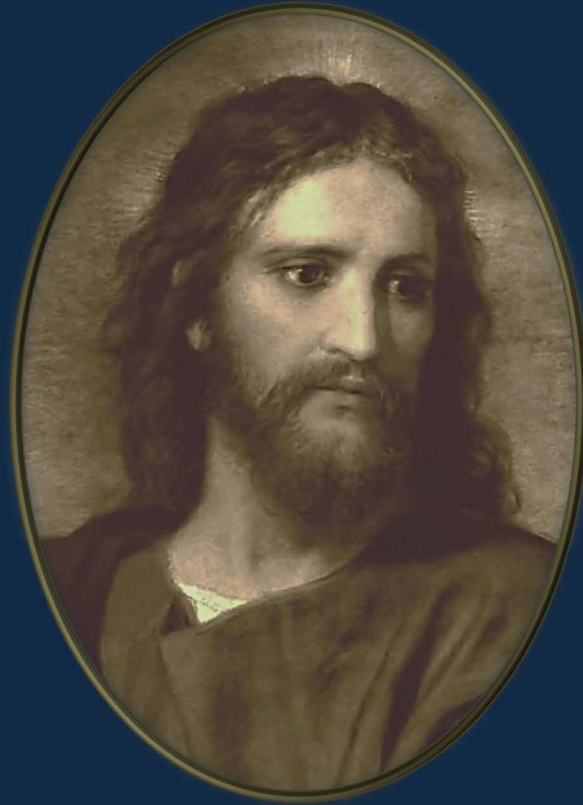




The Christian Academy of Truth



*"And ye shall know the truth, and the
truth shall make you free"*

John 8:32

Chapter 2: The Principles of Truth



Published by the International Publications
Board of The Christian Academy of Truth

Copyright © 2021 The Christian Academy of Truth. All rights reserved.

Chapter 2: The Principles of Truth. First Edition.

These teachings may be freely distributed but may not be amended or altered in any form or by any means without the permission in writing from the International Publications Board of The Christian Academy of Truth.



Important Reminder

As mentioned in the Introduction to these teachings, the eight chapters of The Christian Academy of Truth have been compiled in a very specific sequence and need to therefore be studied in none other than that particular sequence. That is, from the beginning of Chapter 1 all the way through to the end of Chapter 8. Lest one will become confused and thusly unable to correctly understand all of the information conveyed.

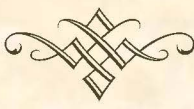
To read the Introduction, go to:

<https://www.thechristianacademyoftruth.org>



“The human mind can no faster be re-spiritualized than by the progressive understanding that the whole of creation is a cosmological expression of God”





The Introduction to this Chapter

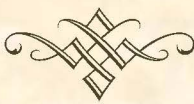
This second chapter serves to factually explain not only the true nature of creation but also the true Origin of creation. Or, as already mentioned in the previous chapter, the principles of Truth in this second chapter will be exposing the deceptiveness of the outer appearances of all worldly things by way of revealing their inner natures to actually consist of the mental powers of God and their innermost essence to actually be the spirit of God. As such, one's meticulous understandings of that science of Life will reveal there to be but only one all-pervasive Life, that the whole of creation is really and truly a cosmological expression of God. As can even so be surmised from the notion that, since the simplest meaning of the word 'science' is 'knowledge' and the causal meaning of the word 'Life' is 'God', the term 'the science of Life' is actually synonymous with the term 'the knowledge of God'.

*The contents of this second chapter have been compiled in such a way as to convey that science of Life (that knowledge of God) in an impartial way, i.e. so as to relay the **spiritual** significances of all the relevant scientific facts without there being any **religious** biases or prejudices. Thusly rendering it the only chapter of these teachings that is entirely devoid of all biblical verses.*

Whilst studying its contents, the student will find there to be but very few discrepancies between the basic principles of Truth and the scientific information published in present-day encyclopedia by reason that such scientific information is mostly based on well-proven facts. Yet he / she will find there to be major discrepancies between the advanced principles of Truth and the information published in present-day scientific journals by reason that the information published in such journals is often based on all kinds of unproven theories such as the Big Bang Theory and The General Theory of Relativity.

Now, by reason that there are not just a few but many true-to-Life aspects and interrelationships pertaining to the true nature and the true Origin of creation, this chapter is far more extensive than what the average seeker of Truth might expect. Yet, after duly contemplating all of such aspects and interrelationships, the student will find the spiritual road of Truth to God to actually be but an exceedingly short and straight and narrow road that is only spanning the distance from the outer appearances of all worldly things through their inner energetic natures to their innermost spiritual essence.





The Format of this Chapter

To assist those students who are not yet familiar with the relevant scientific facts, this chapter is utilizing the following colour-codings:

- all newly introduced keywords appear in this **red** print
- all straightforward explanations appear in this black print
- all more-intricate explanations appear in this **green** print, thusly enabling one to adopt a two-staged study approach (i.e. to first study this chapter in the black print only and thereafter in its entirety)

Furthermore note that the **tannish** colour-coding that was introduced in the previous chapter is again occasionally being used to convey two complementary or contrasting notions in one and the same sentence.

Because of this chapter imparting the principles of Truth almost exclusively from a process-related perspective, the student will find it to contain but very few scientific formulas. Yet, whenever such a formula must necessarily be presented, then it is important for the student to try to most profoundly understand the reciprocal relationships between its constants and its variables.

Special note

- a formula's **constant** is a quantity that is either invariable [such as the constant speed of light] or that is being kept invariable throughout a particular series of scientific tests
- a formula's **variable** is a quantity that is being incrementally changed throughout a particular series of scientific tests so as to assess the quantitative impact thereof on the formula's other variables

For example, the scientific formula $s = v \times t$ renders the spatial distance (**s**) travelled by an object at a velocity (**v**) over a certain period of time (**t**). Those conducting a series of tests might want to keep the distance travelled constant (the invariable) and incrementally change the velocity (the first variable) so as to measure the proportionate impact thereof on the time travelled (the second variable). In which case – if keeping the distance travelled constant – the higher (lower) the velocity, the proportionally shorter (longer) will be the time required for the object to travel across that distance.





The Study Methodology for this Chapter

By reason that this second chapter is imparting a vast amount of progressively more detailed information, it is essential for the student to strictly adhere to the following study methodology:

- ✓ *To avoid all kinds of confusion, study the contents of this chapter in none other than their presented sequence.*
- ✓ *Study neither too long nor too fast during any one study session, so as to allow your subconscious mind to appropriately assimilate (digest) every notion of the Truth.*
- ✓ *Before proceeding to a next section, always ensure that you are clearly understanding all of the facts conveyed in the previous sections.*
- ✓ *Always clearly envision what you learn in your mind's eye. Because the more you visualize all of the workings of the Truth, the sooner your subconscious mind will enable you to grasp the overall picture of the Truth.*

As such, the most effective way to study every main section in this chapter is to first uninterruptedly read through it so as to gain an overall impression of all its contents and to then:

- 1. duly contemplate every fact conveyed in the first paragraph*
- 2. duly contemplate every fact conveyed in the second paragraph*
- 3. duly contemplate all of the correlations between the facts in the first paragraph and the facts in the second paragraph*
- 4. duly contemplate every fact conveyed in the next paragraph*
- 5. duly contemplate all of the correlations between the facts in that next paragraph and all of the facts in the previous paragraphs*
- 6. keep on repeating steps 4 and 5 until you completed the study of that main section*

In this regard, note that the effectiveness of one's every study session can be greatly enhanced by way of:

- *one always selecting that period of the day for studying when the mind is most alert*

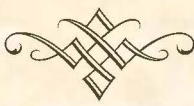
Some people find it easier to study in the morning, others during the course of the day, and still others in the evening. If studying in the evening, then it is recommended that one first listens to some soothing music for five to fifteen minutes so as to neutralize to a noticeable degree all of the emotional tensions that one might have accumulated during the day.

- *one scheduling every such session either before or at least two hours after a full meal*

For remember that whichever mental energies are being utilized to digest a full meal will not be available to the brain for studying.

- *one choosing a study environment where there are as few distractions as possible*

In this regard, note that a distraction is defined as 'any kind of disruptive event that is occasioning one to



lose one's concentration'. As such, to avoid the most common of such distractions, ask your family members to not interrupt your studying except it be for a genuine emergency.

- *keeping the brain and the mind fit for purpose by way of one maintaining a healthy lifestyle*

This practically means that one has to adhere to a natural diet, to maintain an effective exercise program, to keep a regular sleeping pattern, and to often practice the right kinds of stress management techniques.

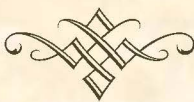
Now, to derive the maximum benefit from this chapter, it will be necessary for one to thoughtfully re-study all of its contents after three months, and again after six months, and annually thereafter. By reason that:

- *the first two revisions serve to transfer the newly acquired knowledge at first from one's short-term memory to one's medium-term memory and then from one's medium-term memory to one's long-term memory*
- *the annual revisions serve to ensure the ongoing retention of that knowledge in one's long-term memory, i.e. so as to enable oneself to always instantly recall whichever principles of Truth are applicable to any given situation or set of circumstances in the real world of Truth*

Let it lastly be mentioned that, whilst studying this chapter, one is to always maintain a clear distinction between the academic intent of these teachings and the ultimate verity of the infinite Truth. That is, from a purely spiritual perspective, there is but one infinite Truth but, in order for these teachings to factually explain all of the transcendental aspects of that but one Truth, they have to necessarily maintain an academic distinction between:

- ✓ *the deceptive appearances of all worldly things (cosmic delusion)*
- ✓ *their true energetic natures (the mental powers of God)*
- ✓ *their true spiritual Essence (the spiritual substance of God)*





The Contents of This Second Chapter

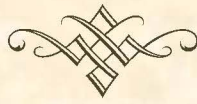
The contents of this chapter have been carefully sequenced in such a way as to assist the student to progress from a very superficial (mundane) understanding of the Truth to the most profound (spiritual) understanding of the Truth. During that transition, the student will find many of the explanations to be far more comprehensive than those of the contemporary scientists by reason that this chapter will be conveying not only the energetic aspects of the Truth but also the underlying mental and spiritual reasons for the occurrence of all such energetic aspects.

In this regard, let the student be reminded that the basic principles of Truth will be primarily explaining the structural aspects of creation while the advanced principles of Truth will be primarily explaining the operational interrelationships between all of such structural aspects.

The Basic Principles of Truth

Part I: The Structural Aspects of Ordinary Matter

- 1. The Four States of Ordinary Matter*
- 2. The Atomic Structure of Ordinary Solids and Liquids and Gases*
 - 2.1. The Generic Structure of Atoms*
 - 2.2. The Actual Size of Atoms*
 - 2.3. The Scientific Classification of Atoms*
- 3. The Subatomic Structure of Ordinary Solids and Liquids and Gases*
 - 3.1. The More Detailed Structure of Atoms*
 - 3.1.1. The Dynamic Configuration of the Orbital Electrons*
 - 3.1.2. The Variedly Energized States of the Electrons*
 - 3.1.3. The Subatomic Constituents of the Nucleus*
 - 3.1.4. The Variedly Energized States of the Three Major Quarks*
 - 3.1.5. The Distinction between Simple and Composite and Aggregate Subatomic Particles*
 - 3.2. The Concept of Isotopes*
 - 3.3. The Generic Concept of Photons*
 - 3.4. The Scientific Classifications of Subatomic Particles*
 - 3.4.1. The Classifications of Simple Subatomic Particles*
 - 3.4.2. The Classification of Composite Particles*
 - 3.4.3. The Classification of Subatomic Particles in terms of their Propagational Speed*
 - 3.5. The Standard Model of Particle Physics*



Part II: The Structural Aspects of Ordinary Energies

4. The Structural Configuration of the Electromagnetic Energies

4.1. The Wavelike Propagation and the Quantum Length of an Electromagnetic Energy

4.2. The Other Characteristic Features of an Electromagnetic Energy

4.2.1. The Frequency and Wavelength of an Electromagnetic Energy

4.2.2. The Different Kinds of Electromagnetic Energies

4.2.3. The Energy Content of Electromagnetic Energies

4.2.4. The Propagational Speed of Electromagnetic Energies

4.2.5. The Polarization of Electromagnetic Energies

Part III: The Structural Aspects of Ordinary Forces

5. The Scientific Classification of the Fundamental Forces of Nature

6. The Characteristic Features of the Four Fundamental Forces

6.1. The Relative Ranges of the Four Fundamental Forces

6.2. The Relative Strengths of the Four Fundamental Forces

Part IV: The Contemporary Cosmological Theories

7. The Present-Day Theories Pertaining to the Structural Composition of the Cosmos

7.1. The Theories Upheld by the Astrophysicists

7.1.1. The Assumed Existence of Dark Matter and of Dark Energies

7.1.2. The General Theory of Relativity

7.2. The Theory Upheld by the Quantum Physicists

8. The Present-Day Theory Pertaining to the Origin of the Cosmos

The Advanced Principles of Truth

Part V: The Spiritual Significance of Dark Matter

9. The Noumenon of God's Spiritual Substance

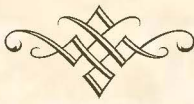
10. The Properties of God's Spiritual Substance

