5.1}$$

In this equation the $E(\rho)$ is the energy of each Neutron, α, β, a and b are free and independent parameters, ρ is the density of the world and ρ_0 is the Neutron density.

As the Neutron density and the nucleus density are equal, so ρ_0 will be equal to:

$$\rho_0 = 2.3 \times 10^{17}\,\mathrm{kg/m^3} \tag{5.2}$$

But the density of this spherical mass is equal to:

$$V = 1\,\mathrm{m}^3\,, \quad \rho = \frac{m}{V} = \frac{10^{53}}{1} = 10^{53}\,\mathrm{kg/m^3} \tag{5.3}$$

By putting the following values for the free parameters in the energy equation, for the energy of each Neutron, we have:

$$\xrightarrow[(\alpha=0.514,\ \beta=2.436)]{(a=13.4,\ b=5.62\,(\mathrm{MeV}))} E(\rho) = 13.4\left(\frac{10^{52}}{2.3\times10^{17}}\right)^{\frac{514}{1000}} + 5.62\left(\frac{10^{52}}{2.3\times10^{17}}\right)^{\frac{2436}{1000}} \tag{5.4}$$

$$E_1(\rho) \simeq 7.3 \times 10^{86}\,(\mathrm{MeV}) \simeq 1.1 \times 10^{74}\,(\mathrm{J}) \tag{5.5}$$

In this equation, as the first part is almost negligible, comparing to the second one, it has been ignored.

We considered the total mass of the universe as neutrons, and by dividing the total mass of the universe ($10^{53}\,\mathrm{kg}$) to the mass of a neutron ($1.6\times10^{-27}\,\mathrm{kg}$), the total number of neutrons will be equal to:

$$N = \frac{10^{53}}{1.6\times10^{-27}} \simeq 2.6\times10^{79} \tag{5.6}$$

By multiplying the computed energy for each neutron to the total number of neutrons we can calculate the total energy:

$$E_T(\rho) = N \times E_1(\rho) \simeq 1.1\times10^{74}\times2.6\times10^{79} = 2.8\times10^{153}\,(\mathrm{J}) \tag{5.7}$$

While the calculated energy by the mass–energy equivalence of a mass equal to $10^{53}\,\mathrm{kg}$ is about:

$$E = mc^2 = 10^{53}\times10^{17} = 10^{70}\,(\mathrm{J}) \tag{5.8}$$

By comparing the calculated energy of the Big Bang moment by two ways (through energy of density, that is 10^{153} joules, and through mass–energy equivalence, that is, 10^{70} joules), we face to a significant difference between the amount through the density energy and through the mass–energy.

Saleh Theory believes that the calculated released initial energy at the Big Bang moment should be calculated by the density energy and if we calculate the released energy in this way, there is no need to define unknown energy called dark energy.

Accordingly, dark energy is nothing but the remaining energy of the initial energy released at the Big Bang moment, minus the energy consumed to form the objects of the universe including: Electrons, Protons, Neutrons, celestial objects, etc.

But the question remains: what is the cause of the accelerated expansion of the universe?!

5.3 Solving the Dark Energy Problem by Revisiting the Fundamental Laws of Physics

Within the world we live in, are many things that we see and so many things that we do not see and we are unaware. Let's go back to the beginning of existence. When this world of ours was a very, very compressed globe, with very high temperature, in which mass and energy were so interconnected and compressed that no separate mass and energy could be conceived.

5.3.1 Dark Energy

If we obtain calculations in a simple and fluent manner with appropriate approximation using the Monte Carlo method mentioned above, we consider the energy at the moment of the Big Bang—with certain considerations—to be approximately 10^{110} to 10^{120} Joules, which is an exceedingly high amount of energy. Next we calculated the amount of consuming energy from the moment of the Big Bang to the present, which is 14 billion years. The consumed energy for creation of sub-photons, photons, electrons, protons, neutrons, atoms, stars, galaxies, structures, etc. is more than 10% of the Big Bang's energy, and it could easily be obtained that about 90% of the Big Bang's energy has remained.

From the beginning of the equilibrium or homogeneity of the universe, this remained energy has caused the expansion of the Universe so that the structure of systems and galaxies remains constant, but most of the galaxy, due to their structure, is moving away and their speed will also increase. It should be noted that what drives them away, is the initial energy that started from the Big Bang moment and continues to this day and will continue to do so. In fact, dark energy has been around since the beginning of the Big Bang, but after the equilibrium or homogeneity of the universe, we found its effect. So the energy applied in the universe is the residual primary energy or the dark energy. For example, when a large dam break many roaring waves flow travel several thousand kilometers and in the end reach a relative calmness near the shore. If the galaxies were not distant from each other, we might never find dark energy.

It could be said that the universe is like a large sphere rotating around itself (like rotating of the Moon around itself and around the Earth, the Earth around itself and around the Sun, the Sun around itself and around the Milky Way and the Milky Way

Figure 5.2: Dark Energy

which revolves around itself and around the hypothetical center of the universe). You should consider that when the huge explosion, the Big Bang, was first created, each particle of that compact object expands at a very, very high velocity in the n directions, and because it has very, very high velocity and acceleration, if there was not any rotational and spiral motion, these particles would never form the stars and galaxies, and the universe, that existed, was like a very large sphere of dust.

We also have to note that this large sphere is growing from inside to outside. So the sphere of the universe has two linear and rotational motions. Given that the universe has reached certain homogeneity and equilibrium, all its points are interconnected by their particular gravitational force. Consequently, while the world is rotating, all its points are rotating all together. But at the same time, considering that it expands from within, each point of that has a linear motion plus a rotational motion. Therefore, we have two velocities, linear velocity ($\vec{v}$) and tangential velocity ($\vec{v}'$) whose total is equal to $\vec{V}$:

$$\vec{V} = \vec{v} + \vec{v}' \tag{5.9}$$

Our linear velocity ($\vec{v}$) is the effect of the dark energy or residual energy. But let's see how our tangential velocity ($\vec{v}'$) is:

$$\vec{v}' = \vec{\omega} \times \vec{r} \tag{5.10}$$

It should be noted that since there is no external force ($\vec{F}_E$) to change the rotational velocity of the universe, the angular velocity ($\vec{\omega}$) is always constant.

$$\vec{F}_E = 0 \tag{5.11}$$

$$\vec{\tau} = \vec{r} \times \vec{F}_E = 0 \tag{5.12}$$

$$\vec{\tau} = I\vec{\alpha} = 0 \tag{5.13}$$

$$I \neq 0 \Rightarrow \vec{\alpha} = \frac{d\vec{\omega}}{dt} = 0 \tag{5.14}$$

$$d\vec{\omega} = 0 \Rightarrow \omega = \text{constant} \Rightarrow \tag{5.15}$$

$$\vec{\omega}_1 = \vec{\omega}_2 \tag{5.16}$$

Where, $\vec{\tau}$ is torque, $\vec{\alpha}$ is angular acceleration and I is the moment of inertia for celestial objects.

Thus, we conclude that our tangential velocity depends on the variable $\vec{r}$. The more the radius ($\vec{r}$) the more our tangential velocity ($\vec{v}'$) is. Accordingly, the variable parameter of the tangential velocity ($\vec{v}'$) is the radius of rotation ($\vec{r}$) from the center of the universe or from where the Big Bang begins. After all, as the saying goes, as dark energy expands the radius of the universe, the radius of rotation and the universe's $\vec{r}$ is always increasing, and consequently our tangential velocity ($\vec{v}'$) is always increasing. It should be considered that dark energy increases $\vec{r}$ and, secondarily, increases the tangential velocity ($\vec{v}'$).

We have to see the Big Bang as a huge explosion that has given a primary energy to everything and it expands the universe, and its effect has given a uniform velocity to everything which moving away from the center of the universe and from the beginning of the Big Bang.

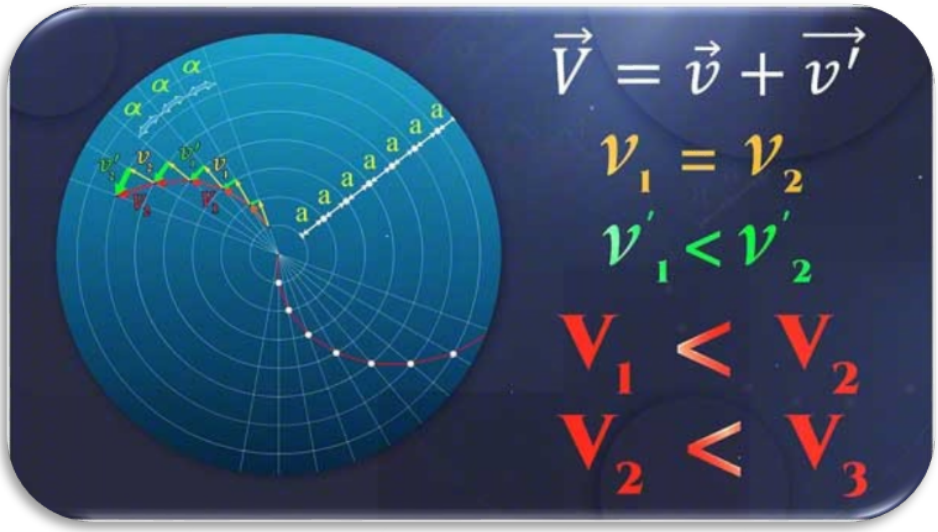

Figure 5.3: Enter Caption

But when the telescopes observe a corner of the sky and find points, they certainly have increasing velocity, and always:

$$\begin{aligned} V_2 &> V_1 \\ V_3 &> V_2, ... \end{aligned} \tag{5.17}$$

that will increase over time, which is due to the dark energy that changes $\vec{r}$ and increases the tangential velocity ($\vec{v'}$), thereby increasing the total velocity ($\vec{V}$) of each object in the sky. We must remember that the dark energy and initial energy have been contiguous, have always been, and always will be. Dark energy is actually the reduced initial energy that is continuous.

In the following, we examine Dark Energy from various perspectives:

5.4 New Explanation for the Nature of Dark Energy Utilizing the Hubble's Law (Dariush Phenomenon)

Let's first review Hubble's elegant law. The general form of Hubble's law is expressed as follows: the velocity of any celestial object in the universe is equal to the distance from the observer, multiplied by the constant number (Hubble constant).

$$V = HD \tag{5.18}$$

This experimental formula indicates that the primary parameter determining the velocity is distance between a celestial object (Ex: Galaxy) and the observer. Variations in velocity correspond to changes in distance, while H is a constant value that does not affect the speed of considered objects.

Hubble's law essentially asserts that the universe's expansion is inevitable, and this expansion will continue, with the key parameter being the distance from the center of the universe. Changes in D or the distance of a celestial object in the universe are continuously expanding because of the big explosion at the Big Bang moment. Given that Hubble's law clearly demonstrates a rotational motion, which has been proved before, therefore, we can always expect increasing rotational velocities of celestial objects in all points of the universe.

For better understanding, we want to formulate a comprehensive mathematical and physical equation for the Big Bang. The equations can be expressed as follows:

$$\textbf{Total motion} = \textbf{Rotational motion} + \textbf{Linear motion}$$
$$\textbf{Total velocity} = \textbf{Rotational velocity} + \textbf{Linear velocity}$$

$$\begin{aligned} \vec{V}_T &= \vec{v}_r + \vec{v}_l \\ \vec{V}_T &= (r\vec{\omega}) + (\vec{a}t + \vec{v}_0) \end{aligned} \tag{5.19}$$

We can deduce that a large amount of energy was released in a very short time due to the Big Bang, creating an initial linear velocity. As it has the negative acceleration the linear velocity decreases but the radius D is increasing.

So, the negative acceleration applies a decelerating motion on the system in its linear motion, but the distance D is increasing. However, in the case of rotational motion, the primary parameter that causes changes in rotational velocity v_r is the distance (r or the same D) that is increasing.

In reality, the presence of linear velocity along the linear path D continuously increases D and as we said, Hubble's law demonstrates a rotational motion in which changes in D are always present and increasing so we find increasing in rotational velocity.

In other words, the value of D always increases, and whenever we observe a galaxy or an object through a telescope, we can easily detect an increase in velocity. This is seen over periods as follows:

$$t_0 < t_1 < t_2 < \cdots < t_n \tag{5.20}$$

$$r_0 < r_1 < r_2 < \cdots < r_n \tag{5.21}$$

$$v_{r_0} < v_{r_1} < v_{r_2} < \cdots < v_{r_n} \tag{5.22}$$

Upon observation, it has been determined that the universe is expanding, and its rate of expansion is increasing. This phenomenon requires additional energy, known as dark energy, if we do not account for the rotational motion from the Big Bang. However, if we do consider the existence of rotation from the Big Bang moment, this phenomenon (**Dariush phenomenon**) becomes clear and does not necessitate further energy (dark energy).

Result:

According to Hubble's law, which indicates the rotational motion of the universe, the speed is increasing, as the parameter D (or r) is also increasing due to the residual energy from the Big Bang explosion.

In fact, dark energy is the residual energy from the Big Bang, and it is the main cause of the expansion of the universe by increasing r. According to Hubble's formula, an increase in the radius value r leads to an increase in the rotational velocities of objects in the universe.

$$r_0 < r_1 < r_2 < \cdots < r_n \tag{5.23}$$

$$v_{r_0} < v_{r_1} < v_{r_2} < \cdots < v_{r_n} \tag{5.24}$$

Ultimately, the effect of the remaining energy from the Big Bang, known as dark energy, is what drives the expansion of the universe.

5.5 The Dark Energy Equation Using Physical Laws and Hubble's Law

Considering that dark energy is a real phenomenon causing galaxies to go away from each other, and their rate of separation accelerates over time, among the various forms of energy, dark energy manifests as kinetic energy, leading to the acceleration of galaxies. The subsequent relationship can be formulated for it:

$$E_D = \frac{1}{2}mv^2 \tag{5.25}$$

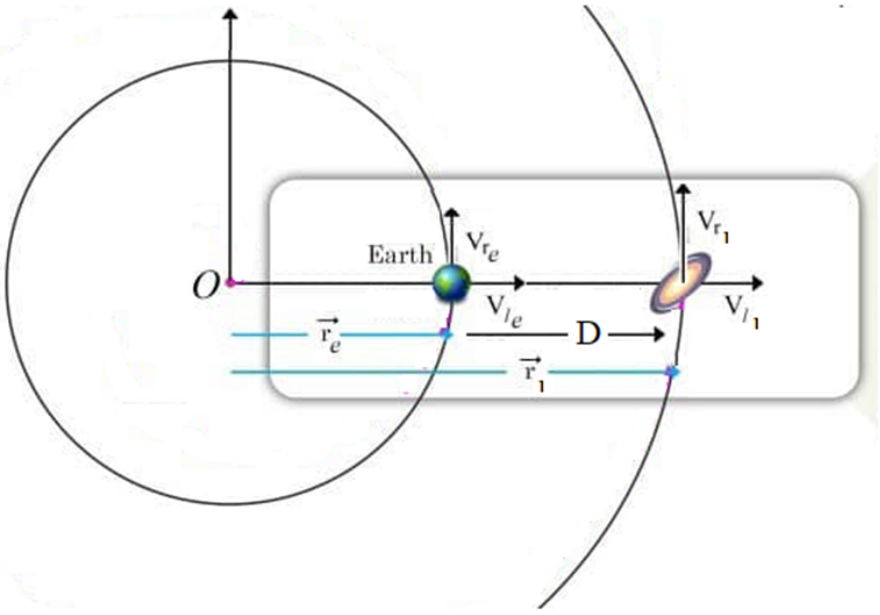

Figure 5.4: The motions can be considered for a galaxy relative to an observer situated on Earth

Referring to the figure 5.4, different models of motion can be considered for a galaxy relative to an observer situated on Earth. However, in general, it can be asserted that

this galaxy possesses both linear and rotational motion, and the following equations can be written for it:

$$r(t) = \frac{1}{2}at^2 + v_{l_0}t + r_0 \tag{5.26}$$

$$v_l(t) = at + v_{l_0} \tag{5.27}$$

$$\vec{r_1} = \vec{r_e} + \vec{D} \tag{5.28}$$

Where r denotes the distance of the galaxy from the universe's centre, a signifies acceleration, v_l represents the linear velocity of the galaxy, r_1 is the distance of a galaxy from the universe's center, r_e is the distance of our Earth from the universe's center and D is the distance of the galaxy from Earth. For rotational motion, the following can also be written:

$$v_r(t) = \omega r(t) \tag{5.29}$$

$$\Delta\theta(t) = \omega\Delta t \tag{5.30}$$

Where v_r is the tangential velocity, ω is the constant angular velocity and $\Delta\theta$ is the angle changes relative to the initial location. Considering the figure and the relationships above, it is clear that the observer on Earth is aligned with the galaxy, thus possessing approximately the same linear velocity:

$$\Delta v_l = 0 \tag{5.31}$$

Nevertheless, their rotational velocity relative to each other is a specific value, which can be computed from the following relationship:

$$v_r = \omega r_1 \tag{5.32}$$

However, as previously indicated in earlier articles, Hubble's law posits the existence of rotational motion in the universe, given that dimensionally, Hubble's constant possesses the dimension of $1/s$ yet remains constant over time; hence, H should represent the angular velocity (ω). D also represents distance, which dimensionally corresponds to r. Consequently, the velocity in Hubble's law is effectively the tangential velocity, wherein ω denotes the angular velocity of celestial objects around the universe's center:

$$V_H = HD = \omega r \tag{5.33}$$

$$\omega = H = 2.33 \times 10^{-18}\,\mathrm{s}^{-1} \tag{5.34}$$

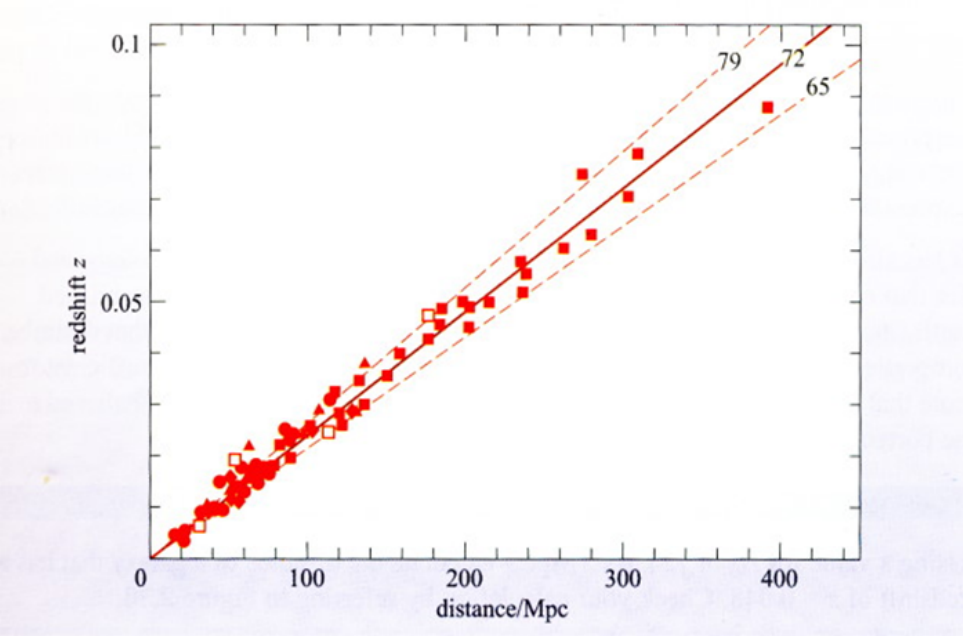

Figure 5.5: Redshift (z) as a function of distance (Mpc), illustrating the linear relationship consistent with Hubble's law and the expansion of the universe.

5.5.1 Calculation Using Physical Laws and Hubble's Law

Now, employing the figure and the preceding equations, we shall proceed to compute the dark energy of a galaxy:

$$E_{D_1} = \frac{1}{2}m_1 v_1^2 = \frac{1}{2}m_1 v_{r_1}^2 = \frac{1}{2}m_1(\omega r_1)^2 \tag{5.35}$$

Where $v_(r_1)$ is the same tangential velocity of the galaxy.

$$E_{D_1} = \frac{1}{2}m_1\omega^2 r_1^2 = \frac{1}{2}m_1\omega^2(r_e + D)^2 \tag{5.36}$$

Also, as $\omega = H$, the following equations can be written:

$$E_{D_1} = \frac{1}{2}m_1 H^2 r_1^2 = \frac{1}{2}m_1 H^2(r_e + D)^2 \tag{5.37}$$

To compute the total dark energy of all galaxies, we have:

$$E_{D_T} = \sum_{i=1}^{n} \frac{1}{2}m_i H^2 r_i^2(t) \tag{5.38}$$

$$\boxed{E_{D_T} = \sum_{i=1}^{n} \frac{1}{2}m_i H^2(r_e + D_i)^2} \tag{5.39}$$

Although the distance of galaxies from the observer (D_i) can be ascertained for a number of galaxies, given that the precise distance of Earth (the Milky Way galaxy)

from the universe's centre (r_e) remains unknown, we shall instead adopt a method for computing the magnitude of dark energy within the universe at any given instant. Assume the entirety of the universe comprises n galaxies of equal mass m, and for computational convenience, we consider all galaxies to be situated at half the distance from the universe's center. Consequently, we have:

$$r_i = \frac{r}{2} \tag{5.40}$$

$$E_{D_T} = nE_{D_i} = n\left(\frac{1}{2}m_i H^2 r_i^2\right) = \frac{H^2 n m_i}{2}\left(\frac{r}{2}\right)^2 \tag{5.41}$$

$$nm_i = M_u \tag{5.42}$$

$$E_{D_T} = \frac{H^2 M_u}{8} r^2 \tag{5.43}$$

$$K = \frac{H^2 M_u}{8} = 6.8 \times 10^{16}\,\mathrm{kg/s^2} \tag{5.44}$$

$$\boxed{E_{D_T} = Kr^2} \tag{5.45}$$

This equation facilitates the calculation of the total dark energy of the universe at any given time, wherein **K** represents the "**Saleh Dark Energy Constant**" and **r** denotes the radius of the universe at any given time.