10.1. The Extremely High Inelasticity of God's Spiritual Substance

10.2. The Extremely High Conductivity of God's Spiritual Substance

10.3. The Extremely Low Resistivity of God's Spiritual Substance

11. The Fallacy of The General Theory of Relativity



Part VI: The Operational Nature of Dark Energies

12. The Three Major Kinds of Energies

12.1. The Potential Energies of God

12.2. The Dark Energies of God

12.3. The Electromagnetic Energies of God

13. The Impact of the Resistivity of God's Spiritual Substance on His Dark Energies

14. How to Superconsciously Experience the Dark Energies of God

Part VII: The Operational Nature of Forces

15. The Broadest Classification of all Natural Forces

16. The Basic Definition and the Characteristic Features of a Physical Force

17. The Basic Definition and the Characteristic Features of a Mental Force

18. The Synonymy of the Forces of Creation and the Forces of the Creator

Part VIII: The Operational Nature of Electromagnetic Energies

19. A Brief Review of the Spiritual Significance of all Electromagnetic Energies

20. How God Made all of His Electromagnetic Energies to Appear

21. An Expanded View of the Magnetic Aspects of an Electromagnetic Energy

22. A Variety of Definitions Pertaining to the Operational Nature of Energies

22.1. The Correlation between the Concept of Energy and the Concept of Forces

22.2. The Concept of Work

22.3. The Concept of Power

22.4. The Correlation between the Concept of Inertia and the Concept of Operational Mass

22.5. How to Maintain the Distinction between the Various Operational Masses

23. The True Origin of all Gravitational Forces

23.1. The True Reasons for the Emergence of all Conventional Gravitational Forces

23.2. The True Reasons for the Emergence of all Unconventional Gravitational Forces

24. The Three-Dimensional Aspects of an Electromagnetic Energy

Part IX: The Operational Nature of Subatomic Particles

25. The Electromagnetic Nature of Subatomic Particles

25.1. The Energetic Conversion of One Subatomic Particle into Another

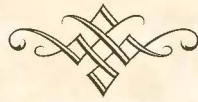
25.1.1. The Energetic Conversion of a Proton into a Neutron



- 25.1.2. *The Energetic Conversions of other Subatomic Particles*
- 25.2. *The Energetic Manipulation of Simple Subatomic Particles*
- 25.3. *The Phenomenon of Two Gauge Bosons Briefly Occupying the Same Volume of Space*
- 25.4. *The Scientific Significance of the Formula $E = mc^2$*
- 25.5. *The Non-Existence of Anti-Matter versus the Existence of Anti-Particles*
- 25.6. *The Dual Nature of Subatomic Particles*
- 26. *The Relative Energy Contents of the Steadily Appearing Subatomic Particles*
- 27. *The Angular Momentum of Subatomic Particles*
- 28. *The Origin of the Lorentz Force*
- 29. *The Magnetic Charge of Subatomic Particles*
- 30. *A Classification of the Scientifically Applied Gauge Group Theories*
- 31. *The Energetic Interactions between the Quarkonic Particles*
 - 31.1. *The Basic Modus Operandi of the Major Quarks*
 - 31.2. *The Basic Modus Operandi of the Gluons*
 - 31.3. *The Basic Modus Operandi of the W-bosons and the Z-bosons*
 - 31.4. *The Basic Modus Operandi of the Mesonic Quarks*
 - 31.5. *The Emergence of the Ghost Particles*
 - 31.6. *The Non-Existence of Gravitons*
 - 31.7. *The Colour Confinement of the Major Quarks*
 - 31.8. *The Overall Observed Effect of all the Quarkonic Interactions*
 - 31.9. *The Higgs Mechanism*
 - 31.9.1. *The Current Assumptions about the Higgs Bosons and the Higgs Mechanism*
 - 31.9.2. *The True-to-Life Significance of the Higgs Bosons and the Higgs Mechanism*
- 32. *The String Theories of the Quantum String Physicists*

Part X: The Operational Nature of Atoms

- 33. *The Concept of Valence Electrons*
- 34. *The Formation of a Molecular Bond*
- 35. *The Formation of an Ionic Bond*
- 36. *The Formation of a Metallic Bond*
- 37. *The Concept of Plasmas*
- 38. *The Molecular Structure of Organic Tissues*



Part XI: The Operational Nature of Solids and Liquids and Gases

39. The Forces that are Enabling the Metamorphic Changes

39.1. The Vibratory Forces

39.2. The Intermolecular Forces

39.3. The Gravitational Forces

40. The Modi Operandi of the Metamorphic Changes

41. Some Basic Definitions Pertaining to all Solids and Liquids and Gases

Part XII: The Spiritual Origin of the 'Physical' Cosmos

42. The Modus Operandi of One's Sensorial Experiences

42.1. The Basic Functionalities of the Five Human Senses

42.2. The Human Sense of Sight

42.3. The Human Sense of Hearing

42.4. The Human Senses of Taste and Smell

42.5. The Human Sense of Touch

42.6. The True Origin of All Sensorial Experiences

43. The True Significance of the Law of Energy Conservation

44. The Verity of Spiritual Creation versus the Falsity of the Big Bang Theory

44.1. The Reasoning that led to the Formulation of the Big Bang Theory

44.2. How to Correctly Understand the True Origin of Creation

45. How to Ascertain Oneself of the Perfect Unity of All Creation

46. The Reality of God versus the Deceptiveness of Cosmic Delusion

To Conclude this Second Chapter

An Overview of the Contents of the Third Chapter



The background of the image is a soft-focus photograph of a sunset or sunrise over a body of water. The sun is a bright, glowing orb on the horizon, casting a long, colorful rainbow-like reflection across the water's surface. The sky is a mix of light blue and pale yellow. In the foreground, there are dark, silhouetted trees and foliage on the left side, with some branches reaching towards the center. The entire scene is enclosed within a thin, dark brown border with decorative, slightly curved corners.

*The Basic
Principles of Truth*



Part I

The Structural Aspects of Ordinary Matter

WHAT THE STUDENT WILL LEARN FROM THIS PART

The factual nature of all ordinary solids and liquids and gases is completely unlike to how they are being visually perceived by reason that:

- ✓ *Every ordinary solid and liquid and gas is actually consisting of a vast number of microscopically small atoms*
- ✓ *Every atom is consisting of a nucleus around which are orbiting a number of electrons*
- ✓ *The nucleus of an atom is consisting of both protons and neutrons, excepting for the common hydrogen atom whose nucleus is consisting of but one proton*
- ✓ *Every such proton and every such neutron is consisting of a variety of constituent particles. The most powerful thereof are known as the quarks and the gluons and the W-bosons and the Z-bosons*

As such, notwithstanding the infinite variety of their outer appearances, all ordinary solids and liquids and gases are actually consisting of but a few different kinds of subatomic particles.





1. The Four States of Ordinary Matter

The term **ordinary matter** is referring to all mundanely known **solids** and **liquids** and **gases** and **plasmas**. Every which solid and liquid and gas and plasma is known to exhibit its own kind of nuclear and chemical and thermal and electrical and mechanical and metamorphic (shape-changing) properties.

Special note

Although most plasmas are really but highly energized gases, they are nevertheless classified as the fourth state of ordinary matter because of them often exhibiting different properties in their plasmic state than in their normal state. Such as air for instance, which is an electrical insulator in its normal state but an electrical conductor in its plasmic state. So, by reason that the structural configuration of a gas in its plasmic state is somewhat different to that in its normal state, it will be necessary to for now exclude all plasmas from the forthcoming explanations. That is, until the different kinds of plasmas are being explained in section 37.

2. The Atomic Structure of Ordinary Solids and Liquids and Gases

Every ordinary solid and liquid and gas is consisting of numerous tiny atoms. A tiny grain of salt, for instance, is actually consisting of several millions of such microscopically small atoms.

An ordinary solid or liquid or gas can consist of but one specific type of atom (then also referred to as **an element**) or of different types of atoms (i.e. of a variety of different elements).

Chemical scientists assigned a different chemical symbol to every kind of element (i.e. to every generic type of atom). To mention but a few of them: the chemical symbol for hydrogen is H, for helium He, for oxygen O, for silicon Si, for sulphur S, for argon Ar, for silver Ag (from the Latin 'argentum').

2.1. The Generic Structure of Atoms

Note that for the benefit of those who are not yet scientifically-minded, these teachings will be referring to a neutrally-charged atom – i.e. which has an equal number of protons and electrons – as a complete atom.

Every kind of complete atom is consisting of:

- a central **nucleus**, which is in turn consisting of a specific number of **protons** and of a variable number of **neutrons** (excepting for the nucleus of a common hydrogen atom which is consisting of but one proton)
- as many spherical **electrons** as the nucleus has protons, orbiting that nucleus at nearly the speed of light (at about 300,000 km/s)

In other words, the nucleus of a complete hydrogen atom is consisting of but one proton, around which is orbiting but one electron. The nucleus of every other complete atom is consisting of both protons and neutrons, around which entire nucleus are orbiting as many electrons as that nucleus has protons.

[View Figure 1](#)



2.2. The Actual Size of Atoms

The diametric size of the average kind of atom is about 200 picometers (about 0.0000002 millimeter). Within that atom, its nucleus (i.e. all of its protons and neutrons combined) is about 10 000 times smaller and its every electron is, furthermore, about 2 000 times smaller than the nucleus.

Special note

To fully appreciate these relative sizes: if the nucleus were to be a soccer ball and the electrons were to be, comparatively speaking, tiny grains of sand, then such tiny grains of sand would be encircling that soccer ball at a distance of about 1.1 kilometers.

This practically means that, from a volumetric perspective, every such atom is actually consisting of more than 99.9999999999 % so-called 'empty space' and of less than 0.000000000001 % subatomic particles.

Wherefrom can be surmised that, by reason that all solids and liquids and gases are but huge congregations of such extremely tiny atoms, every such solid and liquid and gas is actually consisting of more than 99.9999999999 % so-called 'empty space' and of less than 0.000000000001 % subatomic particles. Which is of course totally contrary to the way wherein all of such worldly things are being humanly perceived.

Because of a comparable ratio of 'empty space' to 'matter', the structure of a tiny atom is often likened to the structure of a gigantic solar system having one relatively tiny sun (the nucleus) around which are orbiting at enormous distances one or more relatively even tinier planets (the electrons). Two major differences being that the electrons are orbiting the nucleus at nearly the speed of light and that they are circumnavigating that nucleus in a three-dimensionally coordinated pattern.

2.3. The Scientific Classification of Atoms

As the student may already be aware of, *the periodic table of elements* is a tabular representation of the 118 different types of atoms (elements):

[View Figure 2](#)

3. The Subatomic Structure of Ordinary Solids and Liquids and Gases

When delving somewhat deeper into the world of the extraordinarily small, then all ordinary solid and liquid and gaseous substances are becoming even more unlike to how they are being sensorially perceived.

3.1. The More Detailed Structure of Atoms

3.1.1. The Dynamic Configuration of the Orbital Electrons

The electron shells

Depending on the number of its electrons, an atom can have up to seven *electron shells*.



From the innermost to the outermost, these electron shells were in the past known as K, L, M, N, O, P, and Q and now simply as 1, 2, 3, 4, 5, 6, and 7.

The first shell (i.e. the closest one to the nucleus) can hold up to 2 electrons, the second shell up to 8, the third shell up to 18, the fourth shell up to 32, the fifth shell also up to 32, the sixth shell up to 18, and the seventh shell up to 8. Most types of atoms, however, are holding less than these maximum numbers of electrons in one or more of their shells by reason that the arrangement of the electrons in their shells is dependent on a variety of factors such as:

- the nuclear composition of the atom*
- the energy content of the electrons*
- the dynamic outcome of the electrons' interactive forces*

For the purpose of these teachings, the following table should suffice to illustrate that basic concept:

View Figure 3

The electron sub-shells

*Every electron shell is said to have a specific number of **electron sub-shells**. The most common thereof are known as the s and p and d and f sub-shells:*

View Figure 4

The electron orbitals

*From a greatly simplified perspective, every electron sub-shell can be considered to have a number of **electron orbitals**, with the term 'an electron orbital' being defined as 'the probable path / trajectory followed by an electron around the nucleus'.*

View Figure 5

As such, the terms 'electron shells' and 'electron sub-shells' and 'electron orbitals' are but the specialized terms that scientists use to denote the spatial areas wherein and the trajectories whereupon the electrons are encircling the nucleus in a three-dimensional pattern.

3.1.2. The Variedly Energized States of the Electrons

The quantum physicists discovered that the electrons of an atom can be extraordinarily energized to such an extent that they are starting to exhibit very powerful properties. To maintain a distinction between such variedly energized states, it was decided:

- to still refer to them as **electrons** if they are not extraordinarily energized, i.e. when they are participating in low-strength energetic interactions as naturally occurring in one's daily environment*
- to call them **muons** after they have been significantly energized, i.e. when they are participating in medium-strength energetic interactions as artificially occurring in medium-strength particle accelerators and as naturally occurring during medium-strength cosmic events*



- to call them **tauons** after they have been greatly energized, i.e. when they are participating in high-strength energetic interactions as artificially occurring in high-strength particle accelerators and as naturally occurring during high-strength cosmic events

As such, all muons and tauons are really but differently energized electrons.

3.1.3. The Subatomic Constituents of the Nucleus

As previously mentioned, the nucleus of an atom is consisting of a number of protons and, excepting for a common hydrogen atom, also of a number of neutrons. Every such proton and every such neutron is in turn consisting of a number of even smaller subatomic particles known as:

- The three **major quarks**

A proton is said to have two up quarks and one down quark while a neutron is said to have one up quark and two down quarks. In this regard, note that a so-called up quark and a so-called down quark do have the same energetic nature but a different functionality in that – as will later be extensively explained – they are differently exhibiting their nuclear forces. Within the interior world of every proton and of every neutron, all of such quarks are – whilst maintaining their triangular positions – propagating themselves in one or other quark-shell at close to the speed of light.

[View Figure 6](#)

- A variety of **gluons**

*The gluons of a proton / neutron are said to intermediate the **strong nuclear forces** of the three major quarks. From a functional perspective, it is the strong nuclear forces of the gluons that are preserving the overall structure of the proton / neutron.*

- A variety of **W-bosons** and **Z-bosons**

*The W-bosons and the Z-bosons of a proton / neutron are said to intermediate the **weak nuclear forces** of the three major quarks. From a functional perspective, it is the weak nuclear forces of the W-bosons and the Z-bosons that are slowly but surely weakening the overall structure of the proton / neutron.*

In this regard, do note however that the strong nuclear forces are far more powerful than the weak nuclear forces and that they are thusly preventing the untimely disintegration of a proton / neutron.

- A variety of **mesons**

*Every meson is consisting of two **mesonic quarks** that are far smaller than the major quarks. One of which is deemed to be a normal mesonic quark and the other its so-called mesonic anti-quark:*

[View Figure 7](#)

Such mesonic quarks and anti-quarks will later be explained to also intermediate,



albeit to a much lesser extent than the gluons and the W-bosons and the Z-bosons, the strong and the weak nuclear forces within every proton / neutron.

- *A variety of so-called **ghost particles***

These have recently been acknowledged by quantum physicists not to be particles at all (i.e. in the conventional sense of the word 'particles') but to merely be some very faint transitorily-occurring force field alterations that are being occasioned by the dynamic energetic interactions between the three major quarks of a proton / neutron.

At this stage, nearly all quantum physicists are assuming every proton and every neutron to also consist of:

- *A variety of **gravitons***

It is currently believed that such gravitons are somehow exerting and / or intermediating all of the conventional gravitational forces in Nature. Contrary to that belief, the advanced principles of Truth in Part VIII will factually explain the emergence of all conventional gravitational forces to not be occasioned by such hypothetical gravitons but that they are the natural result of the extremely slow deterioration of all electromagnetic energies in Nature.

- ***Higgs bosons***

Although the actual existence of Higgs bosons has not yet been conclusively proven, they are nevertheless already postulated to somehow underlie the existence of all protons and all neutrons. This chapter will show such Higgs bosons to altogether constitute the undivided spiritual substance / spirit of God yet will, until that verity is factually endorsed in subsection 31.9.2, continue to refer to them as 'Higgs bosons' instead of to 'the spirit of God'.

*Let it lastly be mentioned that, for ease of writing, the three major quarks of a proton / neutron and all the subatomic particles that are consequential to the existence of the three major quarks (such as the gluons and W-bosons and Z-bosons) will be henceforth collectively referred to as the **quarkonic particles** of that proton / neutron.*

3.1.4. The Variedly Energized States of the Three Major Quarks

*Similar to the three variedly energized states of the electrons, quantum physicists discovered that the three major quarks of a proton / neutron can also be extraordinarily energized to such an extent that they are starting to exhibit very powerful properties. The six variations thereof are known as **the six flavours of quarks**:*

- *The **up quarks** and the **down quarks** are the normal quarks participating in low-strength nuclear interactions as naturally occurring in one's daily environment.*
- *The **charm quarks** and the **strange quarks** are, respectively, the significantly energized up and down quarks participating in medium-strength nuclear interactions as artificially occurring in medium-strength particle accelerators and as naturally occurring during medium-strength cosmic events.*



- The **top quarks** and the **bottom quarks** are, respectively, the greatly energized up quarks and down quarks participating in high-strength nuclear interactions as artificially occurring in high-strength particle accelerators and as naturally occurring during high-strength cosmic events.

As such, all charm (**strange**) quarks and all top (**bottom**) quarks are really but differently energized up (**down**) quarks.

3.1.5. The Distinction between Simple and Composite and Aggregate Subatomic Particles

As can be surmised from the previous explanations, a subatomic particle can either be:

- a simple subatomic particle, i.e. which most scientists are still deeming to be an indivisible particle (such as an electron or a major quark)
- a composite subatomic particle, consisting of a variety of simple subatomic particles (such as a proton or a neutron)
- an aggregate subatomic particle, consisting of a variety of composite subatomic particles (such as the entire nucleus of an atom)

3.2. The Concept of Isotopes

Every specific type of atom always has the same **number of protons** in its nucleus. Hence that a hydrogen atom will always have one proton; a helium atom two; a lithium atom three; a beryllium atom four; a boron atom five, a carbon atom six; a nitrogen atom seven, an oxygen atom eight; and so on. However, the **number of neutrons** in the nucleus of such a specific type of atom can vary and will thusly determine the particular form of that specific type of atom, scientifically referred to as **its isotope**. For example:

- The common isotope of hydrogen (H), also known as 'protium', is consisting of 1 proton and 0 neutrons and can thusly be notated as H_1^1 . However, such hydrogen atoms can also appear in the form of their less-common isotopes. That is, a hydrogen atom can have 1 proton and 1 neutron, then known as 'deuterium' and notated as H_2^1 . Or it can have 1 proton and 2 neutrons, then known as 'tritium' and notated as H_3^1 . And so on up to 1 proton and 6 neutrons, then known as 'septium' and notated as H_7^1 . In this regard, note that hydrogen is the only element to which the scientists have assigned different names for its different isotopes.
- The common isotope of uranium (U) has 92 protons and 146 neutrons, then known as uranium-238 and notated as U_{238}^{92} . One of its less-common isotopes also has 92 protons but has 143 neutrons, then known as uranium-235 and notated as U_{235}^{92} .

In this regard, note that the periodic table of elements is showing only the most common isotope of every specific type of atom.

The isotopes of heavy atoms (such as uranium) are often **radioactive**. This practically means that they are very slowly decaying in a seemingly random fashion, which in turn practically means that



their nuclei are regularly losing (i.e. radiating / emitting) energetic entities known as alpha particles and beta particles and gamma ray photons and positrons:

- *An **alpha particle** is a radiated unit consisting of two protons and two neutrons, which is the structure of the nucleus of a common helium atom (He_4^2). Therefore, whenever a radioactive atom happens to emit such an alpha particle, then that will always result in a structural change to the nucleus of that atom.*

For example, when a common uranium atom (U_{238}^{92} , having 92 protons and 146 neutrons) is emitting an alpha particle (He_4^2 , having 2 protons and 2 neutrons), then that uranium atom will change into a less common isotope of a thorium atom (Th_{234}^{90} , having 90 protons and 144 neutrons).

- *A **beta particle** is a very highly energized electron-sized particle, then also known as a nuclear electron because of it being emitted by the nucleus of that atom.*
- *A **gamma ray photon** is a photon consisting of gamma ray energies.*
- *A **positron** is an anti-electron.*

3.3. The Generic Concept of Photons:

There is at present much confusion amongst science students with respect to the concept of a photon. By reason that a photon is being defined in some textbooks as 'a radiated spherical unit of electromagnetic energy' and in other textbooks as 'a radiated simple subatomic particle' and still in other textbooks as 'an assortment of radiated simple subatomic particles'. All three of which definitions are in fact correct because, as will later become apparent during the study of the advanced principles of Truth, a photon can either be:

- *any kind of conventional photon (i.e. either a gamma ray photon or X-ray photon or ultraviolet light photon or 'visible' light photon or infrared photon), all of which this chapter will henceforth be referring to as **simple photons***
- *any kind of radiated simple subatomic particle (such as an electron or a W-boson or a Z-boson)*
- *any kind of radiated composite subatomic particle (such as an entire proton or an entire neutron)*
- *any kind of radiated aggregate subatomic particle (such as the nucleus of a helium atom which, if emitted during a nuclear reaction, is then also known as an alpha particle)*

3.4. The Scientific Classifications of Subatomic Particles

To facilitate their communications with respect to the properties of all known-to-exist and all assumed-to-exist subatomic particles, quantum physicists decided to classify them in a variety of ways. It will soon become apparent that all of such classifications are, notwithstanding the introduction of a few new scientific terms, nevertheless always referring to the same kinds of subatomic particles.



3.4.1. The Classifications of Simple Subatomic Particles

The following explanations serve to at first convey the two current classifications of all simple subatomic particles and then the manner wherein they ought to be classified.

❖ *The Current Classification in view of their Real or Virtual Nature:*

- All steadily appearing simple subatomic particles – i.e. all major quarks and mesonic quarks and electrons and neutrinos and photons – are currently being referred to as the **real** elementary particles.

Special note

A **neutrino** will later be explained to be an extremely tiny particle that is being emitted during, for instance, the thermonuclear fusion of a proton and a highly-energized electron into a neutron.

- All fleetingly appearing-and-disappearing simple subatomic particles – i.e. all gluons and W-bosons and Z-bosons – are currently being referred to as the **virtual** elementary particles.

Special note

The advanced principles of Truth will be duly explaining how the fleeting appearances and disappearances of all such ‘virtual’ subatomic particles are in fact being occasioned by the extremely dynamic energetic interactions between as well the three major quarks of every proton as the three major quarks of every neutron. As such, let it suffice for the student to know for now that at various seemingly random locations in the vicinity of such major quarks these kinds of ‘virtual’ particles are bound to fleetingly appear and disappear, each of them having a lifespan of no more than a tiny fraction of a second. As such, the term ‘virtual particle’ is a somewhat misleading term in that every such fleetingly appearing-and-disappearing particle is actually consisting of real (i.e. not of virtual) electromagnetic energies.

- The simple subatomic particles that the quantum physicists are still postulating to exist in terms of the outcome of their often extremely complicated mathematical calculations are known as the **hypothetical** elementary particles. Of all such presumed-to-exist particles, this chapter will show only ‘the Higgs bosons’ to actually exist.

Some additional notions pertaining to this classification

- In view of this classification, every proton and every neutron is consisting of a combination of steadily appearing elementary particles (their major quarks and their mesonic quarks) and fleetingly appearing-and-disappearing elementary particles (their gluons and W-bosons and Z-bosons and their so-called ghost particles).