The equation of the total universe's dark energy:

$$E_{D_T} = \sum_{i=1}^{n} \frac{1}{2} m_i H^2 (r_e + D_i)^2 = Kr^2 \tag{5.46}$$

$\mathbf{E_{D_T}}$: Total dark energy of the universe at any given time
$\mathbf{m_i}$: Mass of the concerned galaxy
H: Hubble's constant
$\mathbf{r_e}$: Distance of Earth from the universe's centre
$\mathbf{D_i}$: Distance of the concerned galaxy from the observer on Earth
K: Saleh Dark Energy Constant
r: Universe's radius at any given time

5.6 Proof of the Nature and Equations of Dark Energy Based on the Principle of Conservation of Mass and Energy

Undoubtedly, one of the most critical phenomena in the universe is the Big Bang. For countless years, humankind has endeavored to unravel its mysteries, seeking to elucidate its genesis and its ultimate fate.

At the start of the Big Bang, an extraordinarily vast amount of energy was released, propelling matter along straight trajectories as the universe expanded. Interestingly, observational data and theoretical calculations indicate that a substantial amount of energy remains unaccounted for in directly observable forms, leading to the conceptualization of what we call "missing energy" or, more commonly, "dark energy."

Furthermore, it is a ubiquitous characteristic of celestial objects to exhibit rotational motion. Consider, for instance, the Moon's rotation around its axis and its orbit around the Earth, the Earth's axial spin and its orbital path around the Sun, the Sun's axial rotation and its orbit around the supermassive black hole at the center of the Milky Way, and so forth. Therefore, rotational motion seems to be an intrinsic property of components in the universe.

However, in accordance with the fundamental principle of the conservation of mass-energy, the aggregate quantity of mass and energy within a closed system remains invariant over time. Consequently, if we consider the overall motion of celestial objects, the resultant motion is the vector sum of both their linear (translational) and rotational components.

Typically, our analyses tend to focus predominantly on linear motion, often neglecting or failing to quantify the contribution of rotational motion. In essence, the rotational energy of the universe is the same energy that is missing.

In fact, the sum of linear and rotational motion expresses the overall motion, or in other words, the sum of linear and rotational energy represents the total energy that is always constant.

Based on this framework, we can assert that the principle of mass-energy conservation remains universally valid. This combination of linear and rotational motion predicts a cyclic and repetitive motion for the motion of the universe and we can express the comprehensive equations of motion and energy. Drawing upon the preceding discussion, we can delineate the following relations:

According to the principle of energy conservation:

$$\textbf{Total Energy} = \textbf{Linear Energy} + \textbf{Rotational Energy}$$

$$E_T = E_l + E_r \tag{5.47}$$

$$E_T = \frac{1}{2}mv_l^2 + \frac{1}{2}mr^2\omega^2 \tag{5.48}$$

On the other hand, according to the Monte Carlo technique we have calculated the total energy at the Big Bang moment:

$$E_T = 10^{110}\,\mathrm{J} \tag{5.49}$$

We have two types of motion: one is linear with constant acceleration a, and the other is rotational with a constant angular velocity ω, which is equal to the Hubble constant H:

$$\omega = H = 2.33 \times 10^{-18}\,\mathrm{s}^{-1} \tag{5.50}$$

Therefore, we could calculate the linear speed at the Big Bang moment v_{l0}, maximum radius $r_{\max}$ and the acceleration, then write the equation of motion:

$$\frac{1}{2}M_u v_{l_0}^2 = 10^{110}\,\mathrm{J} \Rightarrow v_{l_0} \cong 4.5 \times 10^{28}\,\mathrm{m/s} \tag{5.51}$$

$$\frac{1}{2}M_u H^2 r_{\max}^2 = 10^{110}\,\mathrm{J} \Rightarrow r_{\max} = 2 \times 10^{46}\,\mathrm{m} \tag{5.52}$$

$$v_l^2 - v_{l_0}^2 = 2ar_{\max} \Rightarrow a = -5 \times 10^{10}\,\mathrm{m/s}^2 \tag{5.53}$$

$$r = \frac{1}{2}at^2 + v_{l_0}t + r_0 \Rightarrow r = (-2.5 \times 10^{10})t^2 + (4.5 \times 10^{28})t + r_0 \tag{5.54}$$

$$v_l = at + v_{l_0} \Rightarrow v_l = (-5 \times 10^{10})t + 4.5 \times 10^{28} \tag{5.55}$$

$$v_r = \omega r \Rightarrow v_r = (2.33 \times 10^{-18})\left[(-2.5 \times 10^{10})t^2 + (4.5 \times 10^{28})t + r_0\right] \tag{5.56}$$

$$\Delta\theta = \omega t \Rightarrow \Delta\theta = (2.33 \times 10^{-18})\Delta t \tag{5.57}$$

Where M_u is the total mass of the universe, r is the maximum radius of the universe, v_r is the tangential speed, and $\Delta\theta$ is the changed angle.

The rotational kinetic energy, a form of energy often overlooked in observations, is therefore equivalent to dark energy:

$$E_r = E_{\text{Dark}} \tag{5.58}$$

$$E_T = E_l + E_{\text{Dark}} \tag{5.59}$$

The results of calculations at various illustrative time points are presented in the table below:

t (s)	0	1.00E+00	2.62E+17	4.415E+17	9E+17	1.35E+18	1.8E+18
t (Myr)	0.00	0.00	8.31	14.00	28.54	42.81	57.08
r (m)	0.00E+00	4.48E+28	1.00E+46	1.49E+46	2.01E+46	1.49E+46	-3.60E+44
$v_l\ (^m/_s)$	4.48E+28	4.48E+28	3.17E+28	2.27E+28	-2.00E+26	-2.27E+28	-4.52E+28
$v_r\ (^m/_s)$	0.00E+00	1.04E+11	2.34E+28	3.47E+28	4.68E+28	3.48E+28	-8.39E+26
θ	0.00E+00	1.34E-16	35	59	120	180	240
$E_l\ (j)$	1.00E+110	1.00E+110	5.02E+109	2.58E+109	2.00E+105	2.58E+109	1.02E+110
$E_r\ (j)$	0.00E+00	5.45E+74	2.73E+109	6.03E+109	1.09E+110	6.04E+109	3.52E+106
$E_D\ (j)$	0.00E+00	0.00E+00	6.82E+108	1.51E+109	2.73E+109	1.51E+109	8.79E+105

Table 5.1: Calculations of dark energy

result:

Let's consider the Big Bang phenomenon, where a vast amount of energy is released in a minimal volume at a single moment (the Big Explosion), two primary motions can be identified for this explosion:

1. Linear motion with a decreasing linear velocity ($\vec{v}_l$)
2. Rotational motion with an increasing tangential velocity ($\vec{v}_r$)

$$\vec{v}_T = \vec{v}_r + \vec{v}_l \tag{5.60}$$

The linear motion arises from an explosion in which a large amount of energy is released at an initial time. In this linear trajectory, acceleration is negative, and over time, the distance from the center (r) increases, but the linear speed decreases. (similar to the explosion of a grenade, where the fragments do not extend to infinity). This is because we had an initial explosion, and thereafter no additional energy enters the system in the linear direction. In fact, the most reasonable motion for a simple explosive

movement along the linear path is one in which the speed of particles decreases over time as the distance increases:

$$v_l = a_l t + v_{l_0} \tag{5.61}$$

$$a_l < 0 \tag{5.62}$$

where v_{l_0} is the initial linear speed.

Now, consider the rotational motion. As we have previously demonstrated, Hubble's Law indicates tangential speed, and the equations for rotational motion are as follows:

$$v_r = \omega r \equiv HD = V_H \tag{5.63}$$

$$\omega = H = \text{constant} \tag{5.64}$$

When we observe around us, we see celestial objects like the Moon and the Sun, which we see daily, and the Earth that we stand on, all of which revolve around their respective orbits. Thus, the most evident motion in the universe is rotational motion. In fact, these three visible celestial objects are constantly rotating and follow closed curved paths. It can be said that all celestial objects, from the smallest to the largest, including the Universe itself, exhibit rotational motion, and with the help of Hubble's Law, we can easily determine the tangential speed of more distant objects.

Furthermore, according to the principle of energy conservation, energy neither ceases to exist nor is created; rather, it is merely transformed from one state to another, and the total amount remains constant at any given time. So:

Total Energy at the moment of the Big Bang (E_T) is equal to the Rotational Energy (E_r) plus the linear Energy (E_l)

$$E_T = E_r + E_l = \text{constant} \tag{5.65}$$

$$E_T = \frac{1}{2} m r^2 \omega^2 + \frac{1}{2} m v_l^2 \tag{5.66}$$

$$v_r = \omega r = HD \tag{5.67}$$

$$v_{r_1} = \omega r_1 \tag{5.68}$$

$$v_{r_2} = \omega r_2 \tag{5.69}$$

$$\vdots \tag{5.70}$$

As time progresses, with the presence of linear motion, the radius of the Universe

changes, and (r) continually increases (representing the expansion of the Universe). Therefore, we have:

$$r_1 < r_2 < r_3 < \cdots < r_n < r_{n+1} \tag{5.71}$$

From the above relations, it follows that:

$$v_{r1} < v_{r2} < v_{r3} < \cdots < v_{rn} < v_{r_(n+1)} \tag{5.72}$$

Thus, the tangential acceleration can be derived from the following equation:

$$a_r = \frac{\Delta v_r}{\Delta t} \tag{5.73}$$

Given the above relations, the tangential acceleration leads to an increase in tangential speed. Since the total energy at the moment of Big Bang or the same total energy (rotational energy + linear energy) remains constant (as confirmed by the conservation of energy principle), the amount added to the rotational energy is equal to the amount reduced from the linear energy.

In other words, since scientists had previously considered only linear motion and neglected rotational motion when modelling the universe, they were faced with the observation that the speed of celestial objects increases over time, and the farther these objects are from us, the faster they move away (as described by Hubble's Law). In response to this, they sought a "missing energy" to account for the increasing velocities over time, which they called dark energy. Dark energy was proposed to explain the observed acceleration in the expansion of the universe. However, by considering the presence of rotational motion alongside linear motion, and demonstrating that Hubble's Law actually describes tangential speed, it can be argued that dark energy represents the previously unaccounted-for rotational energy. As linear energy decreases over time, the contribution of rotational energy becomes more prominent. In fact, we can propose that dark energy is simply this rotational energy, which becomes increasingly significant as linear energy diminishes.

Dark Energy is equal to the total energy at the moment of the Big Bang minus the linear energy which is equal to the same rotational energy (that was neglected)

5.7 Dark matter

Another wonder of the physics is dark matter, which some scientists were believed would never be solved because of the lack of signs of its solvability.

Scientists proposed dark matter theory, when they realized that there is a great difference between the calculated mass of galaxies by their gravitational effects and the observable mass of galaxies.

To clarify, could compare the gravitational force between the Sun and Earth and the gravitational force between the Black Hole in the center of the Milky Way and Sun.

Newtonian gravitational force is equal to:

$$F = G\frac{mM}{r^2}, \quad (G = 6.6 \times 10^{-11}) \tag{5.74}$$

Now we calculate the gravitational force between the Sun and Earth by this formula:
$M_{\text{Earth}} = 5.9 \times 10^{24}\,\text{kg}$, $M_{\text{Sun}} = 1.9 \times 10^{30}\,\text{kg}$, $r = 150 \times 10^{6}\,\text{km}$

$$F_{(E\&S)} = 6.6 \times 10^{-11}\frac{(5.9 \times 10^{24} \times 1.9 \times 10^{30})}{(1.5 \times 10^{11})^2} = 3.2 \times 10^{22}\,(\text{N}) \tag{5.75}$$

The gravitational force between the Sun and Black Hole in the center of the Milky Way also equals to:

$M_{\text{Black Hole}} = 5.7 \times 10^{36}\,\text{kg}$, $M_{\text{Sun}} = 1.9 \times 10^{30}\,\text{kg}$, $r = 2.4 \times 10^{17}\,\text{km}$

$$F_{(BlackHole\&S)} = 6.6 \times 10^{-11}\frac{(5.7 \times 10^{36} \times 1.9 \times 10^{30})}{(2.4 \times 10^{20})^2} = 1.2 \times 10^{16}\,(\text{N}) \tag{5.76}$$

Comparing these two forces realize that gravitational force between the Earth and the Sun is much greater than the Sun and a Black Hole in the center of the Milky Way.

Hence the second force in Galaxies is required to prevent their collapse.

To justify this observation, physicists presented theories in this field, one of the most important was the mystery of dark matter. It exists everywhere, but does not occupy space, passes through all matters, does not emit any light beam, and interacts with other objects only through gravity. Therefore, it can only be discovered by gravitational effects. But despite all these definitions and limitations, the existence of this material has not yet been formally proofed. It is notable which it makes up about 27% of the mass and energy of the entire universe, and is one of the largest unanswered questions of current Physics.

Saleh Theory presents a new description of the cause of galaxies' survival and instead of believing in the dark matter that has none of the primary properties of the matter, it points to the existence of a force that has all properties of a force with specified source.

As you aware, all the celestial objects have a rotational motion around the supposed center of the Universe, which is the result of the initial rotation of existing at the Big Bang moment and as the after the Big Bang no force has affected this rotational motion, the rotation continues at the initial angular velocity with a constant value, and the constant of the angular velocity means that the celestial objects at the edges of the universe

Figure 5.6: Dark Matter

rotate with more tangential velocity than the objects closer to the supposed center of the Universe.

For a better understanding, we compare the tangential velocity of rotating objects at the edge of the Milky Way with the rotating objects on the known edge of the universe. By placing values with index one for celestial objects at the edge of the Milky Way and index two for celestial objects at the known edge of the universe, it results that, firstly, the tangential velocity of the celestial objects at the known edge of the universe is more than the tangential velocity of the celestial objects at the edge of the Milky Way. Secondly, the velocity at the known edge of the world is tens thousand times faster than the speed of light.

So, as we get further away from the supposed center of the Universe, the tangential velocity increases, and this enormous difference in velocity, between the objects on the edges of the universe and ones closer to the supposed center of the universe causes a vortex force and like a Tornado pushes everything toward the center of the rotation.

So what is called Dark Matter is only a Vivid Force that is generated from the difference in the speed of rotation of celestial objects at the edge of the universe and those that rotate near its supposed center.

5.8 Dark Matter, Truth, Reality, Imagination or So On, Which One Is It?!

To clarify, we need to gradually and continuously look for real and logical documents, mathematical and physical proofs, etc.

Scientists have concluded that dark matter constitutes more than 85% of the observed mass, presents everywhere, and affects everything but is neither audible and visible nor sensible. However, scientists have not yet been able to trap the dark matter.

If we take a simple look at the nature of dark matter, it has the same properties as natural forces. Actually, if we consider the definition of mass in classical physics, dark matter is not similar to this definition; and is closer to the definition of natural forces, invisible but effective.

To search for the truth and draw conclusions from the complex natural phenomena and various issues, we must find the beginning of this universe and start our search from it.

First, we take a look at the Big Bang phenomenon, which could be the beginning of the universe. If we want to explain the Big Bang phenomenon, we must say that a very large mass in a very small volume starts an explosion that is the source of all existing objects, energies, and forces.

Given its clear and natural effects, it can be said that at the zero moment of the Big Bang, a huge explosion has occurred, and objects, energies, and forces spread in all directions, created a nebulous sphere with a radius of 10^{26} meters.

If we look at this hyper-huge sphere, we can find all particles, from sub-photons, photons, electrons, protons, and neutrons up to various elements, and even nano-black holes. Because with a density of $\mathbf{10^{42}}\,\mathrm{kg/m^3}$ and an extremely intense explosive effect, the Big Bang has the ability to create all possible particles of the universe.

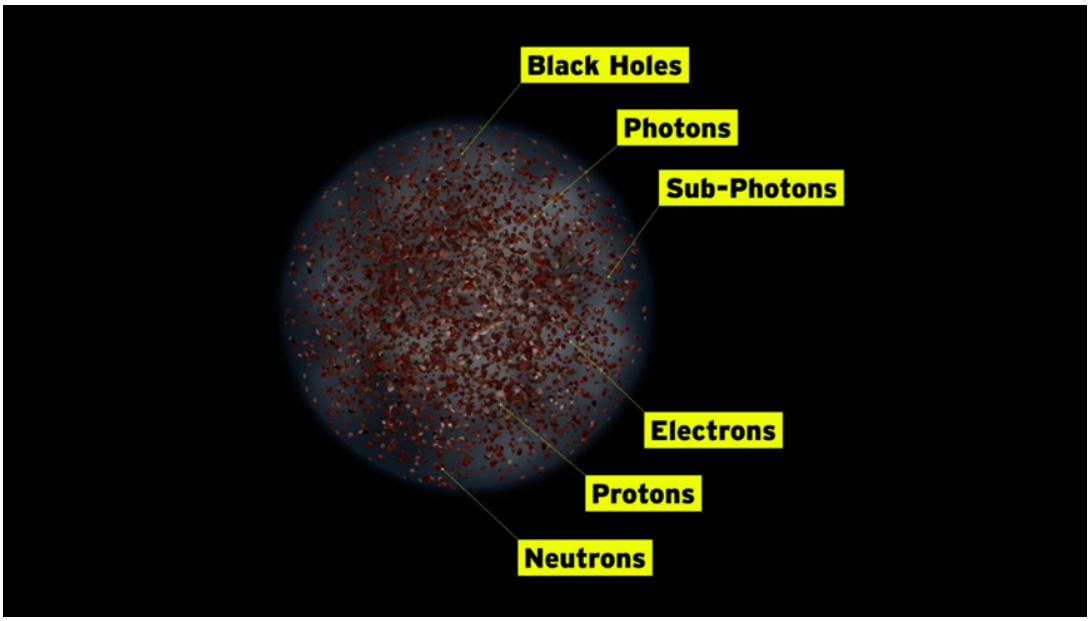

Figure 5.7: Illustration of the hyper-huge sphere after the Big Bang containing various particles and structures including sub-photons, photons, electrons, protons, neutrons, and nano-black holes.

In reality, it can be said that the Big Bang is the strongest and most intense explosion. Now imagine that we are looking at the universe after the Big Bang from the outside, then we will see something so large (Uni-Mom) that could create current structures. Inside this sphere there were all the particles and elements and a big dust has been created

in the universe. This special state is a few seconds (less than 10 seconds) after the big explosion. During this time, all particles were expanding uniformly in the universe with very high velocities due to the explosion. Then, their linear velocity has decreased and reached an average linear velocity, which is less than the initial velocity. As a matter of fact, from this moment the linear velocity decreases relative to its previous time.

On the other hand, according to Hubble's law, the universe is rotating. This law explains that objects and particles have an angular velocity in their rotational motion (H or ω), and the farther they are, the higher their rotational velocity is. In other words, all particles in the Uni-Mom, or the same hyper huge nebulous sphere, have had a rotational motion with a constant angular velocity, ω or H ($H = \omega = 70 \pm 3\,\mathrm{km/s/Mpc}$) but their tangential velocity has been varied based on their distance.

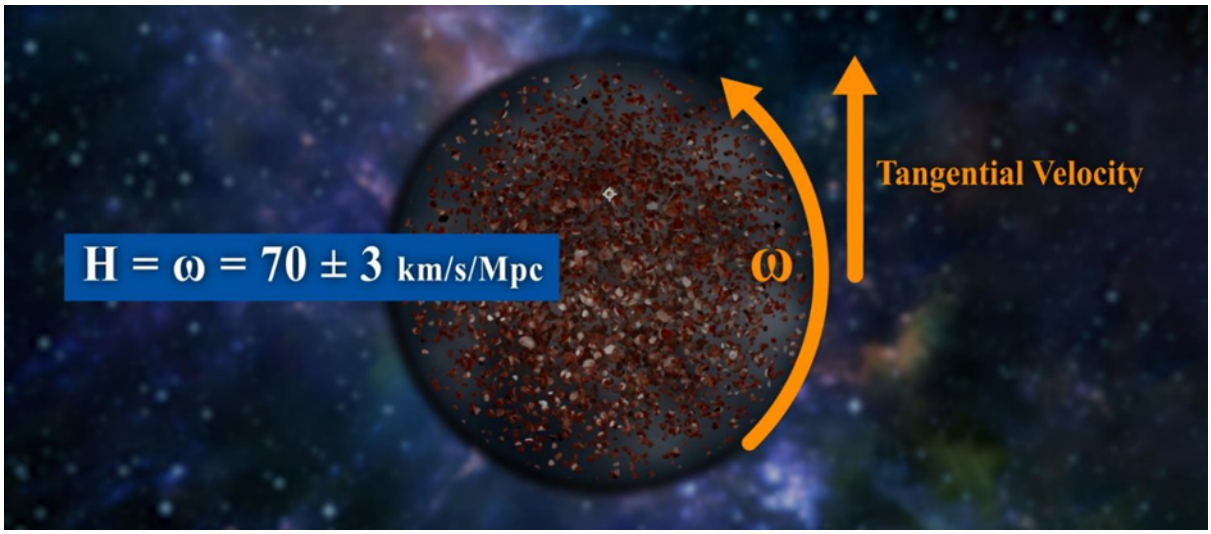

Figure 5.8: Rotational motion of the Uni-Mom with constant angular velocity and distance-dependent tangential velocity.