- *When reading all kinds of scientific journals, then one might gain the impression that the quantum physicists are regularly discovering all kinds of new subatomic particles. Yet all of which 'new' subatomic particles are really but differently energized states or combinations or fragments of already discovered particles. Such as the many seemingly different kinds of mesonic quarks and mesonic anti-quarks that are bound to manifest themselves during a wide variety of particle smashing experiments.*
- *It is important to maintain a clear distinction between, on the one hand, a subatomic particle and, on the other hand, a so-called quasi-particle. By reason that the term 'quasi-particle' is not referring to any subatomic particle at all but is meant to refer to 'an energetic phenomenon whose intrinsic forces can be calculated as if they were being occasioned by the interactions between subatomic particles'. For instance, one specific kind of quasi-particle is known as the phonon, which can be defined as 'the quantum of energy that is occasioning the acoustic vibrations of a crystal lattice'. As such, there is no need for the average seeker of Truth to gain a detailed understanding of such quasi-particles.*

A major inconsistency of this classification

*The classification of all photons as **real** subatomic particles is fundamentally flawed by reason that, within the ambit of a proton or a neutron, a radiated unit (i.e. a photon) can actually be a gluon or a W-boson or a Z-boson. All of which are currently classified as **virtual** subatomic particles.*

❖ *The Current Classification in view of their Assumed Functionalities:*

In terms of this classification, all simple subatomic particles have been categorized into two major groupings:

- *the **gauge bosons** are the simple subatomic particles that are either known or presumed to intermediate the four fundamental forces of Nature:*
 - *the gluons are known to intermediate the strong nuclear forces*
 - *the W-bosons and the Z-bosons are known to intermediate the weak nuclear forces*
 - *the photons are known to intermediate the electromagnetic forces*
 - *the hypothetical gravitons are presumed to intermediate the gravitational forces*
- *the **fermions** are all of the other kinds of simple subatomic particles:*
 - *the major quarks and the mesonic quarks*

They are believed to be as well the donors as the recipients of the strong nuclear forces (as primarily intermediated by the gluons) and of the weak nuclear forces (as primarily intermediated by the W-bosons and the Z-bosons)

- 
- *the electrons and the neutrinos (collectively also referred to as 'the leptons')*
They are believed to be as well the donors as the recipients of the electromagnetic forces (as intermediated by the simple photons).

Some additional notions pertaining to this classification

- *The word 'gauge' literally means 'measure' and the word 'boson' has been adopted as a tribute to the Indian scientist Satyendra Nath Bose who was the first scientist to prove the actual existence of photons. The composite term 'gauge boson' is used by quantum physicists to facilitate their discussions about the energetic interactions between subatomic particles in terms of a number of gauge group theories. Such as when they are trying to assess the change to the properties of a subatomic particle (its energy content, its spin, its so-called electric charge) after it has been made to energetically interact with another subatomic particle.*
- *Although not specifically mentioned in this classification, the general consensus amongst quantum physicists is that the mesons are also gauge bosons in that they are also intermediating – albeit to a much lesser extent than the gluons and the W-bosons and the Z-bosons – the strong and the weak nuclear forces.*
- *The Higgs bosons are not included in this classification by reason that it is still unknown as to whether they have fermionic properties or bosonic properties.*
- *One of the reasons why quantum physicists adopted this classification is that all of the abovementioned gauge bosons and fermions either do have or are assumed to have a characteristic spin. That is:*
 - ❖ *the gauge bosons are said to have a relative spin of 1*
 - ❖ *the fermions are known to have a relative spin of $\frac{1}{2}$ (i.e. a fermion is spinning half as fast around its axis than a gauge boson)*
 - ❖ *the hypothetical gravitons are assumed to have a relative spin of 2*

As such, note that the quantum physicists arbitrarily chose the intrinsic spin of a gauge boson as the standard against which they are measuring the intrinsic spin of the other subatomic particles.

The major inconsistencies of this classification

- *The classification of all photons as **gauge bosons** is even so fundamentally flawed because, as was previously mentioned, a photon can in fact be an electron or a neutrino. Both of which are **fermions**.*
- *In terms of this classification, only the conventionally known simple photons are considered to have an electromagnetic nature. In stark contrast thereto, the advanced principles of Truth will show every kind of simple subatomic particle to actually consist of a spherical conglomeration of electromagnetic energies and to thusly consist of as well electric forces as magnetic forces. Such as a*

gluon, for instance, whose strong nuclear forces are actually very strong magnetic forces.

So, in order to avoid any confusion in this regard, the student is to henceforth bear in mind that, while the four fundamental forces are traditionally being classified as four distinctly different forces, this chapter will show all of them to actually have an electromagnetic origin. And that, as such, it is the manner wherein the electromagnetic energies in Nature are exerting their forces that is giving rise to the emergence of the strong nuclear forces and of the weak nuclear forces and of the conventional electric and magnetic forces and of the conventional gravitational forces.

- *The classification of mesons as gauge bosons is again a cause of much confusion amongst science students. By reason that every such meson is actually consisting of two separate fermionic particles – i.e. of a normal mesonic quark (on the one side of the relevant major quark) and of a mesonic anti-quark (on the other side of that major quark). As such, to classify two spatially separate mesonic quarks (each of which is a fermionic particle) as one gauge boson is factually incorrect. The correct way of understanding the concept of ‘a meson’ is to know it to consist of two separate fermionic particles, each of which will however also be behaving itself as a gauge boson whilst it is energetically interacting with another subatomic particle.*

❖ *The Suggested Re-Classification of Simple Subatomic Particles*

The previous subsections have clearly shown that:

- *A photon can be either a so-called real particle or a so-called virtual particle.*
- *A photon is a fermion whilst it is in transit between two subatomic particles. Yet can also be regarded as a gauge boson whilst it is being emitted by the one subatomic particle and whilst it is being absorbed by the other subatomic particle. Wherefrom can be surmised that the energy exchange between two subatomic particles in the form of a photon will – if temporarily ignoring all anti-particles – always result in a decrease of the energy content of the donor particle and an increase of the energy content of the recipient particle.*

Special note

The fact that all subatomic particles are capable of exchanging at least some of their energy content with other subatomic particles in the form of photons is already suggestive of the truth that every simple subatomic particle is really but a spherical conglomeration of a specific kind of electromagnetic energies. Such as of X-ray energies or of gamma ray energies.

Now, in order to obviate all of the heretofore mentioned inconsistencies, it is suggested that all simple subatomic particles be more broadly re-classified as follows:

[View Figure 8](#)



3.4.2. The Classification of Composite Particles

As in the case of all simple subatomic particles, the quantum physicists decided to classify all composite particles in a variety of different ways. However, by reason that a composite particle is really but a combination of simple subatomic particles, there is no need for the student to study these classifications. As such, what all composite subatomic particles are concerned, it will suffice for the student to only understand the structural aspects and the operational *modi operandi* of the proton and of the neutron.

Furthermore, let the student be reminded of the fact that a so-called 'meson' is actually not a composite particle but merely a convenient term that the quantum physicists are utilizing to collectively refer to as well the mesonic quark as the mesonic anti-quark of a major quark (as previously depicted in Figure 7).

3.4.3. The Classification of Subatomic Particles in terms of their Propagational Speed

The quantum physicists also categorized all subatomic particles in view of their actual and presumed speeds of propagation:

- A subatomic particle that is propagating itself at less than the speed of light is known as a **tardyon**. A typical example thereof is an electron orbiting the nucleus at marginally less than the speed of light.
- A subatomic particle that is hypothetically presumed to propagate itself at the speed of light is referred to as a **luxon**.
- A subatomic particle that is hypothetically presumed to propagate itself faster than the speed of light is referred to as a **tachyon**.

The advanced principles of Truth will show it to be impossible for any such luxon or tachyon to actually exist.

3.5. The Standard Model of Particle Physics

The Standard Model of Particle Physics is a listing of all the simple subatomic particles that quantum physicists are deeming to be the most fundamental subatomic particles. In other words, every quantum physicist is acknowledging the fact that all other observed kinds of simple subatomic particles are really but differently-energized forms or fragments of such most fundamental subatomic particles.

In this regard, it is important to maintain a distinction between The Standard Model of Particle Physics as adopted by the **quantum mechanics physicists** and The Standard Model of Particle Physics as adopted by the **quantum string physicists**¹:

¹ The main difference between these two kinds of scientists is that the quantum mechanics physicists are trying to substantiate their theories not only mathematically but also experimentally while the quantum string physicists are only trying to mathematically substantiate their particular kinds of theories known as the string theories (as later conveyed in section 32 of this chapter).



- *The Standard Model of Particle Physics as adopted by the quantum mechanics physicists does not include the hypothetical gravitons by reason that the gravitational forces of Nature are not yet **experimentally** measurable on a microscopic scale. This practically means that the quantum mechanics physicists are only endeavouring to understand the common origin of all strong nuclear forces and all weak nuclear forces and all conventional electromagnetic forces ².*
- *The Standard Model of Particle Physics as adopted by the quantum string physicists does include the hypothetical gravitons because of them endeavouring to **mathematically** understand the common origin of all four fundamental forces.*

As such, the simple subatomic particles that are included in these Standard Models of Particle Physics are:

- *all conventionally known photons and their anti-particles*
- *all electrons and their anti-particles*
- *all neutrinos and their anti-particles*
- *all quarks and their anti-particles*
- *all gluons and their anti-particles*
- *all W-bosons and their anti-particles*
- *all Z-bosons, each of which is – rather illogically – thought to be ‘its own anti-particle’*
- *all still hypothetical Higgs bosons*
- *all presumed-to-exist gravitons (applicable only to The Standard Model of Particle Physics as adopted by the quantum string physicists)*



² *The student should note that the term ‘conventional electromagnetic forces’ needs to be understood within the context wherein the quantum physicists are currently understanding such forces. That is, as ‘the long-range forces that are being photonically transmitted between charged particles (i.e. in the form of photons)’.*



Part II

The Structural Aspects of Ordinary Energies

WHAT THE STUDENT WILL LEARN FROM THIS PART

- ✓ *Every electromagnetic energy is propagating itself in an oscillatory fashion*
- ✓ *Every electromagnetic energy has a specific length known as its quantum length*
- ✓ *Every electromagnetic energy is characterized by its frequency and wavelength and amplitude*
- ✓ *The electromagnetic spectrum is an academic representation of the different kinds of electromagnetic energies*
- ✓ *Every kind of electromagnetic energy can be energetically converted into any other kind of electromagnetic energy*
- ✓ *All electromagnetic energies are propagating themselves at exactly the same universal speed*
- ✓ *An electromagnetic energy is known to be linearly or elliptically or circularly polarized*





4. The Structural Configuration of the Electromagnetic Energies

Now that the student has a basic understanding of the but few kinds of subatomic particles that all ordinary solids and liquids and gases consist of, the next logical step is to learn to understand the basic characteristics of all electromagnetic energies. It is these naturally occurring electromagnetic energies that are occasioning:

- all of the nuclear and chemical and thermal and electrical and mechanical phenomena in Nature
- all of the metamorphic changes in Nature, i.e. both:
 - the changing of a solid into a liquid and then into a gas and finally into a plasma, and vice versa (the *modi operandi* whereof will, in terms of the applicable forces, be at length explained in Parts X and XI)
 - the energetic conversion of any one type of electromagnetic energy into any other type of electromagnetic energy (as will be explained in subsection 4.2.3)

In this regard, let the student be reminded of the fact that – in the simplest terms – an electromagnetic energy can be strengthened by way of subjecting it to another coherent (frequently congruent) electromagnetic energy and be weakened by way of subjecting it to another incoherent (frequently incongruent) electromagnetic energy.

- the emergence of all so-called conventional gravitational forces (as will be extensively explained in section 23)

From these kinds of natural phenomena can already be surmised that there is a perfect correlation between the various **forces** in Nature and the various electromagnetic **energies** in Nature and the various **subatomic particles** in Nature.

4.1. The Wavelike Propagation and the Quantum Length of an Electromagnetic Energy

Let it first be emphasized that the following explanations are applicable only to all naturally occurring electromagnetic energies and thusly not to all technologically modified electromagnetic energies, such as the modulated kinds of radiowave energies that are nowadays being used in the telecommunications industries. In addition thereto, it is important for the student to henceforth maintain a clear distinction between:

- i) the wavelike propagation of a naturally occurring electromagnetic energy
- ii) the manner wherein the flow of electrons through a conductive medium (i.e. as an electrical current) can be graphically displayed in the form of, for instance, a sinusoidal wave or a pulse wave or a digitalized wave

Now, an **electromagnetic energy** can be defined as ‘an energy that is propagating itself in both a forward (electric) fashion and an alternately sideways (magnetic) fashion’. In other words, it is the electric and magnetic forces of an electromagnetic energy that are occasioning it to propagate itself in a **sinusoidal / oscillating / wavelike** fashion.