Notice:

Although this hyper-huge nebulous sphere has shaped the universe after about 10 seconds and each particle simultaneously has a decreasing linear velocity and an increasing tangential rotational velocity, the objects do not receive any force from the center of the Big Bang or the sphere of the universe, because the explosion happened, and all particles have expanded and no force will receive from any point.

Indeed, this hyper-huge sphere has expanded in infinite space, and each particle has been placed in its place, and this sphere for years, can have internal linear motion (which causes its expansion) and rotational motion (which increases the velocity of particles). It can be said that all particles on a same radius have uniform linear velocities concerning each other, their ΔL is zero, and their angular velocity $\Delta\omega$ is also zero with respect to each other.

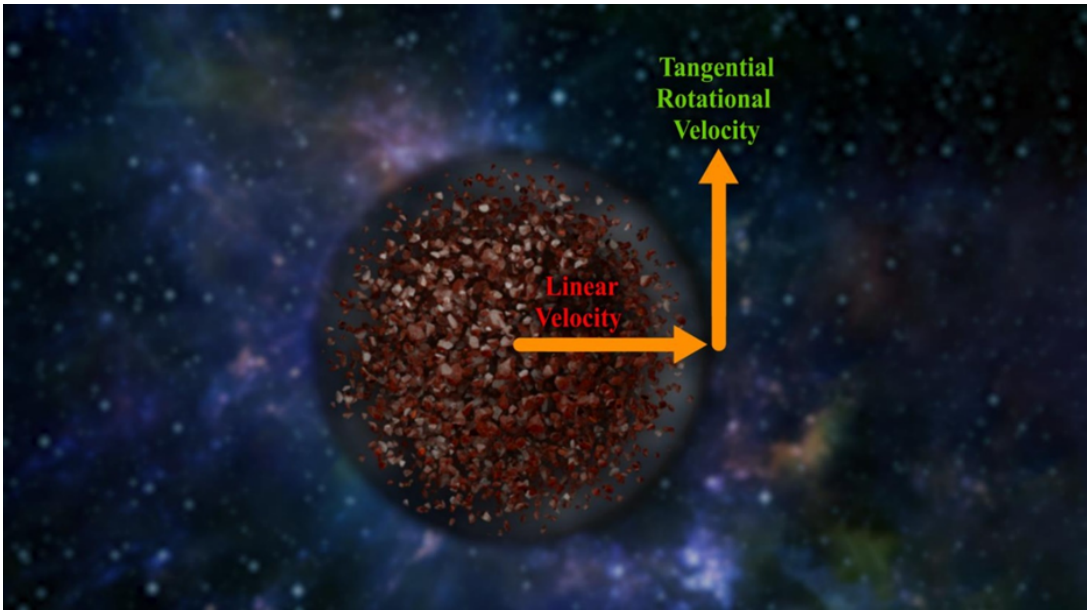

Figure 5.9: Linear and tangential rotational velocities of particles in the expanding Uni-Mom structure.

It can be said that each particle in our universe is in its own special orbit, and no force from any other point will affect it. The only effective factor on these particles is the remaining energy of the Big Bang explosion. Certainly, the remaining energy of the Big Bang (which is the same dark energy) is the factor that continues the movement of each particle in its linear path.

As time passes, the particles of the universe approach each other and join together, forming celestial objects such as planets, stars, black holes, moons, and comets. It should be noted that when particles join together to form larger objects, they continue their linear and rotational velocities before joining.

Clearly, it can be said that the uniform space of our universe has gradually transformed into condensed parts of objects over time. Like the Solar System, which has a star in the center and planets that rotate at large distances around it. With the growth of black holes and the gathering of stars around black holes, little by little this universe has become the present universe.

In simpler terms, with the passage of time, the universe transforms from a uniform large entity (the Uni-Mom) into the universe that we observe today, containing visible stars, galaxies, and clusters.

An important point to note is that the velocity of any particle or celestial object is intrinsic to that particle or mass in its actual and real orbit, and does not require any force from the central black hole to keep them in their galaxy's motion path.

So, with the least possible force, all solars orbit around black holes, and all galaxies around their clusters, etc. in their own orbits.

Result:

Dark matter neither exists nor has an effect; rather, the model of the spatial motion of particles and objects is the same as dark matter. Indeed, any particle in its specific orbit (with decreasing linear velocity and increasing tangential velocity) is in motion and constructs the structure of the universe.

5.9 Dark Matter from the point of view of Saleh Theory

The Big Bang is a natural phenomenon in which, due to the collision of masses and particles and their subsequent explosion, an extremely large cloud comes into existence far from the central point. This immense cloud forms nebulae, which serve as the birthplace for future stars.

However, it is important to note that when cosmic inflation ends, particles begin to cluster together under the influence of magnetic forces and other gravitational forces. These clusters eventually form larger objects, such as moons, planets, stars, and so on.

It is notable that during the early inflationary period, when everything existed as gas and tiny particles, each particle in the universe's space was suspended, as gravitational effects from any specific point did not act upon it. In other words, inflation involved both linear and rotational movement, but no central force acted on these particles. Each particle remained suspended in infinite space, gradually combining with other suspended particles to form larger celestial objects.

In systems like galaxies that possess a central black hole, the black hole exerts a gravitational effect on the particles suspended in infinite space, which are not influenced by any external forces. In such systems, the central black hole can, with minimal force, hold the suspended particles-such as stars, planets, moons, and others-in orbit around itself.

If we consider the particles existing in the universe during the inflationary period, these are the same objects that later form stars or moons. In fact, it can be stated that dark matter is the result of particles being suspended in the infinite space during the inflationary period.

In other words, the Big Bang is a natural phenomenon in which, due to the collision of masses and particles and their subsequent explosion, an extremely large cloud comes into existence far from the central point. This immense cloud forms nebulae which serve as the birthplace for future stars.

However, it is important to note that when cosmic inflation ends, particles begin to cluster together under the influence of magnetic forces and other gravitational forces. These clusters eventually form larger objects, such as moons, planets, stars, and so on.

It is notable that during the early inflationary period, when everything existed as gas and tiny particles, each particle in the universe's space was suspended, as gravitational effects from any specific point did not act upon it. In other words, inflation involved both linear and rotational movement, but no central force acted on these particles. Each particle remained suspended in infinite space, gradually combining with other suspended particles to form larger celestial objects.

In systems like galaxies that possess a central black hole, the black hole exerts a gravitational effect on the particles suspended in infinite space, which are not influenced by any external forces. In such systems, the central black hole can, with minimal force, hold the suspended particles-such as stars, planets, moons, and others-in orbit around itself.

Conclusion:

If we consider the particles existing in the universe during the inflationary period, these are the same objects that later form stars or moons. In fact, it can be stated that dark matter is the results of particles being suspended in the infinite space during the inflationary period.

5.10 Concluding Remarks of Dark Energy and Dark Matter

5.10.1 Dark Energy

The rotational energy of celestial objects is the same as the unseen energy or Dark Energy. This energy causes particles and masses to continue their motion along their rotational paths, and its share of the total energy of the universe is significant. The equations related to Dark Energy are as follows:

$$E_r = E_{\text{Dark}} \tag{5.77}$$

$$E_T = E_L + E_{\text{Dark}} \tag{5.78}$$

$$\text{Rotational Energy} = E_r$$
$$\text{Dark Energy} = E_{\text{Dark}}$$
$$\text{Total Energy} = E_T$$
$$\text{Linear Energy} = E_L$$

This energy is a direct result of the residual motion of particles from the Big Bang explosion, enabling particles and masses to continue their linear and rotational motion

without the need for an external force.

5.10.2 Dark Matter

In conventional cosmological models, Dark Matter is introduced as an unknown force that justifies the stability of galaxies and the acceleration of cosmic expansion. However, according to Saleh's Theory, no actual "Dark Matter" exists, and it has no direct effect. What is perceived as Dark Matter is the result of the motion of particles and masses in infinite space following the Big Bang.

Particles and masses were suspended during the initial stages of cosmic inflation (post-Big Bang) and gathered under minimal gravitational force to form larger bodies such as stars, planets, and galaxies.

Furthermore, as the universe expands, the linear velocity of particles decreases while their tangential rotational velocity relative to the hypothetical centre of the universe increases. The difference in velocity between masses further from the centre of the universe compared to those closer to it creates a centripetal force—akin to the vortex force in a tornado—which produces the apparent effects of mass is created. In conclusion, it should be noted that the effect of Dark Matter is, in fact, the result of two phenomena: first, the centripetal force, and second, the positioning of masses during the inflationary period following the Big Bang—with the latter, the principle of inflation, being significantly more influential.

Conclusion:

Dark matter neither exists nor exerts a direct effect; rather, it arises from the spatial motion model of particles and masses that has shaped the structure of the universe.

5.11 The Actual Nature of Forces and Energies

5.11.1 Introduction

Understanding the nature of forces and energies is one of the most fundamental steps in comprehending the structure of the cosmos. Every phenomenon in nature, from the smallest subatomic particles to the most massive galaxies, forms and evolves in response to the interaction of forces and the exchange of energy. Although classical and modern physics have each provided precise descriptions of fundamental forces, profound questions remain regarding the true origin of forces, the nature of energy, and their connection to the internal structure of matter.

Forces are often described as “interactions”; however, these interactions can have mechanical, wave-based, or even geometric roots within the essence of spacetime. For

instance, in General Relativity, gravity is described as the curvature of spacetime, while nuclear forces are identified as the result of the exchange of force-carrier particles. Nevertheless, a closer examination suggests that these descriptions may merely be "efficient models" of a deeper reality.

On the other hand, energy—whether in linear and translational form or in rotational, vibrational, and compressive forms—acts as a common essence among all natural phenomena. Energy not only generates motion but can itself determine the structure of matter, the stability of particles, and even the geometry of space. Many modern theories, including those emphasising the role of rotational motions, the compression of matter, and helical energies, attempt to explain the origin of forces and the structure of energy through a unified perspective.

In this chapter, using an analytical and somewhat revisionist approach, we examine the nature of forces and energies. First, we analyse the concept of force within the framework of classical physics and new models; subsequently, we investigate energy not merely as a quantity, but as a fundamental characteristic of the motion and structure of particles. We shall discuss its various models, considering that the cornerstone of the universe is the photon.

5.11.2 The True Nature of Forces and Energies (Their Fundamental Unity)

Part I: Energy

If we were standing beside an ocean and a child were to ask what it is, we would simply explain that it is an ocean, composed of water or, in more scientific terms, H_2O molecules. This means that the entire, vast ocean is formed from just two elements, hydrogen and oxygen, which can readily be separated via experimentation to yield these simple elements.

Similarly, on a cloudy day, if the same child were to ask what the great cloud masses in the sky are, we would easily explain that they are clouds whose fundamental nature is also that of the simple H_2O molecule, which, upon cooling, yields rain, snow, or hail. The nature of all these is also the H_2O molecule. To put it another way, an ocean is composed of "N" number of H_2O molecules, all of which possess a near-identical structure and are considered to be one of the simplest molecules in nature.

Considering the Sun on a bright day, the emissions from the Sun that reach the Earth consist of abundant light radiation, illuminating the Earth and the Sun's surroundings. Interestingly, of the total number of photons released by the Sun, only approximately one-billionth reaches the Earth; we call this solar radiant energy. Therefore, radiant energy is the energy of photons arriving at Earth with a linear velocity, "C".

Now, let us consider an atom, which is constructed from electrons, protons, and neutrons. In previous papers, we have posited that electrons, protons, and neutrons are themselves also composed of photons. It is therefore photons, arranged in various configurations, that form electrons, protons, and neutrons, which in turn are situated within the collective structure known as an atom. Thus, during the process of nuclear decay, for example, the constituent photons of the atomic nucleus are liberated and propagate at the speed of light, thereby releasing nuclear energy.

Furthermore, if we examine a mass of molecules, we see that it is composed of a collection of atoms, which are themselves made of electrons, protons, and neutrons. This molecular mass—much like the Earth, which possesses kinetic energy as it orbits the Sun at approximately 110,000 km/h—is composed of "N" photons, each with a mass "m_p". Since it is in motion, it must possess kinetic energy. It can therefore be stated that kinetic energy is a consequence of the motion of these constituent photons.

If we now consider electrons moving within a wire at speeds close to the speed of light, electrical energy can be explained similarly, since electrons are made up of photons. That is, electrical energy is the motion of the photons that form the structure of the electron as it travels through the wire. Furthermore, within a lamp filament, some electrons are annihilated and converted into photons, which itself indicates that electrons are composed of photons. Therefore, the radiant energy produced by the lamp also depends on photons.

In previous chapter, we have referred to the structure of magnetic and gravitational fields, noting that these fields are constructed from 'chain-like' photons. The energy of these fields is therefore derived from the kinetic energy of these interconnected photons.

In essence, it can be asserted that all forms of energy are a product of these photons in motion. Thus, a new definition for energy can be proposed:

The various forms of energy are different manifestations of photon motion, occurring at various velocities, because all matter is fundamentally composed of photons.

Note:

As we have stated in previous chapters, the velocity of photons can range from zero to $3.3\,C$. Moving photons with a velocity up to $3.3\,C$ are descriptive of kinetic energy, whereas those with zero velocity are descriptive of potential energy.

Conclusion:

All forms of energy—such as radiant energy, thermal energy, nuclear energy, magnetic field energy, and gravitational energy, among others—are derived from the kinetic energy of moving photons.

Part II: Force

One of the most abundant energies, which is also the source of life, is Radiant Energy, or the Light Energy, in which photons are separated from the sun and hit the planets, and we calculate its energy with the following equation:

$$E = \frac{1}{2}mv^2 - \frac{1}{2}mr^2\omega^2 = nh\vartheta \tag{1}$$

This relationship is formulated with respect to the rotational motion of the photon.

Also, another famous energy is kinetic energy in which an object with mass of "m" moves from one point to another point that it can be said that the displaced energy can be calculated by the formula:

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

In fact, the mass of an object can also be written as "$m = nm_p$" where "n" is the number of constituent photons of this particular mass and m_p is the photon mass.

Gravitational force

If we consider gravitational force, which is the force between two masses, that is actually the effect of interaction between two masses, that affect each other and create attraction force between them. If we want to imagine this force, we can say that the gravitational force is the same chained photons that are moving between two objects and it causes the effect between these two objects.

Magnetic force

If we have two magnetic objects with N & S poles, there is always a magnetic force between these two magnets, which is from N to N poles or S to S ones in the form of repulsive force and from N to S or S to N poles is in the form of attractive. Now, if we intend to explain the structure of this magnetic force, we have to say that the magnetic force is the same invisible chained photons that go from pole N to S.

Coulomb force

It is clear that the Coulomb force usually exists between two positively and negatively charged particles, which is caused by the effect of excess or deficit of electrons. Due to the increase of electrons in a certain surface, a charged environment is created and this surface has a force effect. Considering that electrons are made up of photons, it can be said that this source of charge is the same photons that make up electrons.

$$F = k\frac{q_1 q_2}{r^2} \tag{3}$$

Considering that charge is the number of electrons, and the electrons are composed of photons, then it can be said that the electric charge force is the same effect of the displacement of photons.

Nuclear force

According to what has already been said about the structure of the nucleus, the nucleus is composed of neutrons and protons that are arranged in a special way next to each other by the Coulomb force. It is clear that the nuclear force (weak and strong) is the same nuclear force between neutrons and protons of the nucleus, which are rotating at a speed near to the speed of light, and these neutrons and protons themselves are also composed of photons.

Result:

According to the above contents, it can be said that all forces and all energies are actually different states of photons, with different structures.

5.11.3 Supplementary Explanations on the Nature of Energy and Force

In a magnet, magnetic flux propagates externally from the North pole to the South pole and returns internally from the South pole to the North pole, thereby establishing a closed circulatory loop. It is posited that this magnetic flux is composed of helical photons that are cyclically interconnected and exhibit properties analogous to a spring.

From this perspective, magnetic force can be understood as a manifestation of these spring-like magnetic fluxes, which are capable of exerting counter-forces when subjected to external loads. The proposed model for magnetic flux is, therefore, a chain of helical photons exhibiting oscillatory, spring-like behaviour. A collection of such entangled photons can manifest this reciprocating motion.

An analogous model can be postulated for the gravitational force, which primarily differs from magnetism in its significantly higher frequency.

Similarly, the fundamental nature of the Coulomb force may be described by a structure composed of interwoven photons, albeit on a much smaller scale than that associated with the gravitational force. As previously theorised, the strong and weak nuclear forces can be regarded as manifestations of the Coulomb force, originating from the specific spatial arrangements of protons and neutrons within the atomic nucleus.

Conclusion:

Consequently, it can be inferred that all forces in nature are composed of interconnected and interacting photons. Under varying spatial and temporal conditions, these photon constructs can manifest as different types of forces. In essence, force itself is a construct of these interwoven photons. The specific dynamics, coupling, and structural configuration of these photons are what differentiate and give rise to the various forces observed in nature.

5.11.4 Summary of the Discussion

It is demonstrated here that the root of all forces and energies in nature traces back to the photon and its motional structure. Various energies, including radiative, kinetic, electrical, nuclear, and magnetic, are all manifestations of photons moving at different velocities and arrangements. Since electrons, protons, and neutrons are also composed of photons, every type of energy in the universe is, in principle, the kinetic energy or dynamics of photons.

Natural forces are explained on the same basis:

Magnetic force is described as chains of helical photons acting like springs; gravity as a similar structure but with a higher frequency; the Coulomb force due to the displacement of photons constituting the electric charge; and nuclear forces as a more compressed and powerful form of these same photonic interactions.

Consequently, all forces and energies are different manifestations of a single entity: the photon. It is the photon—through its weaving, arrangement, and motion—that gives rise to all the physical behaviours of the universe.

Chapter 6

Quantum

6.1 Introduction

The emergence of quantum mechanics is one of the most significant events in the history of science; a revolution that transformed humanity's perspective on energy, light, and the structure of matter. This intellectual movement began in the late 19th century, when classical theories were no longer able to explain phenomena such as black-body radiation, the photoelectric effect, and the stability of atoms. Max Planck was the first to pave the way for quantum thought by introducing the concept of "discrete packets of energy". Shortly thereafter, Albert Einstein demonstrated that light also consists of energy packets, and these particles of light—which we now call photons—play a fundamental role in understanding the behaviour of energy.

In the subsequent decades, the efforts of Niels Bohr, Louis de Broglie, Werner Heisenberg, and Erwin Schrödinger led to a more precise description of atomic structure and the behaviour of subatomic particles, establishing quantum mechanics as one of the primary pillars of modern physics. In this context, photons attained a special status, as many quantum phenomena were revealed through the investigation of the properties and energy of light.

Inspired by this historical trajectory, the present chapter offers a fresh perspective on the fundamental role of light and the photon in understanding quantum mechanics. Without delving into complex details, the reader is introduced to concepts showing why the study of energy structure begins with its smallest packets. Light, the simplest and most omnipresent phenomenon around us, holds within it the key to understanding many quantum principles.

6.2 Introducing Photon as the Basis and Foundation of Quantum Energy

If we look at the world around us, the first thing we see is the Earth, turning around its axis at about 1,600 km/h and orbiting the Sun at about 110,000 km/h. The speeds we don't even feel.

During the day, we see the beautiful, radiant Sun, which isn't visible at night, but the bright Moon is. At night, the sky has a beautiful illumination from the stars, which is made even more beautiful by the moonlight.

If we pay attention to the smallest particles around us, we first encounter water and air molecules. Smaller than these are atoms and subatomic particles like electrons, and much smaller than those are light, or the same photons, which are seen during the day and night.

If we want to consider the smallest particles in the universe, first there are molecules and atoms, and smaller than them are electrons, and smaller than those are "atom of electrons", or photons. Photons are the smallest independent particle in terms of mass, dimensions, and other physical properties.

If we want to define a basic unit for energy, we can consider photons, because, as shown and proven in previous chapters, photons have a constant speed, a specific mass, and unique properties.

In fact, photons are the tangible embodiment of the smallest packets of energy in the universe: independent, free, and always accessible. As the saying goes, sometimes the answer is right before our eyes; we just need to look more closely. Therefore, photons can be considered (given their specific conditions) the foundation of quantum energy.

The photon can be defined as the smallest, lightest, and fastest packet that traverses the universe, existing in all galaxies and circulating throughout the cosmos. The standard quantum energy is essentially the photon, whose energy is calculated using Planck's relation ($E = h\vartheta$). It is important to note that the energy of a quantum packet is highly variable and depends on its frequency. For example, considering a frequency range from 300 THz to 900 THz, the energy quanta in this narrow band of the electromagnetic spectrum can vary significantly.

To define a standard unit, it must be constant. In the SI system, the unit of length is one meter, which is a fixed measure, and the unit of mass is one kilogram, also a fixed measure. Therefore, to define a standard quantum of energy, we must introduce a unit with a constant value.

If we now seek to define the true classical concept of a quantum, it refers to the smallest indivisible packet of energy. One of the most accurate representations of such a quantum packet is the photon—an entity that is extremely small, lightest, and travels at

the highest possible speed. Photons are ubiquitous, essential for life, and thus serve as the most fitting candidates for representing a quantum of energy. Their constant speed and energy characteristics make them ideal for defining a base unit of energy.

Properties of the Photon:

- Constant mass:
$$m_p = 1.64 \times 10^{-36}$$
- Constant total speed:
$$V_T = 3.3\,C$$

Since we want to define a fixed, fundamental unit of quantum energy, the most appropriate approach would be to consider the photon's constant mass multiplied by the square of its constant speed. As established in earlier works, the actual speed of a photon is $3.3\,C$. Therefore, the corresponding relationships can be expressed as follows:

$$E_q = E_p = \frac{1}{2} m_p V_T^2 = \frac{1}{2} m_p (3.3\,C)^2 \tag{6.1}$$

$$E_q = S = 8 \times 10^{-19}\ \text{J} \tag{6.2}$$

According to the derived relationship, we can define a basic energy packet with a constant value, which aligns with the definition of a quanta of energy (the smallest discrete amount of energy).

This characteristic is clearly seen in photons, consistent with the definition of quantum energy (the smallest packet of energy that increases discretely and its value increases by an integer multiple). This is because in a collection of photons, the total energy is equal to the sum of the energy of each photon.

By plotting a graph where the horizontal axis represents the number of photons and the vertical axis represents their discrete energy value, it can easily be shown that the photon has the potential to be introduced as the quanta of energy.

This introduced standard value for all electromagnetic waves is a fixed, enduring, and universal quantum with specific characteristics, meaning that:

1. This energy value is constant.
2. It is governed by mathematical and physical equations.
3. The nature of this energy is well-defined and represents the energy of a single photon.

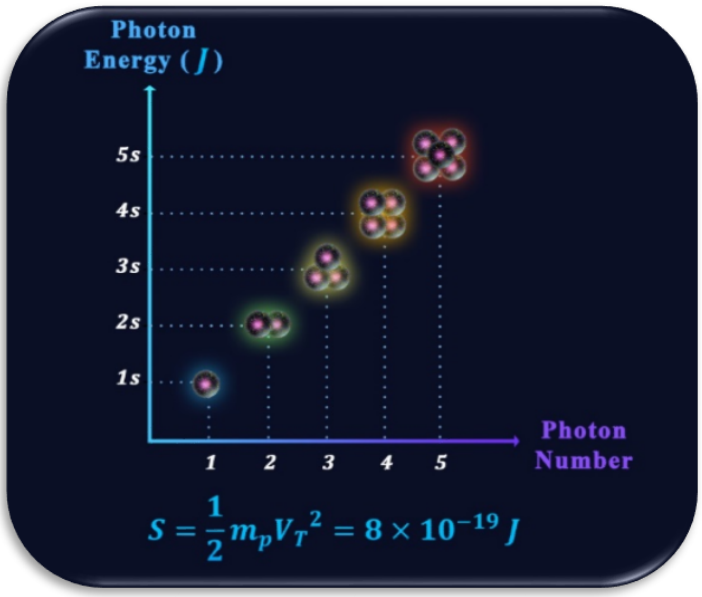

Figure 6.1: Quantized growth of total energy with increasing photon number, illustrating the photon as a fundamental quantum energy packet

4. For larger quantities of energy, the term "nS" can be used, where "S" is the energy unit of a single photon and "n" is the number of independent photons in the set.

Based on the above explanations, quantum energy diagrams can be represented as follows:

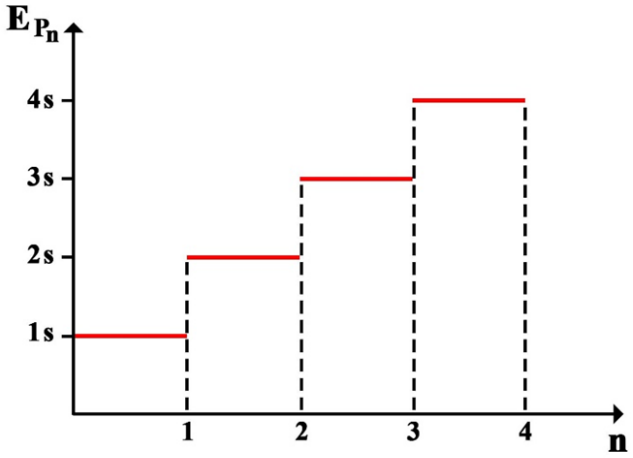

Figure 6.2: Stepwise representation of quantized photon energy as integer multiples of the fundamental energy unit S

In general, the energy of a single quantum packet (a single photon) and a set of n quantum packets could be represented as:

$$E_{P_1} = \frac{1}{2}\left(1.64 \times 10^{-36}\right)\left(3.3 \times 3 \times 10^{8}\right)^2 = 8 \times 10^{-19}\ \text{J} = S \tag{6.3}$$

$$E_{P_n} = nE_{P_1} = n \times 8 \times 10^{-19} \text{ J} = nS \quad \text{where} \quad n \in \mathbb{N} \tag{6.4}$$

Accordingly, the Saleh Theory Group proposes considering the photon as the quantum's nature and its kinetic energy as its quantity, since this aligns with all laws (such as the Max Planck equation).

For instance, as we have proved before, for the green spectrum ($f_G = 600$ THz) we have:

$$E_T/2 = E_L = E_r = hf_G = 4 \times 10^{-19} \text{ J} \tag{6.5}$$

Given that the calculated basic energy value for green ($f_G = 600$ THz) is equivalent to Planck's energy equation (which is the basis and foundation of electromagnetic energy value), therefore, the photon could be introduced as the basic unit (quanta) of energy, which is fully consistent with Planck's energy calculations.

In fact, based on the calculations and evidence presented, photons are the best option for defining the quanta of energy, and based on them, we can calculate the actual and real energy, and it is very suitable for measuring the unit and basic value of energy.

So, if we want to provide a comprehensive definition for quanta of energy, photons, or electromagnetic waves, which are the smallest independent particles around us, have the merit and capability for this.

In fact, it can be said that the best nature for quanta of energy and the equations governing it are photons and the energy presented for them in this section.

$$S = 8 \times 10^{-19} \text{ J} \tag{6.6}$$

6.2.1 Summary of the Discussion

In this section, the photon was introduced as the smallest independent packet of energy and the most suitable candidate for defining the "quantum of energy". Firstly, by referring to various scales of matter—from molecules to electrons—it was shown that photons are smaller than all these particles and possess unique characteristics such as constant mass, constant speed, and total independence.

Subsequently, it was explained why photons can be regarded as the base unit of energy: their energy is discrete, determined by Planck's relation, and as the number of photons increases, the total energy value rises in a stepwise and countable manner.

Furthermore, it was stated that to define a standard quantity of energy, one could utilise the kinetic energy of a photon; a constant, perpetual value with specific equations that align with the theoretical foundations of quantum and Planck's relation.

It was also noted that larger packets of energy can be defined as n times this base unit (nS), thereby yielding an orderly and precise structure for measuring electromagnetic energies.

The chapter concluded that, given the theoretical evidence and the calculations presented, photons are the most appropriate option for defining the nature and magnitude of the quantum of energy, and based upon them, the real and fundamental energy of the universe can be described with greater precision.

6.3 String and Superstring Theory

6.3.1 Introduction

String theory is one of the most prominent attempts in theoretical physics to provide a coherent framework capable of explaining the behaviour of fundamental forces and particles at a deeper level. In this view, the primary constituents of the universe are not point-like particles, but infinitesimally small strings that give rise to different particles and forces through various vibrational patterns.

Despite its immense mathematical complexity, this theory is proposed as a serious candidate for a "Theory of Everything", though it has not yet been accepted as the final version. The requirement for extra dimensions and the lack of direct experimental evidence remain the primary challenges; nevertheless, its powerful structure and innovative predictions have made it one of the most important research paths in modern physics.

6.3.2 Superstring Theory

Superstring theory is one of the most advanced theories in theoretical physics. Instead of point-like particles, it introduces extremely small, vibrating strings as the fundamental components of matter. This theory is defined in a ten-dimensional space (or, in a more advanced theory, an eleven-dimensional space). Its key feature is the combination of strings with the principle of supersymmetry, which helps us to better understand the structure of the universe.

Based on the eleven dimensions of photon movement previously explained in Saleh articles—a brief explanation of which will be provided here—the theory can be explained and interpreted based on the movements of photons, which are the building blocks of the universe.

External movement of a photon

The photon also has different motions. The external motion or the projectile, which consists of two types: a forward motion with a velocity equal to C, which is performed

in three dimensions, and a rotational motion in two two-dimensional planes. So, the external part of photon motion could be explained in five dimensions.

$$3D + 2D = 5D \tag{6.7}$$

Three dimensions relate to the linear motion of the photon, while two dimensions relate to its rotational motion.

Internal motion of photon

Photon also possesses internal motion. This motion comprises two parts: the first is vibrational, causing photons to make small movements in space and adding three extra dimensions. Since, aside from the vibrational motion, a photon moves along an indirect, closed, and tiny path, three additional dimensions should be included, bringing the total internal dimensions of photon motion to six.

This means that the photon is traversing a closed path in three dimensions while vibrating in the other three dimensions.

$$3D + 3D = 6D \tag{6.8}$$

Three dimensions relate to the vibrational motion of the photon, while three dimensions relate to the motion of the photon in a closed loop.

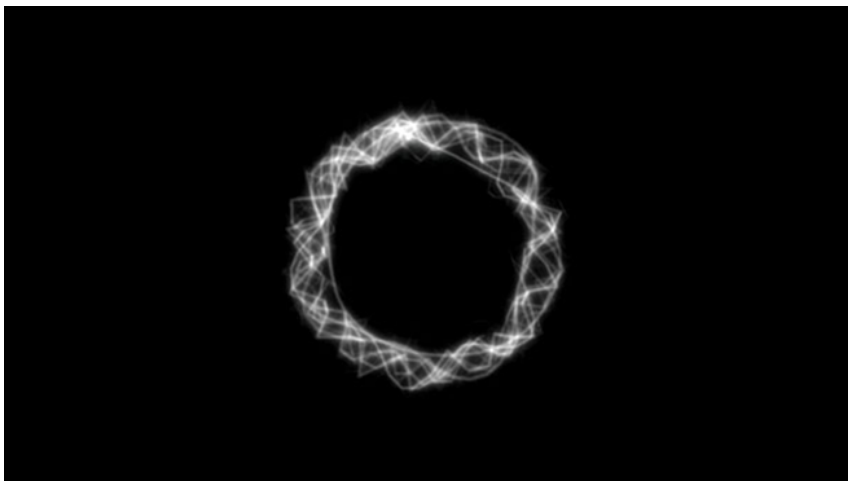

Figure 6.3: Photon Movements

And the sum of the internal and external motions of a photon is:

$$5D + 6D = 11D \tag{6.9}$$

The number of dimensions of motion corresponds exactly to the eleven dimensions of superstring theory.

In reality, due to its mathematical complexity and lack of scientific evidence, superstring theory remains on the boundary of theoretical physics and unproven hypotheses. However, based on the findings of Saleh Theory, this theory can be well-explained and interpreted using the objective realities of photon movements.

6.3.3 Introducing the Photon as String

In previous chapters, we had introduced the structure of electrons, protons, and neutrons, stating that electrons are like a shell on hollow spheres, protons are dense spheres, and neutrons are a combination of the two – a solid sphere within a spherical shell – all of which are constructed from photons. We also elaborated on the reasons for this structure's validity.

Furthermore, we verified the photon's physical parameters and demonstrated that it is a particle with a constant mass. However, when this particle with a constant mass is emitted from an electron and travels individually, it moves in a nested helical path. This path results from the rotational motion of the photon's source, the electron, around itself and the nucleus.

In this section, we address the significant point that, considering the nested helical motion of photons, we can describe 5+5+1 dimensions of movement for them. The nested or double helical motion comprises two helices. Movement along the first helical path requires 5 degrees of freedom, thus allowing 5 dimensions of movement to be attributed to it. Similarly, five degrees of freedom, or dimensions of movement, can also be attributed to the second helix. Combined with the photon's rotational motion around itself, a total of $10 + 1$ movements can be defined for the photon. Therefore, the photon could be a suitable candidate to be introduced as a string.

On the other hand, it should be noticed that the lifetime of the Angel photon is from a blink of an eye up to over thirteen billion years. Also, we should consider that what has a lifetime more than the Solar System should be more premiere and superior than a simple energy quantum.

A beautiful angel photon is the creator of various states, somehow that:

- Visible light is a small part of the light spectrum that is produced by a single accelerated photon.
- A set of coherent photons in a line forms the laser beam.
- A set of rotating photons on a spherical surface without central core called electron.
- A set of compact photons in a spherical volume creates a sun called "proton".
- By placing proton in the center of a spherical shell, called electron, the neutron is generated.

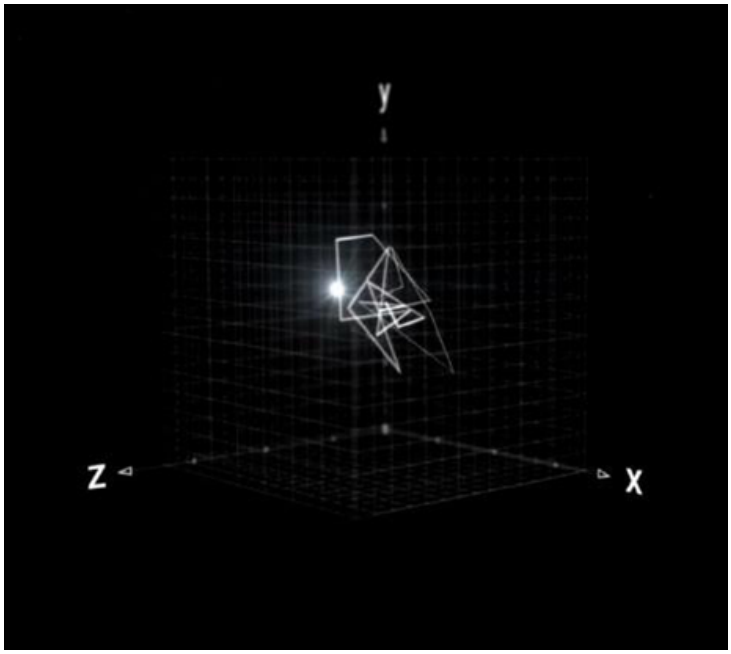

Figure 6.4: Photon as String

- The last state is a single photon without C velocity.

As we said, photon has six dimensions in its internal motion. This means that the photon moves in a closed path in 3 dimensions while vibrating in other 3 ones.

Saleh Theory believes that if we look at the internal motion of the photon, we will find out that the photon in its tiny motions, builds superstring. In fact, Superstring is another name for vibrating and rotating photon. In other words, the superstrings are photons without C velocity.

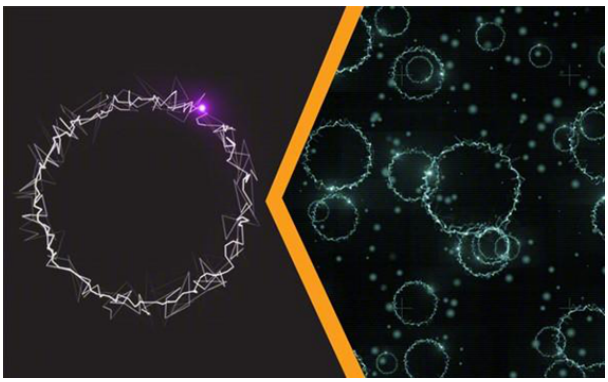

Figure 6.5: Superstring

However, our superstring must be able to account for the Big Bang phenomenon, which is in fact the "sub-photon" whose radius is 10^{-9} times that of a photon.

Indeed, it can be said that the basic phenomenon of the Big Bang is the "Ilitonium" that creates it.

(This subject is explained in Chapter Ten).

6.3.4 The Possibility of Introducing Photon as String by Several Reasons

According to the points discussed, it can be stated that the photon possesses the capability of being a string; given these explanations, it is the best candidate. In fact, the photon is the cornerstone of the universe, possessing eleven movements. Its energy formula is as follows:

$$\frac{1}{2}m(C^2 - r^2\omega^2) = h\vartheta \tag{6.10}$$

Where "r" is amplitude, "ω" is angular velocity and "ϑ" is the frequency of the corresponding spectrum. On the other hand, if we consider a Solar System like our System and look at the relation between the Sun and the Earth, we see that the Earth always revolves around the Sun in a closed circular path. Due to this stable structure, the following relations can be considered:

"The Kinetic Energy = Energy of Gravitational Wave or Gravitational Flux Energy."

$$\frac{1}{2}mv^2 = nh\vartheta \Rightarrow E_K = E_G \tag{6.11}$$

Given that the visible light is actually the same as radiant energy. So, "Radiant Energy = Electromagnetic Energy"

$$\frac{1}{2}m_p(c^2 - r^2\omega^2) = h\vartheta \Rightarrow E_R = E_\vartheta \tag{6.12}$$

As the formula "$E_N = Mc^2$" is valid in nuclear explosions and it means the total mass converts to photon particles, therefore we can assume that nuclear and radiation energy of photons is equal. So, "Nuclear Energy = Radiation Energy"

$$N\frac{1}{2}m_p(c^2 - r^2\omega^2) = Mc^2 \Rightarrow E_R = E_N \tag{6.13}$$

Where, "N" is the number of photons in an object with mass M.

Due to the fact that in transformers, magnetic energy is always converted into electrical energy, so: "Electrical Energy = Magnetic Energy"

$$q(\vec{V} \times \vec{B}) \cdot \vec{d} = RI^2t \Rightarrow E_B = E_E \tag{6.14}$$

Therefore, it can be said that all energies are equal, equivalent and identical.

$$E_K = E_G = E_R = E_N = E_E = E_B = E_\vartheta = E_U = \cdots \tag{6.15}$$

So, we can write the following comprehensive relation

$$E_{et} = N\frac{1}{2}m_p(c^2 - r^2\omega^2) = N'h\vartheta \tag{6.16}$$

(It should be noted that this subject is addressed in Chapter Fourteen).

6.3.5 Summary of String Theory

In this section, it was first explained that String Theory seeks to describe fundamental particles as infinitesimally small, vibrating strings, and is therefore one of the prominent candidates for a "Theory of Everything". Subsequently, by comparing the complex motions of celestial bodies, a new model for the photon was introduced, according to which the photon possesses multiple internal and external motions and can collectively be described in 11 dimensions. This characteristic makes the photon a suitable candidate for explaining the nature of strings and superstrings.

Furthermore, it was demonstrated that various states of the photon can account for the formation of light, electrons, protons, and neutrons, even establishing a connection between the photon and the Big Bang phenomenon. It was also stated that the various types of energy existing in nature—such as radiant, electromagnetic, nuclear, and gravitational—can be equivalent and interconvertible. Ultimately, it was concluded that the photon, with its multi-dimensional structure and fundamental role, can serve as the primary building block of the comprehensive model of cosmos and matter.

Chapter 7

Virtual Waves (The Phenomena of Redshift and Blueshift)

7.1 Introduction

The phenomena of redshift and blueshift constitute fundamental concepts in the understanding of cosmology and observational astronomy. These two effects arise from alterations in the electromagnetic wave component (Visible light, etc.) resulting from the relative motion between the source and the observer. According to scholars, redshift indicates a decrease in frequency and an increase in wavelength, shifting towards the red end of the spectrum; conversely, blueshift indicates an increase in frequency and a decrease in wavelength, shifting towards the blue end.

The discovery of these phenomena dates back to the early twentieth century, when William Slipher observed in 1903 that the spectral lines of certain stars had shifted from their expected positions. These shifts were later linked by Edwin Hubble in the 1920s to the expansion of the universe. Investigating these phenomena provides invaluable data regarding the velocity and direction of movement of celestial bodies. In this chapter, we shall undertake a deeper examination of these concepts and their applications, focusing on frequency variation as the essential core of these phenomena, to explain and interpret this occurrence.

It must be noted that the term "virtual waves" in this context refers to waves arising from the phenomena of redshift and blueshift, and not to any other entity.

7.2 Explanation of How Virtual Waves Are Formed and Their Negative Effects

As an introduction, the following experiment can be used to express and explain the Redshift and Blueshift phenomenon.