View Figure 9



In this regard, note that an electromagnetic energy cannot but always propagate itself in that wavelike fashion but that it will do so:

- either on its own, as applicable to all radiowave energies and microwave energies and the lower-frequency infrared energies (i.e. whose mass-coupling effects are too weak for them to congregate themselves into photons)
- or conjointly with other identical energies in the form of a spherical photon, as applicable to all higher-frequency infrared energies and ‘visible’ light energies and ultraviolet light energies and X-ray energies and gamma ray energies (i.e. whose mass-coupling effects are compelling them to congregate themselves into photons)

Subsequent to the discovery that an electromagnetic energy is propagating itself in a wavelike fashion, it was also discovered that an electromagnetic energy is not infinitely long but that it has a certain length, now known as its **quantum length**. In this regard, note that the word ‘quantum’ (plural ‘quanta’) was derived from the Latin word ‘quantus’, which literally means ‘how much’ or ‘how long’ and which can thusly also be interpreted to mean ‘a unit’. The quantum length of an electromagnetic energy can thusly be defined as ‘the spatial distance over which all of its oscillations / waves extend themselves’. It is that important discovery that heralded the evolutionary transition from the olden-day classical physics to the modern-day quantum physics.

[View Figure 10](#)

4.2. The Other Characteristic Features of an Electromagnetic Energy

The energetic nature of an electromagnetic energy is to be understood not only in terms of its mode of propagation and its quantum length but also in terms of all its other characteristics.

4.2.1. The Frequency and Wavelength of an Electromagnetic Energy

Every singular electromagnetic energy is characterized by its frequency (f) and its corresponding wavelength (λ , the Greek letter lambda):

- Its **frequency** is defined as ‘the rate at which it is oscillating across its imaginary x-axis, as measured over the timespan of one second’ (expressed in Hertz)
- Its corresponding **wavelength** is defined as ‘the spatial extent of a single oscillation’ (expressed in meters)

[View Figure 11](#)

- The relationship between the frequency and the wavelength of an electromagnetic energy is expressed by the mathematical formula:

$$\lambda = \frac{v}{f}$$

Wherein λ (lambda) is the wavelength of that electromagnetic energy in meters; v is its propagational velocity (i.e. the constant speed of light) in meters per second; and f is its frequency in Hz (the abbreviation for Hertz). As such, by reason that the speed of



light is a constant, the inverse relationship between the frequency and the wavelength of a singular electromagnetic energy can be described as follows:

- the higher the frequency (f), the shorter the wavelength (λ)
- and conversely, the lower the frequency (f), the longer the wavelength (λ)
- The following examples serve to illustrate the order of magnitudes of the frequency and the associated wavelength of a few different kinds of electromagnetic energies.

Special note

For those who are not yet familiar with such orders of magnitude, Figure 12 is portraying a tabular representation of their scientific notations:

[View Figure 12](#)

With respect to the following examples, note that for ease of calculation the propagational velocity v (the speed of light) has been approximated to 300,000 kilometers per second (i.e. 3×10^8 meters per second):

- The wavelength of a singular 10 Hz relatively-long radiowave energy is:

$$\lambda = \frac{3 \times 10^8}{10} = 3 \times 10^7 \text{ meters} = 30,000,000 \text{ meters}$$

Yielding 1 oscillation every 30,000 kilometers

- The wavelength of a singular 10^8 Hz relatively-short radiowave energy is:

$$\lambda = \frac{3 \times 10^8}{10^8} = 3 \text{ meters}$$

Yielding 1 oscillation every 3 meters

- The wavelength of a singular 10^{15} Hz 'visible' light energy is:

$$\lambda = \frac{3 \times 10^8}{10^{15}} = 3 \times 10^{-7} \text{ meters} = 0.0000003 \text{ meters}$$

Yielding 1 oscillation every 3 micrometers

- The wavelength of a singular 10^{20} Hz gamma ray energy is:

$$\lambda = \frac{3 \times 10^8}{10^{20}} = 3 \times 10^{-12} \text{ meters} = 0.000000000003 \text{ meters}$$

Yielding 1 oscillation every 3 picometers

4.2.2. The Different Kinds of Electromagnetic Energies

As mentioned in Chapter 1 (One's Spiritual Initiation), the continuous range of all types / forms of singular electromagnetic energies can be academically displayed as *the electromagnetic spectrum*:

[View Figure 13a](#)

[View Figure 13b](#)

4.2.3. The Energy Content of Electromagnetic Energies

Whilst studying this subsection, the student is to bear in mind that all electromagnetic energies have exactly the same number of oscillations, which is why any one type / form of electromagnetic energy can be energetically converted into any other type / form of



electromagnetic energy.

*The energy content of an electromagnetic energy is bound to vary whilst it is energetically interacting with other electromagnetic energies. Although the extent of such energetic interactions can be extremely complicated, the fundamental causes and effects thereof can nevertheless be easily understood in terms of the following **strictly academic** scenarios:*

- *If during the energetic interaction only the **electric** energy content of an electromagnetic energy is being decreased (increased), then that electromagnetic energy will naturally elongate (contract) itself and will thusly change its frequency and its wavelength and its quantum length and its amplitude:*

View Figure 14

- *If during the energetic interaction only the **magnetic** energy content of an electromagnetic energy is being decreased (increased), then that electromagnetic energy will not change its frequency nor its wavelength nor its quantum length but it will only decrease (increase) its amplitude:*

View Figure 15

*It is often claimed by scientists that there is an overlap between the different types / forms of energies in the electromagnetic spectrum [such as between the gamma ray energies and the X-ray energies]. These so-called overlaps are the result of them trying to classify the various types / forms of electromagnetic energies in view of both their frequency and their energy content. Yet, if the different kinds of electromagnetic energies be correctly classified **only** in terms of their frequencies – i.e. as originally intended – then no such overlaps can occur.*

4.2.4. The Propagational Speed of Electromagnetic Energies

*The so-called **speed of light**, which is usually approximated to 300,000 kilometers per second but which is actually 299,792,458 meters per second, is applicable to not only every singular light energy but also to every other kind of singular electromagnetic energy.*

Special note

For ease of writing, this chapter will continue to use the conventional term ‘the speed of light’ but the student should henceforth:

- *bear in mind that it is the universal speed at which every kind of singular electromagnetic energy is propagating itself*
- *acknowledge the fact that a simple photon is always propagating itself at slightly less than the speed of light but that the extent of that difference is so small that its speed can, for all practical purposes, be equated to the speed of light*

Although not strictly related to this subsection, let it nevertheless be mentioned that there are some scientists who are of the opinion that it is possible to reduce the speed of simple photons in a dense medium and that, after such photons transited that dense medium, they



are then somehow miraculously resuming their original speed of nearly 300,000 km/s. What such scientists are failing to realize is that:

- From a realistic perspective, whichever simple photon is entering a dense medium is not the same photon exiting that medium. For whichever simple photon is entering a dense medium is bound to be absorbed by one or other subatomic particle in that medium. Which other subatomic particle will then be emitting some other simple photon. Which other simple photon is then bound to be absorbed by yet another subatomic particle. Which will then in turn be emitting yet another simple photon. And so on until the last emitted photon is finally exiting that dense medium.
- From a hypothetical perspective, even if such a simple photon would not be absorbed by any subatomic particle in that dense medium, then it would still – due to the force fields of the subatomic particles in that medium – be many times over bouncing around in that medium. And thusly give the false impression as if it greatly reduced its speed whilst passing through that medium. The verity whereof can also be surmised from the following analogy:

[View Figure 16](#)

In other words, in a real life scenario, when measuring the time between a stream of simple photons entering a dense medium and that presumably same stream of simple photons exiting that medium, then their propagational speed will only appear to have been greatly reduced whilst they were transiting that medium.

4.2.5. The Polarization of Electromagnetic Energies

The wavelike trajectory of an electromagnetic energy can, due to its interactions with other electromagnetic energies, change from being linearly polarized to being elliptically polarized to being circularly polarized; and vice versa:

[View Figure 17](#)





A Compendium of Fundamental Definitions

Before proceeding to Part III, the student ought to first familiarize himself / herself with the following definitions:

- ❖ *Electromagnetic*: of, or relating to, both the electric and the magnetic forces of an electromagnetic energy
 - Electric*: of, or relating to, the electric forces of an electromagnetic energy
 - Magnetic*: of, or relating to, the magnetic forces of an electromagnetic energy
- ❖ *Electromagnetism*: a collective term referring to the sum total of all electromagnetic phenomena
 - Electricity*: a collective term referring to the sum total of all electric phenomena
 - Magnetism*: a collective term referring to the sum total of all magnetic phenomena
- ❖ *Electronic*: of, or relating to, electrons
 - Electrical*: of, or relating to, the concerted movement of electrons through a conductive medium
 - Electromotive force (EMF)*: the force that is prompting electrons to move in a concerted fashion through a conductive medium; expressed in Volts
 - Electrical voltage (U)*: the acute or the potential difference between two electromotive forces; even so expressed in Volts
 - Electrical current (I)*: the quantitative number of electrons that are moving in a concerted fashion through a conductive medium, as occasioned by an electrical voltage; expressed in Amperes
 - Electrical resistance (R)*: the measure of resistivity that the electrons are experiencing whilst moving in a concerted fashion through a conductive medium; expressed in Ohms

Special note

The reciprocity between the electrical current (*I*), the electrical voltage (*U*), and the electrical resistance (*R*) is expressed by the formula:

$$I = \frac{U}{R}$$

As such, the concepts of i) electrical voltage and ii) electrical current and iii) electrical resistance can be somewhat likened to the concepts of i) the water pressure within a garden hose and ii) the amount of water flowing through that garden hose and iii) the resistivity that the garden hose is imposing upon that water flow.

- ❖ In the field of quantum physics:
 - Mechanical*: of, or relating to, the physically occasioned movement of atoms within a solid or liquid or gaseous substance
 - Mechanical force*: the force that is coercing atoms to physically move in a solid or liquid or gaseous substance
 - Heat*: the intrinsic energy content of an electromagnetic energy, of all its electric and magnetic forces combined
 - Thermal energy*: the vibratory energy content of an atom, due to the vibratory movements of its electrons
 - Nuclear*: of, or relating to, the quarkonic particles of an atom





Part III

The Structural Aspects of Ordinary Forces

WHAT THE STUDENT WILL LEARN FROM THIS PART

- ✓ *The scientific classification of the four fundamental forces of Nature*
- ✓ *The spatial ranges wherever the four fundamental forces of Nature are exerting themselves*
- ✓ *The relative strengths of the four fundamental forces of Nature*





5. The Scientific Classification of the Fundamental Forces of Nature

Now that the student has a basic understanding of the different kinds of subatomic particles in Nature and of the different kinds of electromagnetic energies in Nature, the next logical step is to learn to understand the energetic features of all the so-called natural forces in Nature.

These have been categorized by the scientists into four main groupings, known as 'the four fundamental forces of Nature':

- all strong nuclear forces (*the study whereof is known as chromodynamics*)
- all conventional electromagnetic forces (*the study whereof is known as electrodynamics*)
- all weak nuclear forces (*the study whereof is known as flavourdynamics*)
- all gravitational forces (*the study whereof is known as geometrodynamics*)

That all of these 'physical' forces of creation are actually the mental forces of the Creator will be duly conveyed in Part VII.

6. The Characteristic Features of the Four Fundamental Forces

6.1. The Relative Ranges of the Four Fundamental Forces

❖ The **strong nuclear forces** and the **weak nuclear forces** are said to have an extremely short range by reason that they, excepting in the following instances, are always remaining confined within the interior of every proton and of every neutron:

- during the radioactive decay of an unstable atom, which is bound to result in the ad hoc emissions of nuclear forces into the surrounding environment
- during the course of atom-smashing experiments
- as occasioned by a variety of naturally-occurring and technologically-controlled nuclear reactions [such as, respectively, in the interior of the sun and in specially-designed nuclear reactors]
- as occasioned by a variety of technologically uncontrolled nuclear reactions [such as during a nuclear fission bomb explosion or during a nuclear fusion bomb explosion]

Note that the factual reasons for the natural confinement of these nuclear forces within every proton and within every neutron will be duly conveyed in subsection 31.7.

❖ The **conventional electromagnetic forces** are said to have an extremely long range by reason that, if they are not encountering any obstacle, then they will keep on propagating themselves across many billions of light years.

Special note

A **light year** is defined as 'the spatial distance traversed by an unobstructed singular electromagnetic energy at the speed of light over the period of one terrestrial year'.

❖ The **gravitational forces** are also said to have an extremely long range but, unlike the conventional electromagnetic forces, they are known to quickly disperse over a progressively larger area and will thusly appear to quickly diminish their strength over distance.