7.2.1 Experiment: Using the motion of a green light source

First mode: Motionless light source

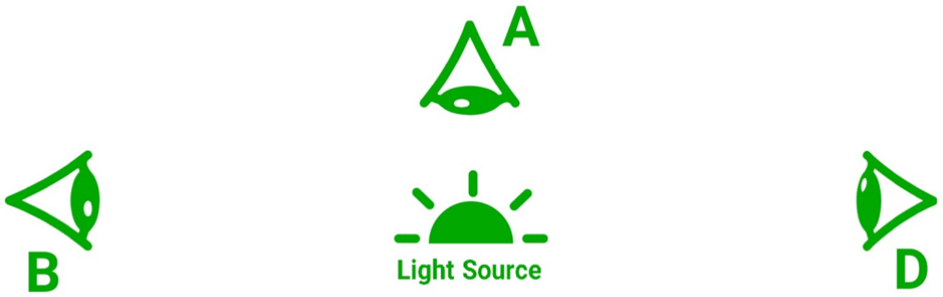

Figure 7.1: Motionless light source

It is clear that the relation $C = \lambda f$ always holds true, because when the green light source be motionless relative to observers, all three observers see the source as green. So the following relations can be written for all three observers:

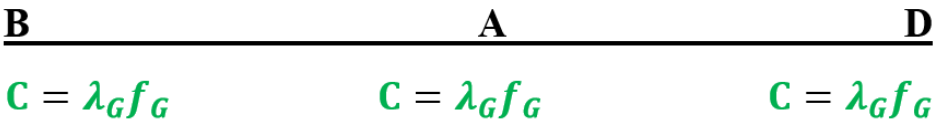

Figure 7.2: Three observers with motionless light source

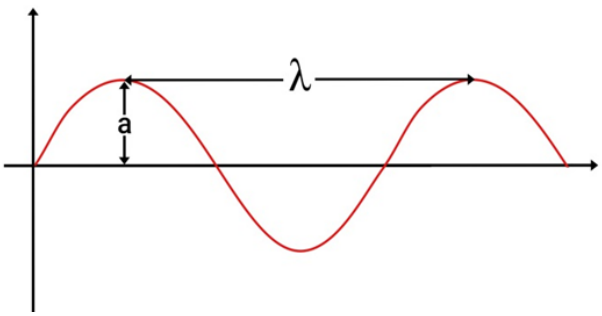

Figure 7.3: An electromagnetic wave has the parameters of wavelength (λ) and amplitude (a), which are particular values for each light

According to the figure, it can be said that an electromagnetic wave has the parameters of wavelength (λ) and amplitude (a), which are particular values for each light. In fact, the certificate of a wave is its wavelength and amplitude. It should be noted that the

relation $\lambda \approx 4a$ always holds true. On the other words, wavelength and amplitude are dependent on each other and the wavelength is a coefficient of the amplitude.

Considering that green light is between blue and red light, the wavelength and amplitude of green light is greater than the wavelength and amplitude of blue light and smaller than red light. It should be noted that wavelength and amplitude are the real and true nature of a light.

Second Condition: Moving light source

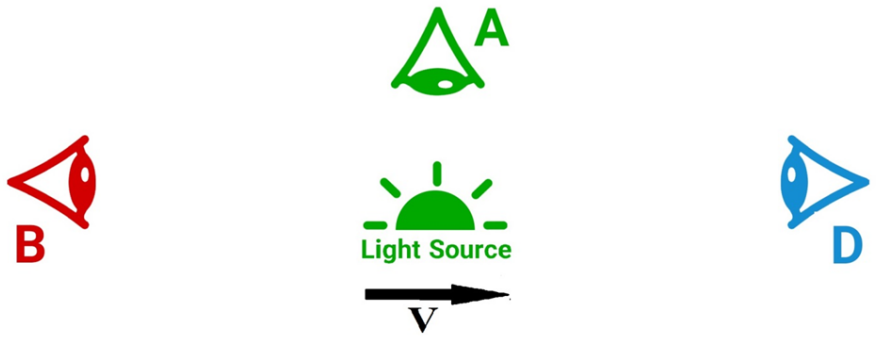

Figure 7.4: Moving light source

According to the figure, the light source moves toward observer "D". It is clear that observer "D" perceives the green light of the source as blue and observer "B" perceives the color of the same light as red. The variable parameter is speed, and as a researcher ignoring the color change is impossible. So, we explain it physically as follows:

The relation $C = \lambda f$ is valid for all observers. Since observer "A" moves along with the green light source, it always perceives the light as green and it will definitely not perceive a change in color. This shows that there has been no change in the nature of green light, because no variable parameter has changed the wavelength and amplitude. So it can be concluded that "λ" is the same for all three observers. As a result, whenever the speed is changed, it changes the frequency because the frequency is the number of photons which hit on the surface per unit of time. So it can be written like this:

$$\begin{array}{ccc} \mathbf{B} & \mathbf{A} & \mathbf{D} \\ C'' = \lambda_G f'' & \mathbf{C} = \lambda_G f_G & C' = \lambda_G f' \\ C'' = \mathbf{C} - \mathbf{V} = \lambda_G (f_G - \Delta f) & & C' = \mathbf{C} + \mathbf{V} = \lambda_G (f_G + \Delta f) \end{array}$$

Figure 7.5: Three observers with moving light source

According to the contents, it can be concluded that the change in color is due to the change in speed. If the speed of the source is added to the speed of light, the color of perceived light changes to blue, and if it decreases, the color changes to red, while this light is always green. As a result, it can be said that the nature of green light is real, but observing blue and red lights is virtual. In other words, changing the speed, changes the frequency, and as a result, the observer perceives the frequency higher or lower than the real frequency.

Note:

When the speed of an object is up to $0.2\,C$ (where C is the speed of light), the Redshift and Blueshift phenomenon is still in the range of visible light. In other words, it can be said that whenever a moving object has a speed of about 0.2 to 0.3 times of the speed of light, we will have Redshift and Blueshift phenomena in the range of visible light, and whenever the speed exceeds these ranges, an object cannot be seen anymore and becomes invisible, and to see it some provisions should be considered. It should also be noted that Redshift and Blueshift phenomenon is a common phenomenon in the universe, like the phenomenon of mirage on Earth. Mirage is a phenomenon that can be seen but does not exist.

For example, we consider Hubble's law,

$$V_H = HD \tag{7.1}$$

where "V_H" is the speed, "H" is Hubble's constant, and "D" is the distance, that it can be written:

$$H = \frac{V_H}{D} \tag{7.2}$$

Considering that the Blueshift and Redshift phenomenon is a simple and natural phenomenon, at high speeds when "V_H" would be close to the speed of light, this causes some changes in our perceived speed compared to the real speed. And due to the constant distance, changes in speed give changes in Hubble's constant. In fact, the change of Hubble's constant, which is about 70 ± 3, is due to the changes in speed.

7.2.2 A new explanation for virtual waves

Although the Redshift and Blueshift phenomenon cause deviation in our perceptions, it is a real phenomenon in the universe. It means that this phenomenon has an effect in the universe and it happens and has a real existence. Therefore, in order to find out the truth, we must pay attention to the following notes:

Considering the size of the universe, which has a radius of 10^{46} meters, the possibility of Redshift and Blueshift phenomena is very high. According to Hubble's law, it can be

shown:

$$\begin{aligned} V_H &= HD \\ V_H &= 0.2\,C \Rightarrow 0.2\,C = 2.2 \times 10^{-18} \times D \Rightarrow D \approx 10^{25}\ \text{m} \end{aligned} \tag{7.3}$$

Therefore, if the distance between the observer and the desired object would be 10^{25} to 10^{26} meters, the phenomenon of Redshift or Blueshift occurs, in which the frequency of visible lights are changed and as a result, their colors are changed. For example, green, blue or red light is seen.

But if the speed exceeds 0.3 times the speed of light, there is a strong possibility that it cannot be seen in the visible light range. This means that the waves are emitted and reach the observer, but the observer does not perceive them.

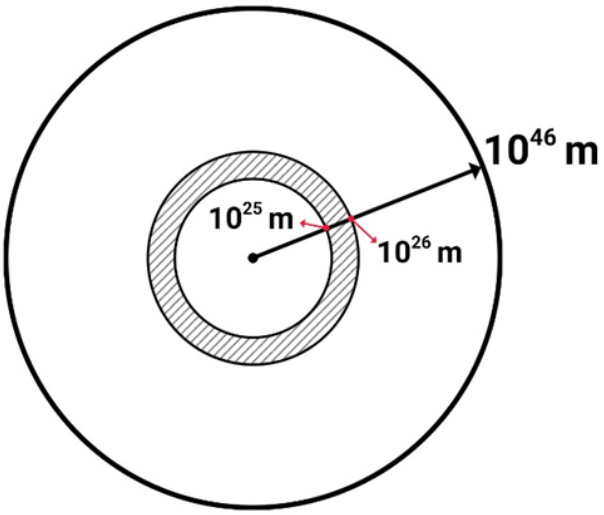

Figure 7.6: Redshift and Blueshift distance range in the universe

If there is a special telescope that is designed for observing x-rays, it collects these specific wave ranges of space and probes them. The waves observed by this telescope, which made errors due to the redshift and blueshift phenomena, can be divided into the following three categories:

1. If the blueshift phenomenon has affected that wave, the observed waves have actually been in the range of visible light, but we perceive them as x-rays.

2. Sometimes the effect of the redshift phenomenon on the real gravity waves causes these waves to be observed in the x-ray range.

3. Real x-rays, which are truly in the range of x-rays, can be seen in another range (even the infrared wave range). In fact, our x-rays have disappeared and we cannot observe them.

Result:

According to these contents, it can be said that most of the waves that we perceive are affected by the Redshift and Blueshift phenomenon and the observers will definitely make an error. This error causes about 70% of the received waves to be different from their reality.

Suggestion: According to the relation "$C = \lambda f$" where "λ" is always constant, if telescopes are built based on sensitivity to wavelength, it can be said that the accuracy will increase to **90%** and the error will not exceed **10%.**

In fact, a revolution in telescope construction must occur to approach the actual truth.

7.2.3 Multi-Function Receiver Sensor (A receiver capable of detecting all types of electromagnetic waves, including: radio, microwave, infrared, visible light, ultraviolet, X-ray, and gravity waves)

To resolve the existing errors in current telescopes, multi-function sensors must be utilised.

The receiver sensor should be sensitive to "λ" instead of frequency, or equivalently, to counting the number of beats.

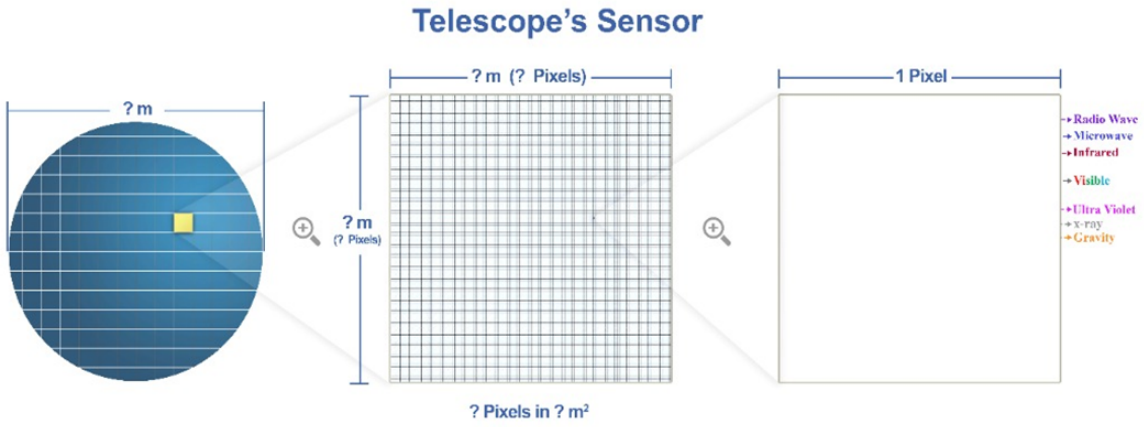

Figure 7.7: Receiver sensor sensitive to wavelength λ.

This type of receiver sensor gives us a real image that does not have the error of virtual waves, and also gives us radio waves, micro waves, infrared waves, visible waves, ultraviolet waves, X-rays, gravity waves in each image simultaneously, and there is no

need for different telescopes. Therefore, you can get a versatile telescope at a reasonable price.

7.2.4 Advantages

1. The telescope can receive original and real waves.
2. The received waves do not include virtual waves or waves that have low shift or high shift due to the phenomenon of Redshift or Blueshift.
3. The accuracy of receipts and calculations increases to about 90% and the error is reduced to less than 10%.
4. Strong and huge telescopes can be built on the ground and the difficulty of sending telescopes into space is reduced.
5. All the waves in the universe can be received with this method without deficiency, and the universe can be observed with only one telescope.
6. The cost of producing telescopes will be reduced to less than 20% of the current cost.
7. Maintenance of telescopes becomes convenient, easy and inexpensive due to their availability.

7.3 Design and construction of low defect telescopes based on wavelength

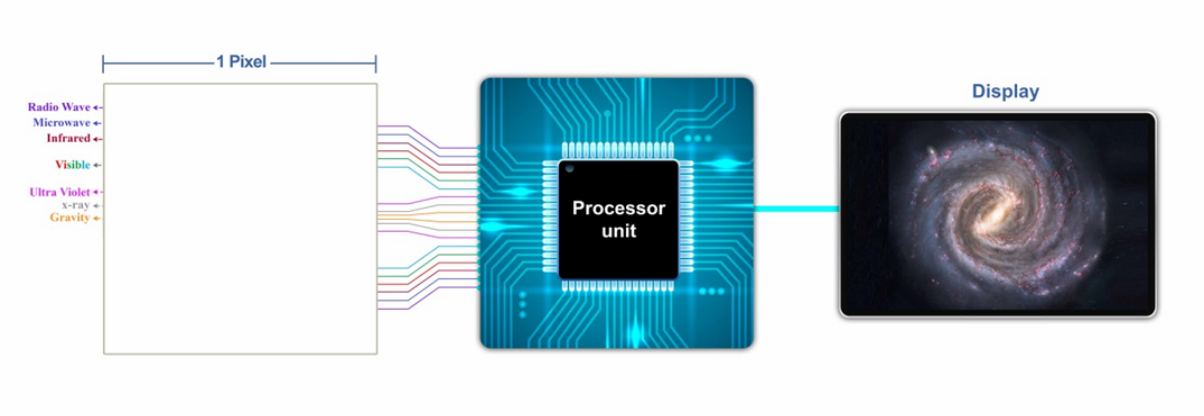

Figure 7.8: Design and construction of low defect telescopes based on wavelength

7.4 Virtual Waves in the Universe (A New Discovery of Celestial Mirages)

As mentioned in the previous articles, we have a phenomenon in the world, Blueshift and Redshift, which is the same change in frequency due to changes in the speed of the light source. So, for example, we perceive a green light source that approaches us as blue, or we perceive it as red when moves away from us. In fact, this change of green light is caused by the speed of its source. This phenomenon is a natural phenomenon that the eye, telescope or any observer actually perceives, but it is not real.

According to Hubble's law ($V_H = HD$), if the speed of light sources, which are actually the same galaxies, is 0.2 to 0.3 of the speed of light, we have the Redshift and Blueshift phenomena, but if the speed is higher than 0.3 of the speed of light, we will have "high shift" and "low shift".

We have already calculated that at a distance of approximately 10^{25} meters up to 10^{26} meters, the phenomenon of Redshift and Blueshift is in the range of visible light. But if the distance is more than 10^{26} meters, it can be said that in that area, invisible objects become visible and visible objects become invisible and "high shift" and "low shift" will begin.

For a better understanding, pay attention to the mirage phenomenon on Earth. This is an actual phenomenon. The observer's eye perceives it correctly, but it is not real. Therefore, the universe can be divided into regions as follows:

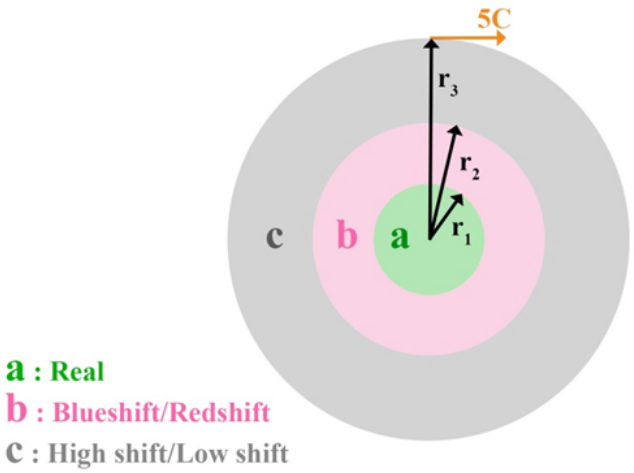

Figure 7.9: Real, Redshift/Blueshift, and Highshift/Lowshift Regions

$$V_H = HD \Rightarrow \begin{cases} 0.2C = HD \Rightarrow D_1 = \frac{0.2\times3\times10^8}{2.22\times10^{-18}} \Rightarrow D_1 \approx 2.7\times10^{25}\ \text{m} \\ 0.3C = HD \Rightarrow D_2 = \frac{0.3\times3\times10^8}{2.22\times10^{-18}} \Rightarrow D_2 \approx 4\times10^{25}\ \text{m} \end{cases} \tag{7.4}$$

$$\Rightarrow r_2 = 10^{25} \sim 10^{26}\ \text{m}$$

The "Real" region ($a : 0 < R < r_1$) is where the speed of the received light is about the speed of light and the speed of the light source is much slower than the speed of light. This region is located in cluster area.

If we receive a light from outside the cluster, for example from another cluster, we have entered the "Redshift and Blueshift" area ($b : r_1 < R < r_2$). We have this phenomenon, Redshift and Blueshift, maximum in the supercluster.

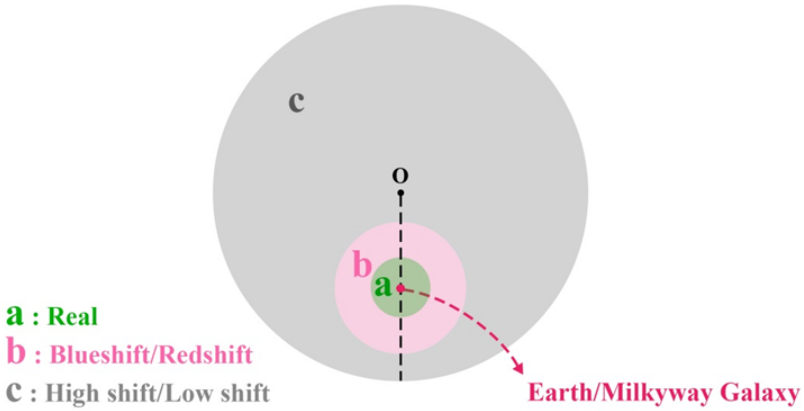

Figure 7.10: Schematic representation of real, redshift/blueshift, and high-shift/low-shift regions in the universe relative to Earth/Milky Way position.

According to the above figure, suppose that we, as observers on Earth and in our galaxy, are located between the center of the universe and the edge of it (or further away from the center). On the other hand considering that the speed of the Earth around itself is 1700 km/h and the speed of the Earth around the Sun is 100'000 km/h and the speed of the Earth around the Milky Way galaxy is 800'000 km/h, it can be predicted that the speed of the Earth around the clusters should be about 2'100'000 km/h. In fact, it can be said that a cluster, or maximum a supercluster, is a Redshift or Blueshift area and the area after the supercluster is called "high shift" or "low shift" area.

In fact, it can be said that most of the images we perceive are virtual and mirage-like. They are actual, but not real. We do not have a comprehensive and complete image. The colors are shifted, the invisible becomes visible and the visible becomes invisible. Another point is that the calculated distance surely has errors. In fact, it can be said that the calculations have many mistakes.

Note: What is the solution?

Using telescopes that operate based on the wavelength of waves, since the wavelength remains a constant value.

$$C = \lambda\vartheta \tag{7.5}$$

$$\lambda = \text{constant} \tag{7.6}$$

7.5 Virtual Waves Creation, Its Negative Effects and Telescopes Design with Low-Defect

In 1929, Hubble presented the observational evidence for one of science's greatest discoveries, the expanding universe. Hubble showed that galaxies are receding away from us with a velocity that is proportional to their distance from us: more distant galaxies recede faster than nearby galaxies. Hubble's classic graph of the observed velocity vs. distance for nearby galaxies is presented in graph which this graph has become a scientific landmark that is regularly reproduced in astronomy textbooks. The graph reveals a linear relation between galaxy velocity (v) and its distance (d):

$$v = H.D \tag{7.7}$$

On the other hand, the observable boundary of universe is 10^{24} km. If we set that in the Hubble's formula, we perceive that the galaxies which located at this distance are currently moving at a speed faster than the speed of light.

$$v = H \cdot D = 72 \times 10^{24}\ \frac{\text{km}^2}{\text{s} \cdot \text{Mpc}} \Rightarrow v = 2.4 \times 10^9\ \text{m/s} \tag{7.8}$$

$$v \gg C \tag{7.9}$$

Redshift and Blueshift phenomenon cause deviation in our perceptions, it is a real phenomenon in the universe. It means that this phenomenon has an effect in the universe and it happens and has a real existence. Now suppose we have a galaxy which has 10^{25} meters distance from us. The possibility of Redshift and Blueshift phenomena is very high. According to Hubble's law, it can be shown:

$$\begin{aligned} &V_H = HD \\ &V_H = 0.2\,C \Rightarrow 0.2\,C = 2.2 \times 10^{-18} \times D \Rightarrow D \approx 10^{25}\ \text{m} \end{aligned} \tag{7.10}$$

Therefore, if the distance between the observer and the desired object would be 10^{25} to 10^{26} meters, the phenomenon of Redshift or Blueshift occurs, in which the frequency of visible lights will change but they are in range of visible light yet. If the speed exceeds 0.3 times of the speed of light, there is a strong possibility that it cannot be seen in the visible light range. This means that the waves are emitted in range of visible and reach the observer, but the observer does not perceive it.

7.6 Proving the Virtuality of Electromagnetic Wave Frequency Using a Table of Various Light Spectra with Identical Frequencies

Considering the decomposed light from sunlight, there are 7 primary colors, each with a specific frequency and wavelength. However, when pure light sources are combined as ordered pairs—for example, if we combine pure red light with a frequency of 450 THz and pure violet light with a frequency of 750 THz in equal proportions—and wish to define a frequency for this combined light, we might calculate the average of the two frequencies, yielding 600 THz. Notably, the combination of red and violet produces a distinctive magenta color. Interestingly, while this frequency falls within the range of green light, the combined color does not resemble green in appearance. In other words, although the average frequency value of 600 THz corresponds to the green spectrum, the resultant magenta light is entirely distinct from green.

Therefore, it may be concluded that frequency acts as a secondary parameter in electromagnetic waves, whilst wavelength remains a primary parameter that does not change. We observe that various light combinations yield different colors despite having identical frequencies.

Conclusion:

The following table clearly demonstrates that several different light spectra possess identical frequencies. Given these diverse color combinations, one may deduce that their wavelengths remain constant, whilst frequency emerges as a secondary and dependent parameter. The existence of different lights with identical frequencies indicates variations in their wavelengths. Indeed, in the fundamental formula:

$$v = \frac{\Delta x}{\Delta t} \Rightarrow C = \frac{\lambda}{T} \Rightarrow C = \lambda F \tag{7.11}$$

Variations in velocity or wavelength combinations can increase or decrease the frequency, making it a dependent variable. To put it more precisely in physical terms, the wavelength determines the propagation pattern of an electromagnetic wave and has a fixed form and structure, whereas frequency lacks inherent stability. Instead, frequency

transforms as the wavelength changes or when the speed approaches relativistic values (close to C), causing light frequencies to shift up or down.

Range (THZ)	Color	Name	F (THz)	Status
370 - 450		Black	370	Pure
		Red	400	Pure
450 - 500		Firebrick	483	Averaged
		Gold	491	Averaged
		Orange	495	Pure
		Chocolate	496	Averaged
		Olive	500	Averaged
500 - 550		Brown	501	Averaged
		Yellow	515	Pure
		Peru	529	Averaged
		Chartreuse	534	Averaged
		Deep pink	549	Averaged
550 - 575		Khaki	567	Averaged
		Olive drab	570	Pure
		Hot pink	572	Averaged
		Tan	574	Averaged
		Peach puff	575	Averaged
575 - 600		Green	580	Pure
		Pink	584	Averaged
		Beige	593	Averaged
		Grey	600	Averaged
		White	600	Averaged
		Magenta	600	Averaged
		Silver	600	Averaged
600 - 625		Indigo	610	Pure
		Medium orchid	610	Averaged
		Slate gray	617	Averaged
		Powder blue	617	Averaged
		Navy	625	Averaged
625 - 650		Sea green	630	Averaged
		Dark slate gray	631	Averaged
		Cadet blue	631	Averaged
		Dark violet	635	Averaged
		Blue	650	Pure
650 - 700		Steel blue	658	Averaged
		Turquoise	658	Averaged
		Teal	700	Averaged
		Cyan	700	Averaged
		Purple	700	Pure
700 - 750		Violet	750	Pure

Table 7.1: Visible Spectrum Frequency Table

7.7 Summary

In this chapter, by presenting a simple experiment, we initially arrived at the significant conclusion that within electromagnetic waves, wavelength is the primary quantity. In the phenomena of redshift and blueshift, contrary to common perception, it is the frequency that changes, rather than the wavelength; it is as if the wavelength is the intrinsic nature of the wave and remains constant, while the frequency undergoes change. Subsequently, errors in conventional telescopes were addressed, and the implementation of wavelength-based telescopes was proposed to prevent the numerous errors resulting from the use of existing telescopic technology. Furthermore, the phenomena of redshift and blueshift were introduced. Finally, by referencing the table of various light spectra, the virtuality of frequency in electromagnetic waves was demonstrated.

Chapter 8

Apparatus of the New Age

8.1 The Electron Tank

8.1.1 Introduction

In today's world, humanity's increasing demand for clean, high-power, compact, and sustainable energy sources has driven researchers towards rethinking the nature of energy and its fundamental carriers. A vast proportion of modern technologies—ranging from electronic and telecommunications systems to terrestrial, aerial, and space transport—depend directly or indirectly on the flow of electrons. From this perspective, the electron is not merely a fundamental particle but serves as the very foundation for the operation of many energy-centric systems.

In this chapter, through a novel perspective on the potential power of electrons, a concept termed the "Electron Tank" is introduced; a reservoir designed for the direct storage of significant masses of electrons and the exploitation of the immense energy inherent in their motion. Using classical computations, this discussion examines electron mass density, kinetic energy at high velocities, and the possibility of energy extraction on an immense scale. Subsequently, the concept of the Electron Tank as a revolutionary energy source is explored across diverse applications, including electric vehicles, spacecraft, clean power stations, medical equipment, nanotechnology, and even anti-gravity systems.

The objective of this chapter is to provide a conceptual framework for redefining the role of the electron as an independent energy carrier and to examine the technological implications of such a perspective for the future of science and industry.

A great revolution in producing affordable, abundant, convenient, clean and ... energy so that one kilogram of it, could supply the power of moving a machine for years!

- A new explanation for the ability of electrons to move heavy objects, create high speeds, high powers and ...?!!

- Calculating the ability of electrons to do work in consumer sources (trains, cars, planes, etc.)
- How to manufacture an electron tank and supply the necessary electrons for its tanks?!!

8.1.2 A new explanation for the capacity of electrons to displace heavy objects, achieve high velocities, high power, etc.!!

When we consider the physical dimension of a parameter, we can understand that it depends on which base quantities such as length, mass, etc. The presence of a base quantity in a parameter indicates the dependency of that parameter. Nowadays it can be said that about 90 percent of our appliances rely on electricity. If we look at electric cars, electric trains, and other electronic appliances, we can see that they are all electron-dependent. In fact, electrons are the basis of the working of such machines. Electrons have the ability to do work due to movement and displacement. It can be said that the moving electron has a high ability to do work. All we know, the speed of electron in wires is close to the speed of light, but another effective parameter that makes electron have a very high ability to perform various tasks is its density.

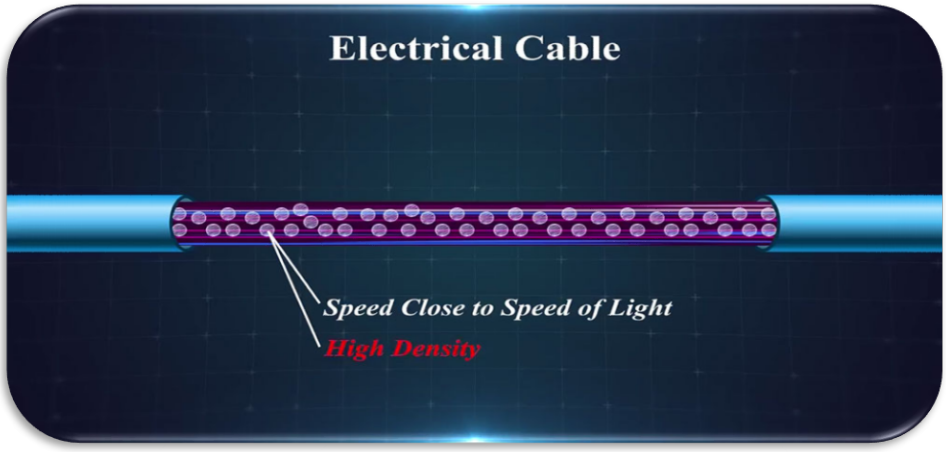

Figure 8.1: Electrical Cable

Calculating the capacity for electrons to perform work in consumption sources (trains, automobiles, aircraft, etc.)

To calculate the density of an electron, we can write:

$$\rho = \frac{m_e}{V_e} \Rightarrow \rho = \frac{9 \times 10^{-31}}{2.19 \times 10^{-44}} = 4.1 \times 10^{13} \left(\frac{\text{kg}}{\text{m}^3}\right) \tag{8.1}$$

Considering the magnitude of its density, it can be said that the ability of an electron

to do work is due to its very high density. It can be said that the product of velocity (S) in density (ρ) is an effective parameter in the high ability of electron to do work.

$$E_{ff} = \rho s \tag{8.2}$$

Now we calculate the energy of "n" electrons to do the work:

$$E_n = n\left(\frac{1}{2}ms^2\right) \tag{8.3}$$

If we multiply and divide the above equation by the volume of an electron, we have:

$$\overset{\times\frac{V}{V}}{\rightarrow} E_n = n\left[\frac{1}{2}\rho s(sV)\right] \tag{8.4}$$

To calculate the number of displaced electrons, we use the following formula:

$$n = \frac{\Delta m}{m_e} \tag{8.5}$$

Where Δm is the mass changes of the source before and after doing the work and m_e is the mass of one electron and equal to

$$9.10938356 \times 10^{-31} \text{ kg}$$

By placing the values in the equation of E_n we have:

$$E_n = \frac{\Delta m}{m_e}\left[\frac{1}{2}E_{ff}\ sV_e\right] \tag{8.6}$$

Given that the speed of electrons in wires is close to the speed of light

$$s \cong 3 \times 10^8 \text{ m/s} \tag{8.7}$$

And inserting the classic amount of electron volume

$$V_e = 2.19 \times 10^{-44} \text{ m}^3 \tag{8.8}$$

We have:

$$E_n = \frac{3 \times 10^8 \times 2.19 \times 10^{-44}}{2 \times 9.1 \times 10^{-31}}\Delta m \times E_{ff} \qquad \text{(joule)} \tag{8.9}$$

$$E_n \cong \Delta m E_{ff} = \Delta m \rho s \qquad \text{(micro joule)} \tag{8.10}$$

$$\overset{\Delta m=1gr}{\longrightarrow} E_n = \rho s \qquad \text{(nano joule)} \tag{8.11}$$

Now by placing the density and speed of electron to calculate the energy of 1 gram of

electrons:

$$E_n = 1.23 \times 10^{22} \text{ (nano joule)} \cong 10^{13} \text{ (j)} \tag{8.12}$$

If we want to calculate this energy for 1 kg of electrons, we have:

$$E_{ff} \approx 10^{16} \text{ (j)} \tag{8.13}$$

According to the above relations, it can be concluded that for every kilogram of electrons, a lot of energy can be obtained, which is efficient and replaceable in all cases where electricity is used. For example, consider a 2-ton car. This vehicle requires energy of about $10^9 j$ to travel 100 km. Therefore, one kilogram of electrons can easily provide the energy needed to travel a distance more than 500,000 kilometers, or in fact, can move this car for more than three years.

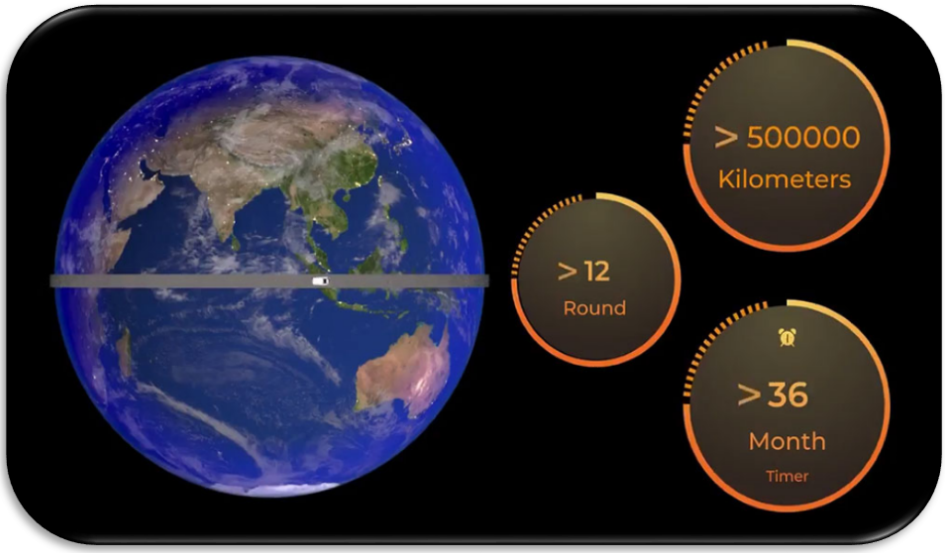

Figure 8.2: Estimated travel capacity of a vehicle powered by one kilogram of electrons.

Conclusion:

In other words, vehicles and everything that works with this power can be charged for months and years.

8.1.3 Super High-Power Battery Named Electron Tank

Considering that conventional batteries used in ordinary vehicles typically have a capacity of around 80 amperes, approximately 10^{27} electrons are stored within them, with the total mass of these electrons being about 0.002 grams. In the largest standard batteries, utilised by major corporations or printing presses, the mass of the stored electrons can reach approximately 1 to 2 grams.

In the new super-batteries introduced in this article, it is possible to store between 100 grams and approximately 20 kilograms of electrons.

$$E = \frac{1}{2}mv^2 = \frac{1}{2}(100 \times 10^{-3})(3 \times 10^8)^2 \tag{8.14}$$

$$\Rightarrow E = 4.5 \times 10^{15} \text{ J} \tag{8.15}$$

It is evident that, given the 10^{15} J energy generated by this battery, such a system could power a vehicle — such as a car, train, airplane, or ship — for several years.

Figure 8.3: Super High-Power Battery Named Electron Tank

8.1.4 The Design and Manufacture of Wrist Phones Utilizing Nano-Scale Electron Tanks and Gravitational Waves (Unlimited Charging, Global Coverage, Reliable and Seamless Satellite Connectivity, . . .)

In light of the rapid advancements being made on a global scale, Saleh Theory Group seeks to make a modest contribution to this significant cause by offering wrist phones.

These phones are equipped with a customized main screen designed to fit the unique contours of the wrist, accompanied by straps meticulously crafted to align with specific user needs.

The necessary hardware is integrated into the edges of the main display and the strap links. The battery is a nano-scale Electron Tank, a battery with the capacity to provide the energy required by a phone for years.

The functionality of the phone is contingent on its capacity to operate within the frequency range of gravitational waves. This characteristic ensures that the device is not subject to blind spots, and it is capable of achieving optimal antenna reception in any location. Furthermore, it is important to note that gravitational waves are considered to be harmless.

It is recommended that this phone be offered to consumers with the lowest possible weight and the highest possible quality. These devices are intended to connect effortlessly with their dedicated satellites (approximately 7 satellites), enabling global coverage.

The phones are designed to align with the specifications of each user, thereby ensuring that each individual possesses a personalized mobile device that can be readily customized using biometric authentication methods such as fingerprints, DNA, iris recognition, and more.

8.1.5 A Revolution in the Design and Manufacture of Spacesuits Utilising Gravitational Wave Frequency and the Miniature Liquid Super-Battery (Liquid Electron Tank)

Part A) Unlimited Telecommunications and Power Supply

Part B) Continuous Suit Heating and Cooling Control

Part C) Sustainable Oxygen Supply

Part D) The Utilisation of Gravity and Anti-Gravity Boots (Positive and Negative Gravity)

Consider a sphere, similar to a marble, approximately 1 cm in diameter. If we could contain a high density of electrons within this volume in a highly reliable superinsulator, it would essentially be a compact container capable of storing an extremely large amount of energy. According to calculations, the following relations can be derived:

Figure 8.4: Liquid Electron Tank

$$\rho = \frac{m_e}{V_e} \Rightarrow \rho = \frac{9 \times 10^{-31}}{2.19 \times 10^{-44}} = 4.1 \times 10^{13} \text{ kg/m}^3 \tag{8.16}$$

$$V_s = \frac{4}{3}\pi r_s^3 = \frac{4}{3}\pi(5 \times 10^{-3})^3 = 5.24 \times 10^{-7} \text{ m}^3 \tag{8.17}$$

$$E = \frac{1}{2}mv^2 = \frac{1}{2}(\rho V_s)C^2 \tag{8.18}$$

$$E = \frac{1}{2}(4.1 \times 10^{13})(5.24 \times 10^{-7})(3 \times 10^8)^2 \tag{8.19}$$

$$\Rightarrow E = 9.67 \times 10^{23} \text{ J} \tag{8.20}$$

Where ρ, m_e, and V_e are the electron density, electron mass, and electron volume, respectively; V_s and r_s are the volume and radius of the electron tank sphere; and E is the total energy.

Part A: Unlimited Telecommunications and Power Supply

Given the compact volume and exceptionally high energy density, we can design the spacesuit and the astronaut's telecommunication equipment based on the gravitational wave frequency.

This design ensures that the communication device's signal strength—both relative to the primary (mother) receivers and in relation to others—is highly stable. Furthermore, communication will be continuously maintained in all directions and locations, rendering a communication breakdown meaningless.

$$\frac{1}{2}mv^2 = nh\vartheta \quad \Rightarrow \quad \vartheta = \frac{mv^2}{2nh} \tag{8.21}$$

As stated previously, n is the number of force lines passing through the surface of the sphere, so we have:

$$n = \frac{S}{S_p} = \frac{4\pi r^2}{4\pi r_p^2} = \frac{r^2}{r_p^2} \tag{8.22}$$

Therefore:

$$\vartheta = \frac{r_p^2}{2h} \times \frac{mv^2}{r^2} \tag{8.23}$$

The value of the left-side coefficient is constant as:

$$\frac{r_p^2}{2h} = \text{constant} \cong \frac{1}{10} \tag{8.24}$$

And finally, the gravitational frequency will be equal to:

$$\vartheta = \frac{mv^2}{10r^2} = \frac{E_k}{5r^2} \tag{8.25}$$

$$\vartheta_{\text{Earth}} = \frac{(5.97 \times 10^{24})(2.98 \times 10^4)^2}{10(6.37 \times 10^6)^2} \tag{8.26}$$

$$\Rightarrow \vartheta_{\text{Earth}} \cong 1.42 \times 10^{19} \text{ Hz} \tag{8.27}$$

Part B: Continuous Suit Heating and Cooling Control

Given that the space environment can experience extremely high or low temperatures, this high reserve of electron energy can be utilised to provide long-term heating and cooling for thermal regulation of the suit.

This allows the suit to sustain a comfortable internal microclimate for the astronaut over extended periods of time. Essentially, it enables the creation of a stable, continuous climate control system within the spacesuit.

Part C: Sustainable Oxygen Supply

Considering the ease of converting Carbon Dioxide (CO_2) into Oxygen and Carbon, a device can be incorporated into the spacesuit. This device would continuously transform the CO_2 from the astronaut's breathing into oxygen, maintaining a consistent oxygen level within the suit's environment for many hours.

Part D: The Utilisation of Gravity and Anti-Gravity Boots (Positive and Negative Gravity)

Given the substantial energy that a Miniature Liquid Super-Battery (Liquid Electron Tank) can produce, coils can be strategically positioned within astronauts' spacesuits.

By passing electrical current through these coils, fields can be generated in specific directions that either align with or oppose the ambient fields present in space, thereby enabling the creation of the required gravitational or anti-gravitational effects.

8.1.6 Design and Manufacturing of UFOs by Creating High-Frequency Magnetic Fields or Manufacturing of Artificial Anti-Gravity

As is well known, the flow of electrons or, in other words, the electric current can create magnetic fields in the solenoid. Magnetic fields can cause electrons to flow through solenoid and produce electric current too. Therefore, the following experiment can be presented.

According to the figures, it is clearly evident that if the electric current reaches a specific value, a magnetic field could be created that causes the object to lift off the ground. Indeed, the magnetic and electric fields have the homogeneity properties of energy.

"Magnetic Energy = Electrical Energy"

$$q(\vec{V} \times \vec{B}) \cdot \vec{d} = \frac{1}{2} I^2 R t \tag{8.28}$$

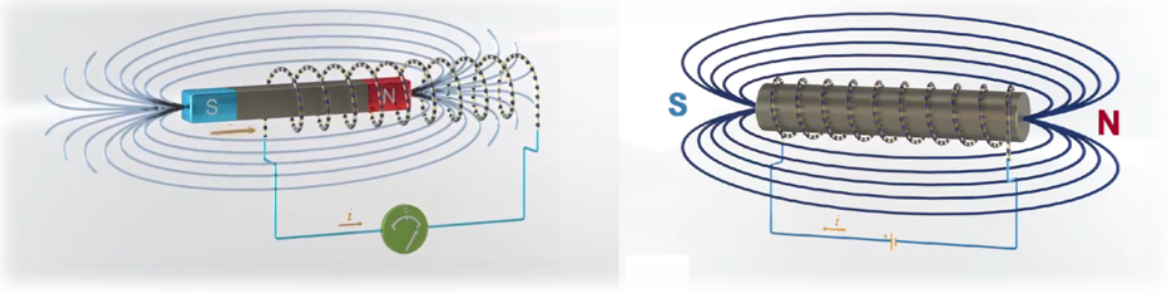

Figure 8.5: Experimental illustration of object levitation generated by high-intensity magnetic and electrical field interactions.

On the other hand, the electromagnetic wave spectrum includes a wide range of frequencies that are all made of photons. These waves can be grouped into two categories, one made of single photons and the other of chained photons.

The boundary between these two categories is actually visible light. In fact, the visible light region divides electromagnetic waves into two categories:

1. Waves of lower frequency than that of visible light, made of single photons, and
2. Waves of higher frequency than that of visible light, made of chained photons.

So given the principle of "photon as a basis for electromagnetic waves" (like hydrogen as a basis for all other elements in the Universe), although all electromagnetic waves are made of photon, their structure is divided into two categories of single and chained. And the chained ones have an elastic structure and more stability.