Hence that, from an observational perspective, the strength of a gravitational force will always appear to be inversely proportionate to the square of the distance away from its point of origin. This practically means that at twice that distance its strength will appear to be $2^2 = 4$ times weaker, at three times that distance $3^2 = 9$ times weaker, at four times that distance $4^2 = 16$ times weaker, and so on. Which is why, from a terrestrial perspective, the further a rocket travels into space away from the Earth, the less it will be affected by the gravitational forces of the Earth.

6.2. The Relative Strengths of the Four Fundamental Forces

- ❖ The **gravitational forces** are comparatively speaking extremely weak forces, in the sense that an individual gravitational force is so weak that it cannot be measured even with the most sophisticated scientific instruments. As such, these kinds of forces can only be measured when they are collectively exerting themselves at a much larger scale up to a macroscopic (astrophysical) scale.
- ❖ The **weak nuclear forces** of the W-bosons and Z-bosons are about 10^{27} times stronger than the gravitational forces.
- ❖ The **conventional electromagnetic forces** are on average about 10^{11} times stronger than the weak nuclear forces and thusly about $[10^{(11+27)} =] 10^{38}$ times stronger than the gravitational forces.
- ❖ The **strong nuclear forces** of the gluons are about 10^2 times stronger than the conventional electromagnetic forces and thusly about $[10^{(2+11)} =] 10^{13}$ times stronger than the weak nuclear forces and thusly about $[10^{(2+11+27)} =] 10^{40}$ times stronger than the gravitational forces.

To fully appreciate the comparative strengths of these four fundamental forces:

- ✓ the weak nuclear forces are about 1,000,000,000,000,000,000,000,000 times stronger than the gravitational forces
- ✓ the conventional electromagnetic forces are on average a further 100,000,000,000 times stronger than the weak nuclear forces
- ✓ the strong nuclear forces are on average a further 100 times stronger than the conventional electromagnetic forces





Part IV

The Contemporary Cosmological Theories

WHAT THE STUDENT WILL LEARN FROM THIS PART

- ✓ *The scientific theories wherewith the astrophysicists are trying to gain a better understanding of the macroscopic aspects of the cosmos:*
 - *the assumed existence of dark matter and of dark energies*
 - *the General Theory of Relativity*
- ✓ *The scientific theory wherewith the quantum physicists are trying to gain a better understanding of the microscopic aspects of the cosmos:*
 - *the assumed existence of Higgs bosons*
- ✓ *The Big Bang Theory wherewith the astrophysicists and the quantum physicists are trying to understand the true origin of the cosmos*





7. The Present-Day Theories Pertaining to the Structural Composition of the Cosmos

7.1. The Theories Upheld by the Astrophysicists

7.1.1. The Assumed Existence of Dark Matter and of Dark Energies

*Because of the observed occurrence of a number of cosmological phenomena that cannot be any otherwise explained, astrophysicists have come to very strongly suspect the actual existence of some kind of **dark matter** and of some kind of **dark energies** underlying the entirety of the cosmos.*

Based on the outcome of their mathematical calculations, they are currently assuming that – in view of the total mass of the observable cosmos – all of the known subatomic particles and all of the known electromagnetic energies are contributing only about 5% to that total mass while the remaining about 95% can only be attributed to:

- i) the existence of such dark matter (about 23% of that total mass)*
- ii) the existence of such dark energies (about 72% of that total mass)*

The student should note that these percentages are specifically referring to the operational mass of the cosmos and not to the existential materiality of the cosmos. In this regard, note that the advanced principles of Truth will at length be explaining:

- the **operational mass** of an entity to be an **energetic feature** of that entity, i.e. to be 'the quantifiable measure of its inertia' or more precisely 'the quantifiable measure of its forceful resistance to undergo any changes to its current status'*
- the **existential materiality** of an entity to be a **substantive feature** of that entity*

As such, the assumption that 23% of the operational mass of the cosmos is attributable to the existence of dark matter is not excluding that dark matter from all-pervasively underlying not only i) all dark energies but also ii) all electromagnetic energies and consequently also iii) all subatomic particles.

7.1.2. The General Theory of Relativity

The General Theory of Relativity, as postulated by Albert Einstein, is presupposing the existence of all kinds of space-time relativities throughout the cosmos. The advanced principles of Truth in Part V and in Part XII will be exposing the fallacy of that theory.

7.2. The Theory Upheld by the Quantum Physicists

Even so, because of the occurrence of a number of quantum-physical phenomena that cannot be any otherwise explained, the quantum mechanics physicists have come to very strongly suspect the actual existence of the Higgs bosons.



In addition thereto, based on the outcome of their mathematical calculations, the quantum string physicists have come to suspect:

- i) the Higgs bosons to be the only real subatomic particles*
- ii) every other simple subatomic particle to merely consist of a variety of so-called energetic strings – that are appearing to derive at least some of their operational mass from the Higgs bosons*

Special notes

- The advanced principles of Truth will show these two assumptions to be much closer to the Truth than is currently realized by all quantum physicists.*
- There is a growing consensus amongst as well the quantum mechanics physicists as the quantum string physicists that the mass of a Higgs boson must be significantly greater than the mass of any other simple subatomic particle. Which no doubt beckons the question as to why the actual existence of such Higgs bosons has not yet been experimentally verified. The answer whereto will be conveyed in subsection 31.9.2 of this chapter.*

8. The Present-Day Theory Pertaining to the Origin of the Cosmos

That theory, known as the Big Bang Theory, is based on the assumption that the entire cosmos could only have come into existence due to the primordial explosion of an unimaginably dense basketball-sized object. In other words, that such a tiny basketball-sized object must have somehow contained all of the ordinary matter and all of the ordinary energies and all of the ordinary forces of the billions and billions and billions of present-day gargantuan galaxies, each of which 'mature' galaxies is known to consist of between ten million and one trillion solar systems.

In addition thereto, there are some scientists who are of the opinion that that unimaginably dense basketball-sized object must have somehow originated itself out of a singularity, which they are defining as 'an infinitely small speck of space that cannot be considered to have any spatial dimensions'. Needless to say that that assumption is even more irrational than the first one.

Part XII of this chapter will be exposing the fallacy of that Big Bang Theory from as well a spiritual as an energetic perspective.



The background of the image is a soft-focus photograph of a sunset or sunrise over a body of water. The sun is a bright, glowing orb on the horizon, casting a warm, golden light across the sky and water. The sky is a mix of light blue and pale yellow. In the foreground, there are dark, silhouetted trees and foliage on the left side, with some branches reaching towards the center. The water in the foreground shows gentle ripples and a small wave breaking on the left. The entire image is enclosed within a thin, dark brown border with decorative, slightly curved corners.

*The Advanced
Principles of Truth*



Part V

The Spiritual Significance of Dark Matter

WHAT THE STUDENT WILL LEARN FROM THIS PART

- ✓ *How to understand the astrophysical concept of dark matter and the quantum-physical concept of the Higgs bosons and the metaphysical concept of the ether within the context of the theosophical concept of the spirit of God*
- ✓ *The intrinsic properties of God's spiritual substance in terms of its extremely high inelasticity and its extremely high conductivity and its extremely low resistivity*
- ✓ *The factual reasons why the General Theory of Relativity is fundamentally flawed*





9. The Noumenon of God's Spiritual Substance

When bearing in mind that all astrophysicists and all quantum physicists and all metaphysicists and all religionists are trying to rediscover the same ultimate Truth / Reality concerning the true origin of creation, then it should come as no surprise that there is no fundamental difference between the concepts of:

- i) the invisible **dark matter** that all astrophysicists are knowing to underlie the whole of creation*
- ii) the invisible **Higgs bosons** that all quantum physicists are knowing to underlie the whole of creation*
- iii) the invisible **ether** that all metaphysicists are knowing to underlie the whole of creation*
- iv) the invisible **spirit of God** that all religionists are knowing to pervade the whole of creation*

In this regard, let it be specifically noted that:

- *There are some metaphysicists who are already referring to the Higgs bosons as 'the God particles' yet which term is not entirely correct by reason that such Higgs bosons will soon be understood to not be individual particles but them to 'altogether comprise' the but one uniform / undivided / inseparable spiritual substance of God.*
- *The original concept of the ether was derived from the ancient Vedantic philosophy that, within the human region of creation, all of the different aspects of Nature can be archetypically likened unto the five classical elements of earth and water and air and fire and ether. The first three thereof being indicative of the three delusive aspects of Nature and the two last thereof being indicative of, respectively, the true energetic aspects of Nature and the true essence of Nature. As such, the more profoundly these five classical elements of Nature be factually understood, the sooner one will come to realize:*
 - 1) the delusive appearances of all solids (earth)*
 - 2) the delusive appearances of all liquids (water)*
 - 3) the delusive appearances of all gases (air)*
 - 4) the true operational nature of the fiery energies of God (fire)*
 - 5) the true essence of the ethereal spirit of God (ether)*

10. The Properties of God's Spiritual Substance

From the explanations in section 9 can now be surmised that the spiritual substance of God (dark matter, all Higgs bosons, the ether, His spirit) is the only real substance underlying the whole of creation. The intrinsic properties whereof can be factually explained in terms of how all His electromagnetic energies are propagating themselves not only in a wavelike fashion but also at exactly the same speed of light.

10.1. The Extremely High Inelasticity of God's Spiritual Substance

The fact that all electromagnetic energies are propagating themselves in a wavelike fashion can only mean that the spiritual substance of God must be an extremely inelastic substance, i.e. that



His spiritual substance can only be microscopically expanded and contracted whenever and wherever His electromagnetic energies are forcefully propagating themselves across that spiritual substance. This also practically means that, contrary to the postulated General Theory of Relativity, not one such expansion or contraction can ever occur outside the bandwidths of such electromagnetic energies.

10.2. The Extremely High Conductivity of God's Spiritual Substance

The fact that all electromagnetic energies are propagating themselves at exactly the same speed of light (i.e. at nearly 300,000 km/s) can only mean that His spiritual substance is not only a perfectly uniform substance but also an extremely conductive substance. Its extreme conductivity being the natural result of its extreme inelasticity, as can also be surmised from the following analogy:

If a large number of inelastic billiard balls be perfectly lined up with one another, then the energetic force imparted to the first billiard ball will be straightly transmitted (i.e. conducted) via all of the intermediate billiard balls to the last billiard ball. Similarly so, if the substance of God be hypothetically likened unto an infinite number of inelastic Higgs bosons, then such 'Higgs bosons' will be allowing the almost unimpeded propagation of all His wavelike electromagnetic energies.

This furthermore practically means that the spiritual substance of God is in and by itself actually a stationary substance.

The due acknowledgement whereof is of vital importance to one's spiritual understandings. Because it means that, while God's electromagnetic forces are always in a constant flux (i.e. constantly propagating themselves at the speed of light), His underlying spiritual substance is remaining virtually immovable (i.e. excepting for the aforementioned microscopic expansions and contractions). Thusly confirming the metaphysical truth that, notwithstanding the occurrence of all kinds of energetic changes within and throughout the whole of creation, the underlying substantive spirit of God is remaining virtually unchangeable (i.e. incorruptible).

10.3. The Extremely Low Resistivity of God's Spiritual Substance

The extremely low resistivity of God's spiritual substance is but the inverse extent of its extremely high conductivity, in much the same way that a so-called superconductor has nearly no resistivity. As such, although the resistivity of God's spiritual substance is extremely low, it is nevertheless bound to occasion:

- *the extremely slow deterioration of all His electromagnetic energies and of all His dark energies, which is bound to result – as will be duly explained in section 23 – in the emergence of, respectively, all conventional and all unconventional gravitational forces*
- *the occurrence of the so-called Higgs mechanism, as will be duly explained in subsection 31.9.2*

Special note

Although not yet so considered by all quantum scientists, the order of magnitude of that resistivity



can be mathematically guesstimated by way of calculating the ratio between:

- i) the total energy content of all the gravitational forces exerted by a planetary body*
- ii) the total energy content of all the subatomic particles in that planetary body*

11. The Fallacy of The General Theory of Relativity

The General Theory of Relativity, as postulated by Albert Einstein whilst he was trying to understand the true origin of all gravitational forces, is actually not one overall theory but a combination of a few facts and a few assumptions. All in all, that General Theory of Relativity is presuming the so-called fabric of space and time to be some kind of interwoven space-time continuum that is curved / warped / bent in the vicinity of all celestial bodies and that is somehow capable of adapting itself to one's frame of reference. The only way to expose the fallacy of that General Theory of Relativity is for one to thoughtfully consider at first the verity of the relevant facts and then the fallacy of the relevant assumptions:

❖ *The fact that **the speed of light is a constant throughout the entire cosmos***

This fact cannot be disputed by reason that, irrespective of the direction wherein an electromagnetic energy is propagating itself, it will always do so at exactly the same speed of light. As previously explained, the exactitude of that universal speed is a direct result of the extremely high conductivity / extremely low resistivity of God's perfectly uniform spiritual substance.