In the previous article entitled "New Discoveries about the Magnetic Fields" we have presented the results of an experiment whose aim was the experimental calculation of the frequency of magnetic waves and in which the frequency range, taking into account the mass and the type of magnet, was found to be between 10^{15} Hz to 10^{16} Hz.

Similarly, in another article entitled "New Discoveries About Gravity 2" we dealt with the calculation of the frequency of gravitational waves whose frequency threshold was found to be 10^{18} Hz.

Thus a new electromagnetic spectrum diagram was presented with a new classification in which the magnetic waves are after visible and ultraviolet light.

After that, there is the range of X-ray, then the gravitational waves and finally the range of the Gamma ray.

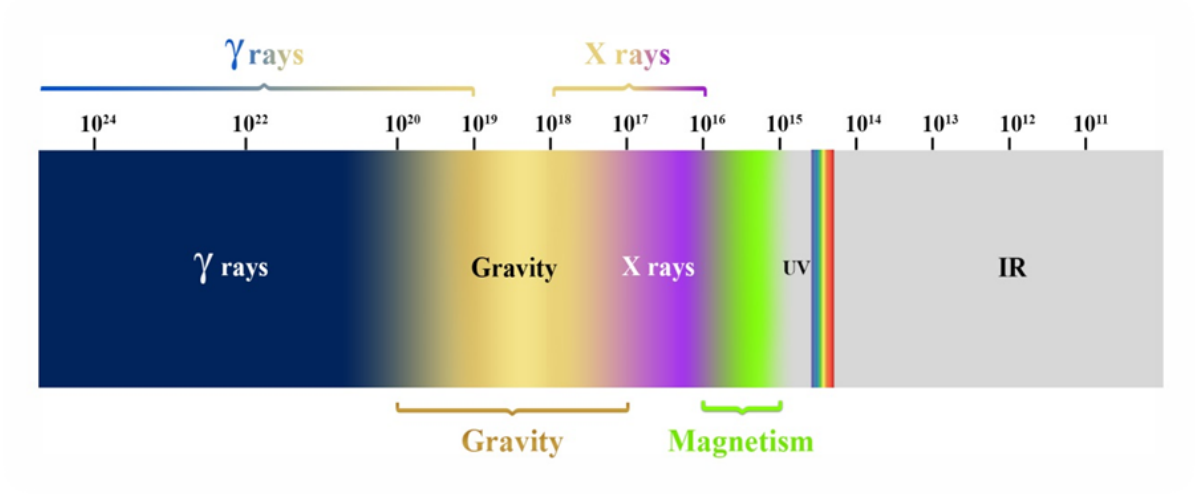

Figure 8.6: Gravitational waves between the gamma-ray and X-ray ranges

Therefore, considering the chained structure of both magnetic and gravitational waves, if we can change the frequency of magnetic waves and increase it to about 10^{18}Hz (approximately 100 times), we can say that we have created artificial gravitational waves; Waves that have the ability to overcome gravity. For this purpose, we use the following formula:

$$q(\vec{V} \times \vec{B}) \cdot \vec{d} = \frac{1}{2} I^2 R t = nh\vartheta \tag{8.29}$$

According to the written energy formulas, to create a frequency of 10^{18}Hz, the electrical energy relation can be easily used. If we increase the electric current 10 times, we can increase the frequency as much as hundred times. Therefore, to produce artificial gravity frequency, we need a system that can withstand at least 10 to 50 amperes of electric current. This system should be like of which it can pass through this current for a long time without damaging itself. To produce it, a "Toroidal solenoid" can be used, and to optimize it, a hollow central core made of iron or steel can be used in the middle. The following is a proposed design for an anti-gravity plate:

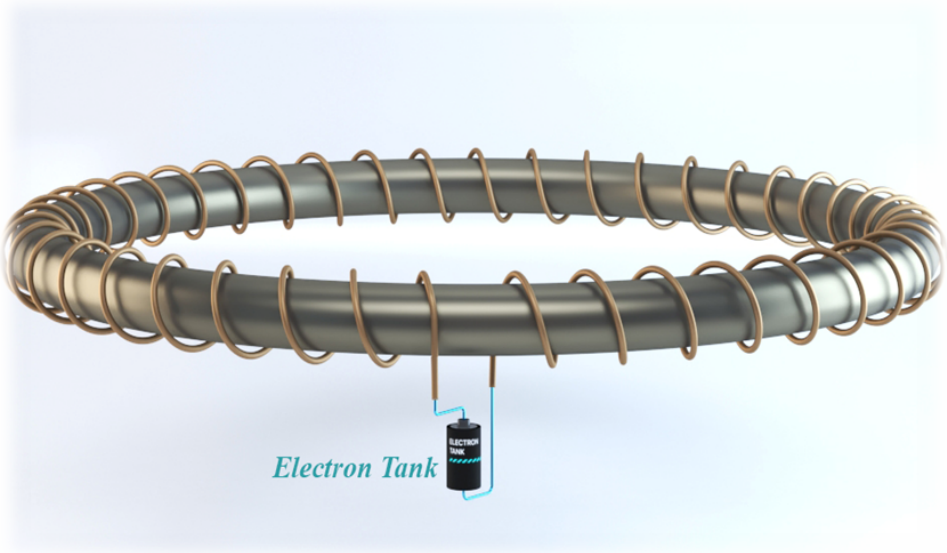

Figure 8.7: Toroidal solenoid for generating artificial gravitational frequency

This loop can be repeated in several layers within each other to achieve the appropriate power. With this method, we have created electromagnetic waves with a frequency in the range of 10^{18}Hz and higher (gravitational wave range), so it can interact with gravitational waves. As a result, we can say that we have created anti-gravity waves.

Notice:

1. By changing the direction of electric current in the system, gravity or anti-gravity can be created.

2. The best way to produce an anti-gravity plate (or gravity) is to use a Toroidal solenoid under it, which creates an interaction between the surface created by the Toroidal solenoid and the surface of the Earth (planet), but a slight difference in gravity force between two edges of the anti-gravity plate can upset the balance. Therefore, in order to prevent the imbalance, the rotational movement of the

Toroidal solenoid under the anti-gravity plate is necessary, because the rotational motion balances the possible difference in gravity between the two edges of the anti-gravity plate compare to each other and could balance it.

3. How to control and move anti-gravity plates?

   To drive the disk, it is enough to adjust the amount of current in each part, and changes in the current intensity of each part cause it to change and move.

Figure 8.8: Anti-gravity plate

4. Artificial gravitational waves created by changing the frequency of magnetic waves, and like the strong repulsion and absorption of like and opposite magnet poles have the ability to strongly repel or strongly absorb each other.

5. The production of this special magnet (which is actually artificial gravity) requires the movement of electrons. Therefore, the best option of energy source is "Electron Tank", as explained in the previous articles. Electron Tank is electron storage with the mass around 1 to 10 kg, which has the ability of storing approximately 10^{16} j energy, so it can be a proper power supply for this system.

If the structure of a UFO is made in the most optimal form, it could move in water and space at a fraction of the speed of light.

Figure 8.9: UFO powered by artificial gravity waves

8.1.7 A New Design to Manufacture Spaceships That Could Travel at a Speed Close to the Speed of Light

According to the law of conservation of energy, in which all forms of energies could be changed into other forms and are not lost, the following relations can be written:

Energy = magnetic energy = electrical energy = kinetic energy = potential energy = radiant energy

$$E = E_B = E_E = E_K = E_U = E_R \tag{8.30}$$

$$E = q(\vec{v} \times \vec{B}) \cdot \vec{d} = RI^2t = \frac{1}{2}mv^2 = mgd = nh\vartheta \tag{8.31}$$

The Electron-tank is an abundant, huge, clean and high source of energy, in which a large amount of electrons are placed in a very small space and could produce a lot of energy.

One kilogram Electron-tank has 10^{16} j of energy, which is equal to the consumed electricity of a city for several months.

In order to propel a spaceship, it is enough to design engines that have the ability to emit particles such as photons, electrons, etc. As a result of the reaction of the emission of particles, a reaction force will create that moves the spaceship.

It should be noted that in vacuum space, by using the impulse of particles that have a speed close to the speed of light, it is possible to produce energy by which a spaceship could reach the speed close to the speed of light.

$$E_{\text{Tot}} = N \times n\left(\frac{1}{2}mc^2\right) \times t \tag{8.32}$$

Where E_{Tot} is the total produced energy in terms of t, N is the number of engines, n is the number of particles per second and t is the time.

In which the total energy is equal to multiply of the energy of each particle, the number of particles per second, the number of engines of the spaceship and the time. In vacuum space, the energy entered into the spaceship increases by the time and in fact increases its speed.

In fact, it can be said that at the proper time, the speed of spaceship can reach to a fraction of the speed of light. Assuming that it can reach 0.01 of light speed, the round trip from Earth to Mars can be completed within 24 hours.

Notice:

Considering that the spaceship wants to travel at a speed close to the speed of light, its safety is so important, since small objects have many destructive effects at high speeds.

For the safety of spaceship and its crew, anti-gravity plates must be manufactured as a protector.

For example, we calculate the speed of a spaceship with the following specifications:

M (Mass of the spaceship): 10,000 tons
n (number of electrons per second): 10^{30}
N (number of engines): 10
t (time): 3600 s
So we have:

$$E_{\text{Tot}} = N \times n \left(\frac{1}{2}mc^2\right) \times t \tag{8.33}$$

$$E_{\text{Tot}} = 10 \times 10^{30} \left(\frac{1}{2} \times 10^{-30} \times (3 \times 10^8)^2\right) \times 3600 \tag{8.34}$$

$$\Rightarrow E_{\text{Tot}} = 1.62 \times 10^{21}\,\text{J}$$

$$E_{\text{Tot}} = \frac{1}{2}Mv^2 \tag{8.35}$$

$$\Rightarrow 1.62 \times 10^{21} = \frac{1}{2} \times 10^7 \times v^2$$

$$\Rightarrow v = 1.78 \times 10^7\,\text{m/s}$$

According to the above calculations, it is possible to design a spaceship with a mass of 10,000 tons, which could travel from Earth to Mars with 10% of its fuel, return with the same amounts, and reserve 80% of fuel in a very short time, with a successful displacement.

It should be noted that in vacuum space, by using the impulse of particles that have a speed close to the speed of light, it is possible to produce energy by which a spaceship could reach the speed close to the speed of light. Therefore, in order to propel

a spaceship, it is enough to design engines that have the ability to emit particles such as photons, electrons, etc. As a result of the reaction of the emission of particles, a reaction force will create that moves the spaceship.

In this case, the total energy of spaceship is equal to multiply of the energy of each particle, the number of particles per unit of time, the number of engines of the spaceship and the time, that in vacuum space, the energy entered into the spaceship increases by the time and in fact increases its speed until it could travel at a speed close to the speed of light.

Considering that the spaceship wants to travel at a speed close to the speed of light, its safety is so important, since small objects have many destructive effects at high speeds. For the safety of spaceship and its crew, anti-gravity plates must be manufactured as a protector.

8.1.8 Development of Clean Energy Power Plants Utilising the Resonance Phenomenon (Kurush Fission Phenomenon)

Let's first outline a new method for the fission of atoms of elements utilising the resonance phenomenon, before detailing the development of these power plants.

It has previously been demonstrated that electrons and nuclei of atoms traverse in specific, continuous, and closed orbital paths at speeds approaching the speed of light.

Given that electrons and nuclei have distinct orbits with specific frequencies in their repetitive motion, and considering the phenomenon of resonance in nature—such as one diapason causing another to vibrate, or an aircraft flying over a bridge causing it to vibrate due to matching frequencies—it is possible to disrupt the order and harmony of an atom's or nucleus's motion. This can be achieved by using lasers that are co-frequency with the rotational frequency of an electron around its nucleus or with the frequency of its nucleus, thereby causing the atom or nucleus to undergo fission.

It's also important to note that if we consider the frequency of an electron or nucleus of a particular atom to be, for example, f_1, and a laser with the same frequency f_1 is designed and emitted toward the atom, the resonance phenomenon will occur, leading to fission. According to the equations

$$C = lf \qquad \text{or} \qquad C = \frac{1}{T}$$

(where C is the speed of light, l is wavelength, and f is frequency), co-frequency implies identical wavelengths and an equal value of rotational radius (r) of the laser photons and the rotational radius of the electron or nucleus.

If the laser is co-frequency (same wavelength – same R_{mom}) with a specific electron, it can indeed collide at a specific location. However, if the frequencies differ, the probability

of collision decreases and may not happen at all. This is because a photon traverses in a helical path, like a spiral spring. When this photon is formed into a laser, it's as if a bundle of photons with a specific and distinct radius follows a helical path.

In essence, they effectively create a cylindrical shell. If the radius of the inner void of this cylindrical shell isn't equal to the rotational radius of the electron or nucleus of the atom, no collision will occur, or the probability of collision will be extremely low, and the bombarded particles will pass through this empty space or tunnel without colliding.

In fact, we can say that the laser's optimal effect is achieved when the laser particles in a specific region have an equal rotational radius to the electron or nuclear particles, maximising collisions. Based on this explanation and the frequencies of electrons and nuclei, we must build a specific laser to achieve the desired nuclear fission or atom breakdown through laser–atom collisions. nuclei and the rotational radius in visible-light lasers, these lasers are not suitable for fission. We need to develop a laser with a frequency of at least approximately 10^{18} Hz and conventional current lasers are not suitable.

For atomic nucleus fission using this method, we propose the use of gravity lasers or electron lasers.

Based on the above, various elements (atoms or nuclei) can be vibrated using special lasers, ultimately leading to their fission. Similar to how a significant amount of clean energy is released from Uranium through fission, a vast amount of clean energy can also be obtained from the fission of atoms or nuclei of many other elements by utilising the resonance phenomenon. In essence, power plants can be developed that generate abundant clean energy using this method (resonance).

8.1.9 What is an Electron Tank and Its 10 Diverse Applications in the Universe?

Utilisation in Nanotechnology, Such as the Construction of Smart Wrist Phones

According to the previous article, "A great revolution in producing affordable, abundant, convenient, clean and ... energy so that one kilogram of it could supply the power of moving a machine for years !" which is proposed by Saleh Research Group, offers a highly efficient and compact energy solution. Its key advantage lies in providing a substantial amount of energy within a very small volume. This makes it particularly well-suited for applications like smart wrist mobiles, where space is at a premium. The significant energy density of the Electron Tank could allow these devices to operate for many years without needing to be recharged.

Use as an Energy Supply Source for Spacecraft, Starships, Space Stations, etc.

Given the significant need for high energy in a small volume and with low weight for extended periods in spacecraft, spaceships, and space stations, the Electron Tank presents itself as the optimal solution for these applications.

Use as an Energy Supply Source in Electric Vehicles, Electric Trains, Aircraft, etc.

In today's modern world, public transportation is heavily utilised, and securing its energy supply poses a major challenge for humanity. Considering the numerous advantages of the Electron Tank, it's the best option for powering these vehicles.

Use as a Backup Energy Supply in Domestic or Industrial Power Stations, etc.

Power plants, which are responsible for supplying energy to an entire system, may occasionally go offline for various reasons (e.g., maintenance, renovation). During such times, a suitable temporary replacement for the energy supply is needed. The Electron Tank could be an ideal option for this purpose.

Supplying Energy to Portable Medical Equipment

Due to the widespread use of portable medical equipment and its critical importance in healthcare, especially during emergencies and outside clinical environments, a constant energy supply for these devices is essential. The Electron Tank is the best means to achieve this.

In the Construction of UFOs

UFOs are a fascinating and increasingly global area of interest, with many countries seeking to leverage this technology. Given the critical need for an energy supply for such devices, the Electron Tank is proposed as a solution for powering UFOs.

In the Design of Dream Houses

Dream houses are completely self-sufficient residences capable of meeting all their basic needs, including energy and water. They might even incorporate anti-gravity panels for easy portability and be earthquake-resistant. One way to achieve these features is through the use of an Electron Tank.

In Agricultural Colonies

In agro-industrial complexes, where various forms of energy, including light, heat, electrical, and fossil fuels, are often required, the Electron Tank can serve as the best alternative to the aforementioned energy sources.

For Obtaining Clean Water from the Air

The provision of clean water, particularly in arid and dry regions and other areas, is a pressing concern for humanity today. Devices can be developed to extract water from atmospheric humidity for various uses, and the Electron Tank can power these devices.

As an Energy Source for Lamps to Produce Artificial Light for Plant Growth on Earth, Underground, Spacecraft, and Beyond

For supplying energy to produce artificial light for plant growth in spacecraft, underground, on Earth, or in other locations, the Electron Tank is the best option due to its numerous advantages.

8.2 Summary

The aforementioned sections introduce a novel energy storage concept termed the "Electron Tank," based on the high-density storage of significant electron masses within a minimal volume. The fundamental premise posits that the kinetic energy of electrons, particularly at ultra-high velocities, can generate immense energy density; thus, a minute quantity of electrons could potentially power vehicles and various systems for extended durations.

Consequently, the Electron Tank is proposed as a potent alternative to conventional energy sources. Its versatile applications range from electric vehicles and trains to spacecraft, portable medical devices, backup power plants, self-sufficient homes, agricultural colonies, and systems for water harvesting and artificial lighting.

Furthermore, the text explores speculative advancements enabled by this technology, such as long-lasting wearable devices, anti-gravity plates, UFOs, and high-speed interstellar travel, all positioning the Electron Tank as a clean, compact, and high-capacity energy source. In essence, the Electron Tank is presented as a potentially revolutionary technology for the future of human energy and transport.

Chapter 9

Hubble's Law and the Rotational Nature of the Universe

9.1 Introduction

In the early decades of the twentieth century, a fundamental transformation occurred in the human understanding of the structure and dynamics of the cosmos. The observations made by American astronomer Edwin Hubble in 1929 mark a turning point in the history of cosmology. By analysing the optical spectra of distant galaxies, he identified the phenomenon of redshift, discovering that most galaxies appear to be receding from Earth and that there is a direct relationship between their distance and their recession velocity. This relationship, known today as Hubble's Law, is expressed as follows:

$$v = H_0 \times d \tag{9.1}$$

This discovery provided the foundation for the formulation of the theory of the expanding universe and, subsequently, the Big Bang model. According to this view, space itself is expanding, and galaxies are moving away from one another as a result of this expansion. Consequently, the current universe is not static, but rather dynamic and in a state of constant evolution.

Despite the remarkable success of this model in explaining many cosmic phenomena, more precise data obtained from ground-based observatories and space telescopes in recent decades have raised new questions regarding the origin and true nature of these observed velocities. Is the redshift of galaxies solely due to the linear expansion of space, or could it be a reflection of a more fundamental and structural type of motion on a cosmic scale?

In this chapter, while reviewing the historical background and theoretical foundations of Hubble's Law, a physical analysis of the data and galactic velocity patterns will be conducted to allow for broader interpretations of this law to be examined. The aim is to demonstrate that Hubble's Law may, beyond being a linear relationship between

distance and velocity, carry deeper information regarding the order, structure, and overall dynamics of the universe.

9.2 History of the Discovery of Hubble's Law

At the beginning of the twentieth century, the scientific worldview was still under the influence of the Newtonian static perspective. Most astronomers imagined the universe to be a fixed collection of stars and galaxies situated within an infinite and unchanging space. However, alongside the advancement of observational tools and the emergence of more precise telescopes, signs appeared that challenged this perception.

In 1912, the American astronomer Vesto Slipher, through the study of the optical spectra of certain spiral nebulae, discovered that their spectral lines had shifted towards longer wavelengths compared to standard lines. This phenomenon, which was later termed "redshift", indicated that these objects were moving away from Earth. At that time, it was not yet clear whether these nebulae were truly independent galaxies or merely parts of the Milky Way.

Using the 100-inch Mount Wilson telescope in California during the 1920s, Edwin Hubble was able to identify Cepheid variable stars within some of these nebulae. By using the relationship between the pulsation period of these stars and their absolute magnitude, Hubble calculated the true distance of these nebulae and demonstrated that they were much further away than the Milky Way. Thus, it became evident that the universe was far larger than previously imagined.

Hubble then measured the distances of a large number of galaxies and compared them with Slipher's redshift data. The result of this investigation was astonishing: he observed that the apparent recession velocity of the galaxies was proportional to their distance. This finding was published in 1929.

The discovery of Hubble's Law marked the end of the "static universe" hypothesis and the beginning of a new era in cosmology. Following this, Alexander Friedmann and Georges Lemaître, using Einstein's equations of general relativity, proposed dynamic models of the universe in which space could expand or contract. The Big Bang theory, built upon these models, described the universe as the result of an initial explosion and as being in a state of continuous expansion.

Despite the widespread acceptance of this theory, some new observational data in recent decades have shown that galactic velocities are not always consistent with a simple linear expansion model. This point will be subject to rigorous analysis in the present chapter to clarify whether Hubble's Law merely expresses the linear expansion of space, or if it may be a sign of a type of organised and rotational motion on a cosmic scale.

9.3 The Concept of Hubble's Law

Hubble's Law is one of the most fundamental relationships in cosmology and demonstrates that the universe is expanding.

According to this law, the recession velocity of galaxies from an observer is proportional to their distance.

$$v = H_0 \times d \tag{9.2}$$

The galactic velocity is denoted by V (km/s),
where H_0 is the Hubble Constant, expressed in units of s^{-1},
and d represents the distance of the galaxy from the observer in Megaparsecs (Mpc).