Special notes

- *It cannot be claimed that an electromagnetic energy is propagating itself at twice the speed of light if so observed from the perspective of another electromagnetic energy that is propagating itself in the opposite direction. Because, from a quantum-physical perspective, each and every electromagnetic energy is always propagating itself at exactly the same speed of light irrespective of one's adopted frame of reference. In other words, the student is to always maintain a clear distinction between the **actual** speed of an energetic entity and the **relative** speed at which two energetic entities are appearing to move in relation to one another.*
- *When visualizing the oscillatory movement of an electromagnetic energy, then it would appear as if its magnetic forces are not always propagating themselves at the speed of light, that they are rhythmically reversing their direction within the bandwidth of that electromagnetic energy. That impression is however a wrong impression due to one trying to maintain an academic distinction between the electric and the magnetic forces of that electromagnetic energy. Because, in reality, the magnetic forces of an electromagnetic energy can never exert themselves independently from the electric forces, which practically means that an **entire** electromagnetic energy will always propagate itself in a perfectly wavelike fashion at exactly the speed of light.*

What the dark energies of God are concerned, their modus operandi needs to be differently understood in that every such dark energy is actually consisting of but only one localised scintillating force, i.e. of but only one rhythmically vacillating magnetic force. Whose movement is being constrained by the inelastic nature of God's spiritual substance and whose



velocity is thusly bound to rhythmically vary from zero (every time it is reversing its direction) to the speed of light (every time it is exerting itself at the midpoint of the scintillation).

❖ **The fact that an energetic entity is due to increase *its mass* whilst it is being energized**

This fact can even so not be disputed in that Albert Einstein's well-proven formula $E = mc^2$ is clearly stating that, since the speed of light (c) is a constant, the energies (E) being added to (subtracted from) an energetic entity are bound to increase (decrease) the operational mass (m) of that energetic entity. Yet bear in mind that, as will hereafter be explained, such is not applicable in the event that one is trying to accelerate a mundane substance to close to the speed of light.

❖ **The assumption that a mundane substance is bound to acquire a *relativistic mass* at close to the speed of light**

This assumption is flawed by reason that, from a quantum-physical perspective, the enormous amounts of energies wherewith to try to accelerate a mundane substance to close to the speed of light would occasion all of its electrons to be stripped from their nuclei. With the result that both the electrons and the nuclei would then become widely dispersed throughout the surrounding environment. And which would then of course result in the complete destruction / defragmentation of that mundane substance.

The assumption that a mundane substance is bound to acquire a so-called relativistic mass at close to the speed of light is therefore clearly a wrong assumption.

❖ **The assumption that *space* is curved / warped / bent nearby celestial bodies**

This assumption appears to have been validated by the observation that the trajectories of light photons are somewhat being deflected nearby massive celestial bodies. Yet, the plain and simple reason thereto is that:

Every electromagnetic photon is consisting of electric and magnetic forces, which practically means that its trajectory cannot but be somewhat deflected by the gravitational forces of a nearby celestial body.

Another phenomenon that is appearing to validate the assumption that space is curved / warped / bent is that a light photon is known to increase (decrease) its frequency – i.e. it becomes so-called blue-shifted (red-shifted) – when propagating itself towards (away from) a massive celestial body. Once again, such is not due to any kind of curvature / warping / bending of space because it is only natural that the energy content of an electromagnetic photon is bound to change to the same extent that it is being subjected to the gravitational forces of a celestial body. In other words, that it is bound to marginally increase (decrease) its frequency whilst propagating itself towards (away from) a massive celestial body.

In this regard, let the student be reminded of the fact that the spiritual substance of God can only be rhythmically expanded and contracted within the narrow bandwidths of His electromagnetic energies. Thusly rendering it utterly impossible for His spiritual essence to ever be macroscopically curved / warped / bent.

❖ **The assumption that *time* is curved / warped / bent nearby celestial bodies**

This assumption is entirely based on the previous assumption in that, if the speed of light is to



remain constant, then every presumed curvature of space would have to necessarily result in a proportionate curvature of time. In other words, the kind of reasoning that gave rise to this particular assumption is:

*If the speed of light [expressed in **km/s**] is to remain constant, then the shortening of a kilometer [**km**] would have to result in a proportionate shortening of the associated second [**s**].*

It is because of such alleged curvatures of space and time that all general relativity theorists have come to believe that it is practically possible:

- i) to travel through a so-called wormhole to a distant galaxy*

The prospect thereof is no doubt very appealing to all science fiction fans but is rendered utterly impossible in terms of the real properties of God's spiritual substance, i.e. which can never be macroscopically curved or warped or bent.

- ii) to travel in time*

The sheer impossibility thereof ought to be patently clear when thoughtfully considering the following paradox:

If it were possible to build a time machine, then that would enable one to travel back in time and to prevent one's parents from ever having met one another. This practically means that one would not have been born, which in turn practically means that one could not have stepped into that time machine.

While, from a scientific perspective, any such 'time travel' is rendered utterly impossible not only because of the exacting operation of the cosmic law of cause and effect but also because of the exacting operation of the law of energy conservation.

❖ ***The assumption that the passage of time is being altered by the speed whereat one is travelling through space***

This assumption appears to have been validated by a number of experiments during which two atomic clocks were made to move at different speeds and during which the faster moving clock was always observed to operate at a somewhat slower pace than the other clock. Which is then being interpreted to mean that the two clocks must have somehow measured a different rate in the passage of time.

What the relevant scientists are failing to understand is that the discrepancy in the 'time display' of such two atomic clocks is not being occasioned by any difference in the passage of time but is due to the two atomic clocks then operating under slightly different energetic conditions. The factual reasons thereto can be relayed as follows:

An atomic clock is consisting of:

- i) a core unit that is specifically designed to measure the so-called electronic transition frequency*
- ii) another unit that is utilizing that frequency to update a digital display of what is then presumed to be the time itself*



Now, the faster an atomic clock is being made to move (accelerated, energized), the greater the microscopic distances will be between its electron orbitals and thusly also the lower the electronic transition frequency will be. Thusly explaining why the digitalized time display of a faster moving atomic clock will be slightly different to the digitalized time display of a slower moving atomic clock.

As such, it is important to acknowledge that no atomic clock can ever measure the time itself but that it can only measure the aforementioned electronic transition frequency, which is bound to somewhat change to the extent whereto such a clock is being accelerated (energized) or decelerated (de-energized).

The above explanations have clearly shown that the cosmos is not some kind of malleable space-time continuum but that it is actually consisting of the substantive spirit of God, which can:

- i) never be macroscopically curved / warped / bent*
- ii) only be microscopically expanded and contracted within the narrow bandwidths wherein His electromagnetic energies are propagating themselves*

To conclude this section, let it be specifically mentioned that it would be presumptuous for any person to doubt the ingenuity of Albert Einstein because of him having conceptualized The General Theory of Relativity. For it cannot be denied that it was his ingenious way of thinking that gave rise to not only the $E = mc^2$ formula but also to the Special Theory of Relativity³.



³ *That Special Theory of Relativity is – rather confusingly – only applicable to all non-relativistic events, all of which can be easily explained in terms of the olden-day Newtonian laws.*



Part VI

The Operational Nature of Dark Energies

WHAT THE STUDENT WILL LEARN FROM THIS PART

- ✓ *How to maintain a clear distinction between the potential energies of God, the dark energies of God, and the electromagnetic energies of God*
- ✓ *The impact of the resistivity of God's spiritual substance on His dark energies*
- ✓ *How to superconsciously experience His dark energies*





12. The Three Major Kinds of Energies

From here onwards, the student is to maintain a clear distinction between the potential energies of God, the dark energies of God, and the electromagnetic energies of God.

12.1. The Potential Energies of God

The potential energies of God are all of the latent / dormant / unutilized powers of God. Needless to say that these are infinitely more numerous and thusly altogether infinitely more powerful than all of His manifested / utilized powers combined.

12.2. The Dark Energies of God

The dark energies of God are those kinds of energies wherewith He is enabling Himself to experience the most ecstatic / exhilarating / scintillating sentiments of joy. Which is why He is at all times maintaining their existence throughout the infinitude of His being and thusly not only within the ambit of His creation.

As previously explained, every such dark energy is not an electromagnetic energy but is actually consisting of but only one tiny scintillating force (i.e. of but only one tiny magnetic force) that can in and by itself not be measured by any present-day scientific instrument. Thusly explaining why – for now – scientists have only been able to infer the actual existence of such dark energies from:

- i) their observations of certain astrophysical phenomena*
- ii) their mathematical calculations pertaining to the total operational mass of the observable cosmos*

12.3. The Electromagnetic Energies of God

The electromagnetic energies of God are those kinds of energies that are propagating themselves in a wavelike / oscillatory fashion within the ambit of His creation. They are the kinds of energies wherewith He made to appear His entire creation.

13. The Impact of the Resistivity of God's Spiritual Substance on His Dark Energies

The extremely low resistivity of God's spiritual substance is occasioning not only all of His electromagnetic energies but also all of His dark energies to ever so slowly lose their strength. Yet unlike His electromagnetic energies, which He is allowing to ever so slowly be converted back into His potential energies (i.e. so as to ensure the ultimate fulfilment of His creation), He is at all times maintaining the existence of His dark energies (i.e. so as to enable Himself to continually enjoy their scintillations). Hence that God is mentally re-strengthening His dark energies whenever He perceives them to have lost some of their strength.

14. How to Superconsciously Experience the Dark Energies of God

*In this regard, let it first be specifically mentioned that there is a vast difference between the **temporary***



pleasures that can be derived from one's exposures to God's oscillating electromagnetic energies and the *everlasting joys* that can be derived from one's discernment of His scintillating dark energies. To give the student some idea of the extent of that difference:

In the same way that one cannot discern the faint light of the stars whilst being exposed to the bright light of the sun, so can one also not superconsciously discern the delicate scintillations of God's dark energies for as long as the mind remains consciously and subconsciously obsessed with (i.e. exclusively fixated on and infatuated with) His much grosser electromagnetic energies.

It can therefore be stated that there is no other way to transcendently re-experience the delicate sensations of God's scintillating dark energies than for one to recultivate during the course of all one's daily meditations the superfine sensitivities of one's spiritual sense. The practical methodologies whereto will be conveyed in Chapter 7 (The Advanced Methods of Truth).

This explains why those who are already spiritually highly advanced are capable of experiencing a far greater measure of such everlasting joys than those who are not yet spiritually advanced.

A Very Important Consideration

The experience of such joyful sensations is to not be mistaken for the experience of one's spiritual feelings. By reason that such joyful sensations are not being occasioned by one's discernment of God's spiritual essence but by one's discernment of His dark / scintillating energies. As such, the experience of the joyful sensations of God's dark / scintillating energies can only yield the most exquisite mental satisfactions but not any spiritual feelings. Even as the pleasurable sensations of God's electromagnetic energies can only excite the mind but not satisfy the soul.

*The question as to whether plants and animals are also capable of experiencing such exquisite joys will be duly addressed in Chapter 3 (The Spiritual Descent of Man). Let it suffice to know for now that within the human region of creation their DNA structures are not as sophisticated as the DNA structures of all human beings and that they are thusly not capable of **intuitively** experiencing such ecstatic joys but only capable of **instinctively** experiencing their own specific kinds of mundane pleasures.*



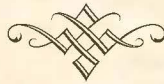


Part VII

The Operational Nature of Forces

WHAT THE STUDENT WILL LEARN FROM THIS PART

- ✓ *The definition and the characteristic features of a physical force*
- ✓ *The definition and the characteristic features of a mental force*
- ✓ *The metaphysical truth that all of the physical forces in creation are actually the mental forces of the Creator*





15. The Broadest Classification of all Natural Forces

If broadly classifying all natural forces into all **physical forces** and all **mental forces**, then it would appear as if the whole of creation is almost entirely consisting of physical forces and of comparatively speaking but few mental forces. That classification does not however negate the fact that each and every physical force and each and every mental force is always a lively force and that – as such – the true origin of all such lively forces can only be explained within the context of the actual existence of **an all-inclusive Life**.