One parsec (an astronomical unit) is equivalent to the distance light travels in approximately 3.26 years, or roughly

$$3.085 \times 10^{16}\,\text{km}. \tag{9.3}$$

9.4 Determining the Hubble Constant

To determine the value of the Hubble Constant, two quantities must be measured for a given set of galaxies:

9.4.1 Galactic Recession Velocity

The recession velocity of a galaxy is measured by determining the redshift of its optical spectrum:

$$v = c \times z \tag{9.4}$$

where C is the speed of light and Z is the redshift, defined by the formula:

$$z = \frac{\lambda_{\text{Observed}} - \lambda_{\text{Real}}}{\lambda_{\text{Real}}} \tag{9.5}$$

9.4.2 Galactic Distance

Measuring galactic distance is more challenging and requires the use of the "Cosmic Distance Ladder". The distance ladder consists of the following stages:

1. Parallax: Used for nearby stars within the Milky Way.

2. Cepheid Variables: Stars that possess a specific relationship between their absolute magnitude and their luminosity pulsation period.

3. Type IA Supernovae: Since they all share a nearly identical absolute magnitude, they are used as "standard candles" for measuring distances to far-off stars.

4. Other Methods: Such as galaxy clusters, gravitational waves, or the Cosmic Microwave Background (CMB).

By collecting a large dataset of velocities and distances, a plot of velocity against distance is constructed, and a line of best fit is drawn. The gradient (slope) of this line determines the value of the Hubble Constant.

Modern precise measurements have determined the value of the Hubble Constant to be between 67 and 74 km/s/Mpc.

Through a rigorous examination of Hubble's Law, significant and intriguing conclusions can be reached, including:

1. The justification of the sphericity and the rotation of the Universe by Hubble's law

2. The calculation of the real radius of the Universe and its actual rotational velocity by Hubble's law

9.4.3 The Justification of the Sphericity and the Rotation of the Universe by Hubble's Law

If we assume that the Universe is spherical and in addition to increasing its radius, it also has a rotational motion around its axis, its velocity equations can be written as follows:

Total Velocity of Universe = Linear Velocity + Rotational Velocity

$$\vec{V_T} = \vec{V_r} + \vec{V_l} \tag{9.6}$$

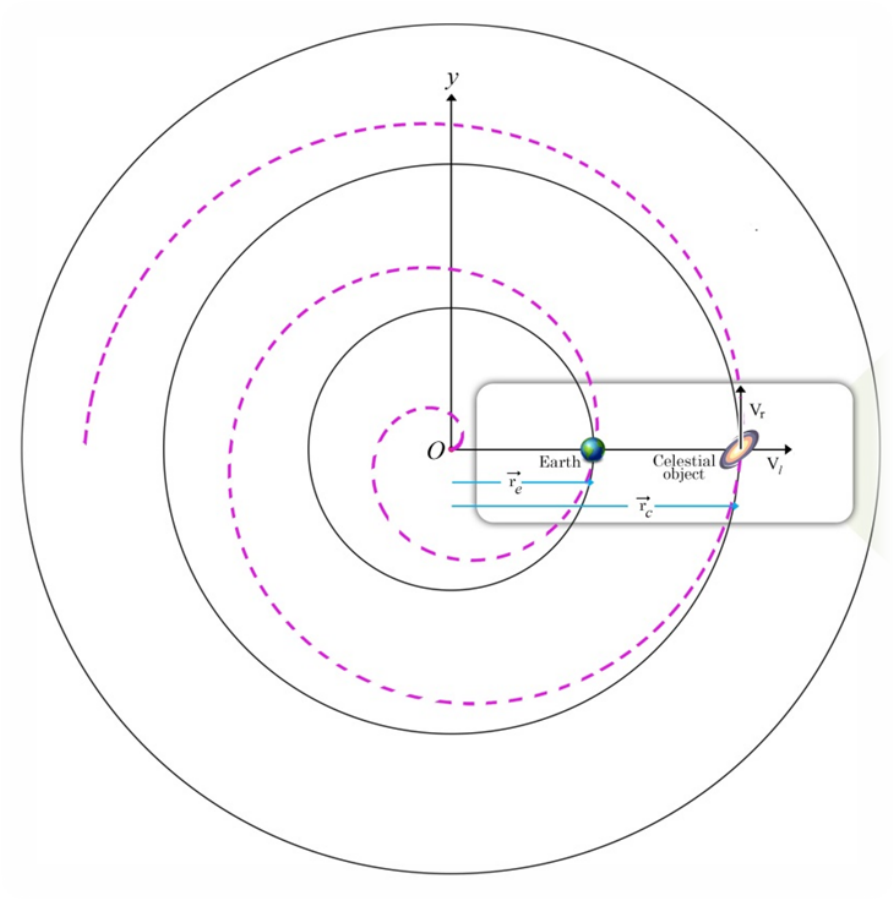

Figure 9.1: The Total Velocity of the Universe Is Equal to the Sum of Its Linear Velocity and Rotational Velocity

Linear Velocity ($\vec{V_l}$)

After the Big Bang, all the Universe particles have been released by the initial energy and ejected in a projectile motion. In other words, due to the projectile motion of the Big Bang, an initial energy have been given to the particles and they have been ejected at a very high speed and after billions of years or at the same time the homogeneity of the Universe, they have reached a relative equilibrium and after it, have continued to move at a constant speed "L" and now have the same constant value:

$$V_l = L \tag{9.7}$$

Rotational Velocity ($\vec{V_r}$)

At the moment of Big Bang, there was another type of motion, namely rotational motion. In this motion, the rotational velocity depends on two parameters: angular velocity (ω) and rotational radius (r):

$$V_r = \omega r \tag{9.8}$$

However, due to the nature of the initial projectile motion of the particles, they had also an initial rotational speed and over time and after the Universe became homogeneous, their angular velocity (ω) became constant. In fact, it can be said that after the Universe homogeneity, that is the same relative calm, balance, harmony, uniformity ... of the universe, the rotational motion has also got a uniform angular velocity (ω).

But the Universe is expanding at a constant linear velocity and over time the radius of the Universe, simply put, rotational radius (r), increases. So, in fact, our rotational velocity ($\vec{V_r}$), which is affected by both the angular velocity parameter (ω) and the rotational radius (r), increases without any force being applied to it. So the general calculation relation of the Universe velocity can be simplified as follows:

$$V_T = \omega r + L \tag{9.9}$$

Hubble's law, on the other hand, describes the velocity of a galaxy in the Universe, and the general calculation relation is as follows:

$$V_H = HD \tag{9.10}$$

Now we calculate the velocity of the Universe for a galaxy and correspond it to the velocity in Hubble's law:

$$V_T = \omega r + L \tag{9.11}$$

$$V_H = HD + 0 \tag{9.12}$$

Comparing the above two formulas, it is clear that dimension of "D" is equal to dimension of "r" and dimension of "H" is equal to dimension of "ω". In fact, we can say that "D" is the same "r" that has the length dimension and "H" is the same "ω" that both have time inverse dimension. And since the value of the linear velocity is constant, the linear velocity of the galaxy, in the formula obtained by Hubble, is zero relative to the Milky Way galaxy.

Calculation Method of the Hubble Constant

The method of calculating the Hubble's constant is that the slope of the velocity-location diagram of the observed galaxies is considered as the Hubble's constant. Therefore, the relation can be written as follows:

$$\omega_1 = \omega_2 = \omega_3 = \cdots = \omega_n = \frac{V_{r_1}}{r_1} = \frac{V_{r_2}}{r_2} = \frac{V_{r_3}}{r_3} = \cdots = \frac{V_{r_n}}{r_n} = H_1 = H_2 = H_3 = \cdots = H_n \tag{9.13}$$

According to Hubble's experimental law $V_H = HD$ and the Hubble's constant calculation method, for galaxies which their linear velocities are in the same direction and therefore their linear velocities relative to each other are zero, the value of H is equal to their angular velocity (H) or the same (ω).

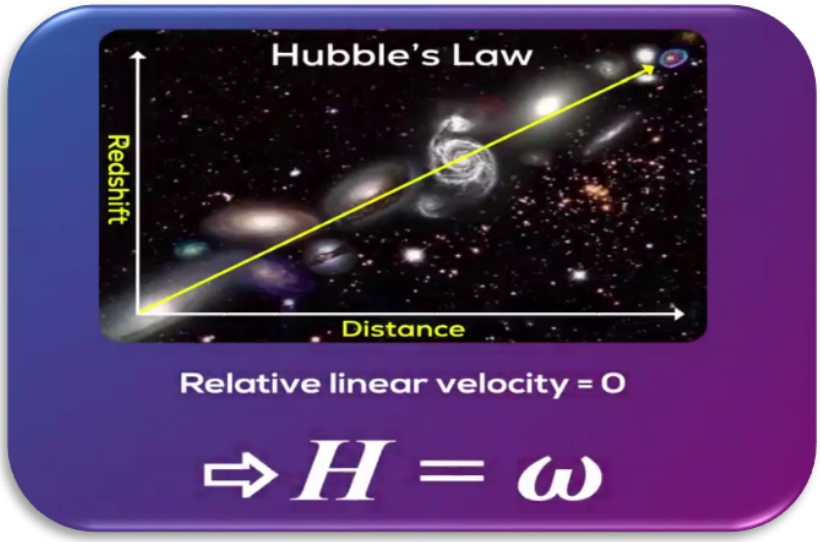

Figure 9.2: The value of H is equal to angular velocity (ω)

Notice:

Based on the above relations and explanations, it can be said that Hubble's law calculates the rotational velocity of galaxies around the center of the Universe and also proves that the Universe is approximately spherical and rotates, or we can say that Hubble's law shows the algebraic value of the rotational (tangential) velocity of cosmic objects relative to an earthly observer in the universe.

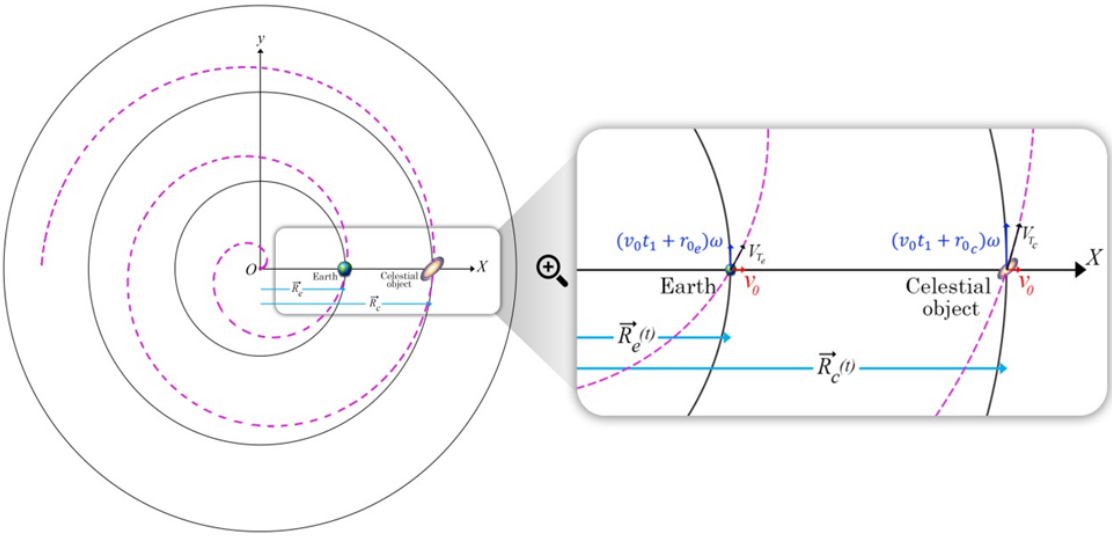

Figure 9.3: Hubble's law as a description of galactic rotational motion in a spherical Universe.

9.4.4 The Calculation of the Real Radius of the Universe and Its Actual Rotational Velocity by Hubble's Law

The energy of the Big Bang can be obtained using the Monte Carlo method, which was originally developed for calculating the binding energy of a neutron star. Assuming that the total mass of the Big Bang consists entirely of neutrons, this method allows us to calculate the total energy at a time very close to the Big Bang, when the radius was approximately 100 km.

A brief summary of these calculations is provided in this chapter. For further information regarding the Monte Carlo method and its application, you may refer to the article [Insert Reference] or Chapter Ten (The Big Bang).

$$\rho_o = 2.3 \times 10^{17} \text{ kg/m}^3 \tag{9.14}$$

$$\rho = 2.38 \times 10^{37} \text{ kg/m}^3 \tag{9.15}$$

$$a = 13.4 \text{ (MeV)}, \qquad b = 5.62 \text{ (MeV)} \tag{9.16}$$

$$\alpha = 0.514, \qquad \beta = 2.436 \tag{9.17}$$

In this context, a, b, α, and β are free and independent parameters, ρ represents the density of the Universe near the time of the Big Bang, and ρ_o represents the density of a neutron.

$$n = \frac{m_u}{m_n} = 2.6 \times 10^{79} \tag{9.18}$$

where m_u is the mass of the Universe, m_n is the mass of a neutron, and n is the total number of neutrons in the Universe, based on the assumption that the entire mass of the Universe is composed of neutrons.

$$E_l(\rho) = a\left(\frac{\rho}{\rho_o}\right)^{\alpha} + b\left(\frac{\rho}{\rho_o}\right)^{\beta} \tag{9.19}$$

$$E_t(\rho) = n \times E_l(\rho) \tag{9.20}$$

$$E_l(\rho) = 13.4\left(\frac{2.38 \times 10^{37}}{2.3 \times 10^{17}}\right)^{0.514} + 5.62\left(\frac{2.38 \times 10^{37}}{2.3 \times 10^{17}}\right)^{2.436} \tag{9.21}$$

$$E_l(\rho) \cong 5.7 \times 10^{48}\ (\text{MeV}) = 9.1 \times 10^{35}\ \text{J} \tag{9.22}$$

The binding energy $E_l(\rho)$ of each neutron in a neutron star is given by:

$$E_t(\rho) = n \times E_l(\rho) \tag{9.23}$$

$$\Rightarrow E_t(\rho) = 2.6 \times 10^{79} \times 9.1 \times 10^{35}\ \text{J} \tag{9.24}$$

$$= 2.3 \times 10^{115}\ \text{J} \tag{9.25}$$

For further considerations, we consider the total energy equal to 10^{110} J. So we can write the following relations:

$$E_T = 10^{110}\ \text{J} \tag{9.26}$$

$$E = \frac{1}{2}mv^2 \tag{9.27}$$

Where "m" is the total mass of the universe and it equals to 10^{53} kg. So we have:

$$10^{110} = \frac{1}{2} \times 10^{53} V_l^2 \tag{9.28}$$

$$\Rightarrow v_l \cong 10^{28} \text{ m/s} \tag{9.29}$$

Therefore, the linear velocity of the Universe is about 10^{28} m/s.

On the other hand, the lifespan of the Universe is 14 billion years. So we can write:

$$v_l = v = \frac{d}{t} \Rightarrow d = r_U = 10^{28} \times 1.4 \times 10^{10} \tag{9.30}$$

If we change the year to second we have:

$$r_u = 4 \times 10^{45} \text{ m} \tag{9.31}$$

As a result, the current radius of the Universe (r_U) is about 10^{45} meters.

If we use the Hubble's law that gives us the rotational velocity of the Universe, the rotational velocity at the edges of the Universe should be about:

$$V_H = HD = 2.4 \times 10^{-18} \times 10^{45} \tag{9.32}$$

$$\Rightarrow V_h = V_r = 2.4 \times 10^{27} \text{ m/s} \tag{9.33}$$

Comparing the linear and rotational velocity of the Universe with the speed of light ($C = 3 \times 10^8$ m/s), we would see that the linear and rotational speeds of the Universe are now more than 10^{18} times of the speed of light:

$$V_l \cong 10^{18} C \tag{9.34}$$

$$V_r \cong 10^{18} C \tag{9.35}$$

Furthermore, the rotational motion of the universe can be demonstrated through another simple argument, using the ratio of galactic velocities obtained by the Hubble Telescope.

Accepting the Big Bang theory—whereby celestial objects were dispersed in all directions by the initial explosion—allows us to understand that the velocity differences observed through telescopes cannot result from linear motion alone. According to physical laws, the linear velocities of objects originating from the Big Bang should be identical (or differ only marginally) relative to one another. Yet telescopic observations demon-

strate a very different scenario. From the observer's perspective (the telescope), one would expect $\Delta V = 0$ for galaxies along the same line of sight.

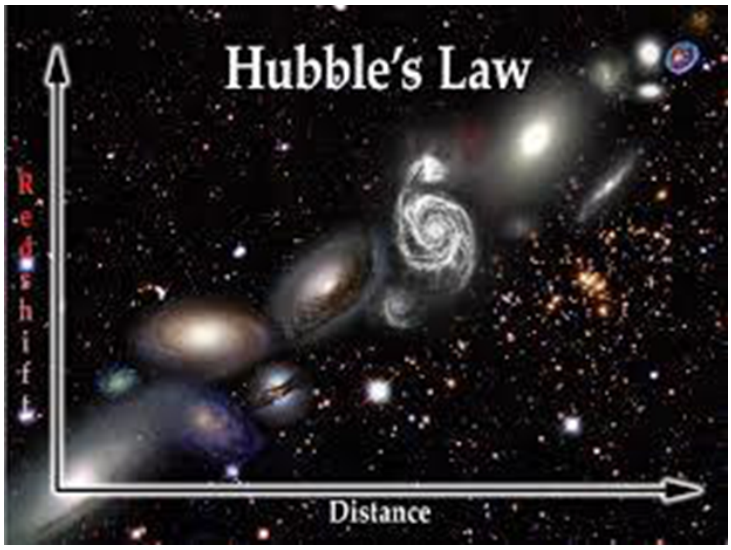

Figure 9.4: Hubble's law

However, telescopes reveal significant velocity differences between galaxies. The rotational motion of celestial objects accounts for these velocity disparities.

To demonstrate this point, consider a motorway where vehicles cannot exceed 100 km/h due to imposed limits. Regardless of a vehicle's power capacity, it cannot surpass its designated speed limit. Yet telescopes detect velocities approaching the speed of light (C) for celestial objects. This provides a straightforward explanation: the observed velocity differences arise from rotational motion, rather than linear motion.

Galactic motion comprises two components: linear and rotational movement. This explanation readily demonstrates that the observed velocity differences result from rotational motion. For galaxies aligned along the same trajectory, the linear velocity difference is either negligible or non-existent, and the substantial velocity disparities cannot be attributed to linear speed—this marked difference is certainly due to rotational velocity.

9.5 Ten Useful Applications of Hubble's Law

1. **Calculating the Tangential Velocity of Celestial Objects in the Universe**

   Based on the aforementioned arguments, it has been demonstrated that the velocity of celestial objects obtained via Hubble's Law—contrary to the long-held assumptions of astronomers—is, in fact, their tangential velocity rather than their linear velocity.

2. **Defining and Calculating the Universal Constant**

In 1929, by combining his own observations with data from other astronomers, most notably Vesto Slipher, Edwin Hubble discovered a relationship between the distance of galaxies and their velocity, which is known today as Hubble's Law. This relationship led to the calculation of the Hubble Constant (H).

3. **Proving the Existence of Rotational Motion in the Universe**

   In light of the points discussed above, it has been established that Hubble's Law represents the rotational velocity of celestial objects, thereby serving as evidence for the rotation of the Universe itself.

4. **Calculating the Rotational Velocity of the Universe**

   As previously stated, it has been proven that the Hubble Constant is, in essence, the angular velocity of celestial objects. Given the homogeneity of the Universe, Hubble's Law consequently represents the rotational or angular velocity of the entire Universe.

5. **Calculating Galactic Velocities in the Universe**

   The primary utility and application of Hubble's Law ($V = HD$) is determining the velocity of celestial objects, a principle that holds true for galaxies.

6. **Demonstrating the Exceedance of the Speed of Light via Hubble's Law**

   According to Hubble's Law ($V = HD$), and considering that the radius of the observable universe is approximately 5×10^{26} m, a simple calculation demonstrates that at the edges of the cosmos, and indeed in other regions, the velocity of celestial objects exceeds the speed of light.

7. **Proving the Expansion of the Universe**

   Since Hubble's Law states that $V = HD$, it follows that as the distance (D) increases, the velocity (V) also increases. This correlation inherently indicates the expansion of the Universe.

8. **Deriving the Equations of Motion for Celestial Objects in the Universe**

   By utilising the Hubble Constant—which, according to the established relations, represents the angular velocity of the Universe—and the initial energy of the Universe obtained through the Monte Carlo method, the general equations of motion for celestial objects at various moments can be derived. These equations are detailed in the article within Chapter Ten (The Big Bang) of this book.

9. **Deriving the Energy Equations of Celestial Objects in the Universe**

Similar to the eighth point, where the velocity equations for each celestial body can be obtained, the energy equations of the Universe at any given moment can be derived using the equations of motion.

10. **Determining the Structural Model and Shape of the Universe**

    Based on the findings of this chapter and the papers published by the Saleh Theory Group, the shape and structure of the Universe can be determined using the equations of motion and the Hubble Constant.

9.6 Summary

Hubble's Law, regarded as an empirical and valid law, is believed by scientists to represent the linear velocity or the recession of celestial objects from one another. However, through the application of simple and logical reasoning and mathematical relations, it has been proven that this law actually denotes the rotational or tangential velocity of celestial objects, rather than their linear velocity. Furthermore, this law describes the rotation of the cosmos around a centre and implies the existence of velocities exceeding the speed of light for objects located at the edges of the cosmos.