Special note

Up until the time of this writing, no conventional scientist has ever been able to rationally explain the true origin of all the physical (objective) forces in creation and neither of all the mental (subjective) forces in creation. That is, at present, the majority of all scientists are still under the impression that so many billions of years ago the trillions of present-day gargantuan galaxies must have somehow come into being due to the explosion of an incredibly dense basketball-sized object. And the evolutionary theorists are still under the impression that, at some stage during all of such commotions, some inorganic substances must have somehow changed themselves into organic creatures whenever and wherever they 'subjectively' perceived themselves to be in a Life-sustaining environment. Needless to say that all of such illogical assumptions are nothing more than the outcome of the overactive imaginations of such scientists and evolutionary theorists.

Now, for the student to regain the righteous understanding of the true origin of Life, the next three sections serve to progressively convey the true reasons for the existence of all lively forces.

16. The Basic Definition and the Characteristic Features of a Physical Force

From an academic perspective, a **physical force** can be defined as 'the resultant outcome of a physical exertion'. When casually observing the various phenomena in Nature, then it would appear as if entirely new physical forces are being created all the time. Yet such is actually not the case by reason that the occurrence of every 'new' natural phenomenon is merely the result of the conversion of some existing natural forces into differently appearing natural forces. For example:

- When mundanely lifting an object, then the physical forces required to lift that object are being extracted from one's bodily energies as evidenced by the fact that, if one continues to lift heavy objects, then one will soon become fatigued / exhausted.
- The lightning strikes that can be observed to occur during a storm are due to the electrical discharges between those adjacent air layers having a significantly different energy content. Every which electrical discharge is then naturally producing an aerial reverberation known as a thunderclap.

Now, from a quantum-physical perspective, it can be stated that the four so-called fundamental forces of Nature are not really different forces but that they are only appearing to be different because of their different strengths and their different functionalities. That is, as previously explained:



- the gravitational forces are, comparatively speaking, the weakest forces in Nature
- the weak nuclear forces are about 1,000,000,000,000,000,000,000,000 times stronger than the gravitational forces
- the conventional electromagnetic forces are on average about 100,000,000,000 times stronger than the weak nuclear forces
- the strong nuclear forces are on average about 100 times stronger than the conventional electromagnetic forces

17. The Basic Definition and the Characteristic Features of a Mental Force

Similar to a physical force, a **mental force** can be defined as 'the resultant outcome of a mental exertion'. The impact whereof, i.e. of each and every such mental force on one's **bodily forces**, needs to be clearly understood within the context of the following notions:

- The volitional intent to exert a mental force is known as **a will**. There are many psychological terms for 'a will' such as a fancy, a whim, a wish, a want, a desire, a hope, an aspiration, a need, an ambition, a longing, a yearning, a craving, a passion. Each of which terms serves to indicate a different confidence level as to whether or not that volitional intent can be fulfilled / actualized.
- It is only after a will has been activated by the application of one's mental forces that a direct connection is being established between those mental forces and one's bodily forces. Hence that the willful expression of a mental force is colloquially also known as **a willpower** or **a mindpower**. As can also be surmised from the fact that 'the greater (*smaller*) one's willpowers / mindpowers, the greater (*smaller*) will be their impact on one's bodily forces'.
- By reason that the true-to-Life significance of the word **emotion** is 'an energy in motion', every mental power that one activates within oneself is in fact an emotion and is thusly bound to energetically produce a variety of **psychosomatic effects**. In this regard, note that the word 'psychosomatic' can be defined as 'occasioned by the soul or by its incumbent ego (psyche) in the body (soma) by means of the activation of a mental force'.

As such, those not yet having learned how to control their emotions tend to utilize most of their mental powers to engage in **physiological movements** whilst the remainder of such mental powers will then be occasioning a number of inordinate **biological changes** such as, for instance, an excessive release of certain hormones into the bloodstream. Which is why, to mention but one example thereof, a very angry person will tend to:

- i) physically strike out at whatever happens to be in his / her surrounding environment
- ii) secrete an inordinate amount of adrenaline (the fight or flight hormone) into his / her bloodstream

From these explanations can already be surmised that:

- ✓ All wholesome emotions (righteously managed and controlled mental forces) cannot but produce beneficial biological changes in one's physical body while all unwholesome emotions



(unrighteously managed and controlled mental forces) cannot but produce harmful biological changes in one's physical body. Which is why one's every so-called **mood**, which can be defined as 'a temporary state of mind', is to always be a health-enhancing mood and thusly never a health-destroying mood.

In this regard, note that the subsequent chapters will be at length explaining how to righteously manage and control one's energetic emotions so as to enable oneself to at all times remain in touch with one's spiritual feelings. So, let it suffice to know for now that it is actually one's uncontrolled energetic emotions that are perturbing and disturbing one's mind to such an extent that one can no longer discern one's spiritual feelings.

- ✓ From a psychological perspective, every attempt to try to suppress an unwholesome emotion is not a stress-relieving practice but a stress-provoking practice. For in doing so, one has to send additional mental forces to one's muscular tissues so as to try to prevent the expression of that unwholesome emotion. As such, it is the conjoint activation of the mental forces comprising the unwholesome emotion and of the oppositional mental forces wherewith to try to prevent the expression of that unwholesome emotion that is then bound to result in one experiencing all kinds of muscular tensions, which most people are then equating to 'their emotional tensions'. In addition whereto, it ought to be duly noted that:
 - The more one's unwholesome emotions be suppressed, the more the resultant emotional tensions can be intuitively discerned by those having retained or having recultivated their spiritual sensitivities. As evidenced by the fact that a newborn baby for instance is still very sensitive to the emotional environment that it is being exposed to and will thusly tend to be calm and contented in the company of an emotionally calm person (having '**good vibes**') but cry and wail in the company of an emotionally disturbed person (having '**bad vibes**').
 - Most people are trying to alleviate their emotional tensions (i.e. their muscular tensions) by way of vigorously exercising and / or playing interactive sports yet such is only a temporary solution. The permanent solution thereto is for one to altogether prevent the build-up of any such emotional / muscular tensions, by way of one learning to arouse within oneself only the right kinds of emotions.

Let it lastly be mentioned that all earthly creatures are capable of expressing the same kinds of mental powers, i.e. all plants and animals only instinctively so but all human beings both instinctively and intuitively⁴ so. Thusly confirming the fact that all earthly creatures are actually deriving their mental powers from but only one source of Life, which is God.

⁴ Wherever the word 'intuitively' or any variation thereof is used by these teachings, then it needs to be borne in mind that all of one's intuitive notions are actually inclusive of all one's conscientious notions (i.e. in the sense that a conscientious notion is also an intuitively conceived notion). But, by reason that these two kinds of notions are meant to fulfil a different purpose during the actualization of one's spiritual growth, these teachings will be maintaining an academic distinction between them.



18. *The Synonymy of the Forces of Creation and the Forces of the Creator*

*Those who are still materialistically-minded are believing the cosmos to consist of both physical forces and mental forces, of both those kinds of forces they are perceiving to manifest themselves in an objective mode and those kinds of forces they are perceiving to manifest themselves in a subjective mode. Whilst those who are genuinely spiritually-minded have come to acknowledge the fact that God is perfectly capable of exerting His mental forces in as well an objective mode (i.e. in the form of all electromagnetic energies and dark energies) as in a subjective mode (i.e. in His capacity as all living creatures). And that, as such, all of the forces of creation are actually the mental forces of God. As can also be surmised from the fact that each and every such force, irrespective of whether it be a so-called objective force or a so-called subjective force, is always a **lively** force. Thusly evidencing there to be but one all-inclusive **Life** throughout the whole of creation, which is God in His capacity as the whole of creation.*

*In this regard, let it furthermore be duly acknowledged that all of the objectified forces in Nature (the four fundamental forces of Nature) are actually the intrinsic forces of all the electromagnetic energies in Nature. Not one of which wavelike electromagnetic energies would ever be able to forcefully propagate itself if it was not for the underlying substantive spirit of God (the ether, dark matter, all of the Higgs bosons). Thusly explaining why all of such electromagnetic energies are propagating themselves at **exactly** the same speed of light, i.e. by reason of the never-changing extremely high conductivity and the therewith associated never-changing extremely low resistivity of that substantive spirit.*

What all of the subjectified forces in Nature are concerned, let the student henceforth always take due note of the successive interrelationships between:

- i) one's will (volitional intent)*
- ii) one's mental forces (willpowers / mindpowers)*
- iii) the psychosomatic impact of such mental forces on one's bodily forces*
- iv) the impact of such bodily forces on the so-called physical forces of Nature*

Because the sooner these successive interrelationships be perfectly understood, the sooner one will begin to realize there to be a perfect correlation between all of the subjectified forces in creation and all of the objectified forces in creation, that all of them are in fact the mental forces of the Creator.





Part VIII

The Operational Nature of Electromagnetic Energies

WHAT THE STUDENT WILL LEARN FROM THIS PART

- ✓ *How God occasioned the appearance of all His electromagnetic energies*
- ✓ *The basic concept of the magnetic affectations of an electromagnetic energy*
- ✓ *A variety of definitions pertaining to the operational nature of all energies*
- ✓ *The true origin of all gravitational forces*
- ✓ *The three-dimensional aspects of the propagation of an electromagnetic energy*





19. A Brief Review of the Spiritual Significance of all Electromagnetic Energies

The previous explanations have clearly shown:

- God's **thought energies** to actually be all relatively-long radiowave energies
In this regard, note that the manner wherein a sentient being is capable of conceiving and processing and utilizing such relatively-long radiowave energies / thought energies will be at length explained in Chapter 3 (The Spiritual Descent of Man)
- God's **intermediate energies** to actually be all relatively-short radiowave energies and all microwave energies and all infrared energies and all 'visible' light energies and all ultraviolet light energies and all X-ray energies and all gamma ray energies
- God's **subatomic energies** to actually be those intermediate energies that He powerfully 'gathered together' into the spherical forms of all His subatomic particles

Chapter 3 (The Spiritual Descent of Man) will also be conveying the precise manner wherein God selectively utilized all of such electromagnetic energies to structurally configure at first the archangelic region of creation and then the angelic region of creation and finally the human region of creation. That is, in exact accordance with the narration thereof by Moses in the first ten verses of the first Genesis chapter.

20. How God Made all of His Electromagnetic Energies to Appear

The modus operandi that God employed to initialize all of His electromagnetic energies at the advent of His creation – all of them at first in the form of thought energies yet most of which He then later strengthened into all other kinds of electromagnetic energies – can be easily understood in terms of the following metaphor:

[View Figure 18](#)

In a somewhat similar way, at the advent of His creation, God willfully / mentally / forcefully made all of His thought energies to appear across a vast spherical expanse of His spiritual being. Yet bear in mind that, what that metaphor is concerned, one will have to take into account all of the following dissimilarities:

- The rope is consisting of subatomic particles while the spiritual substance of God is consisting of His uniform spirit. Nevertheless, even as the rope can only oscillate within the confines of a particular bandwidth, so can every thought energy also only oscillate within the confines of a particular bandwidth (i.e. due to the extremely high inelasticity of God's spiritual substance).
- The correlated conductive and resistive properties of the rope are allowing the oscillations to only propagate themselves at a mundane speed. The correlated extremely high conductivity and extremely low resistivity of God's spiritual substance are compelling His thought energies to propagate themselves at the universal speed of light.



- Because of the rope in Figure 18 only being moved up and down, the oscillations of the rope are only extending themselves in a two-dimensional fashion. Unlike a thought energy that is bound to propagate itself in a three-dimensional fashion within the confines of its 'tube-like' bandwidth.
- Unlike to how the rope in Figure 18 is made to exoterically oscillate, God utilized His mental powers to esoterically occasion the appearance of all His wavelike thought energies.

21. An Expanded View of the Magnetic Aspects of an Electromagnetic Energy

It was previously relayed that every electromagnetic energy is consisting of both electric forces and magnetic forces and that it is such electric and magnetic forces that are occasioning it to propagate itself in an oscillatory / wavelike fashion, at the speed of light, within a very narrow bandwidth.

At this point, let the student now also acknowledge the fact that it is the magnetic forces of an electromagnetic energy that are giving rise to the occurrence of its so-called **magnetic affectations**:

[View Figure 19](#)

Yet, by reason that an electromagnetic energy is not propagating itself in a two-dimensional fashion but in a three-dimensional fashion, its radially exerted magnetic affectations (i.e. when viewed in a perpendicular plane to its bandwidth) will become more and more dispersed the further and further away from their point of origin. Hence that the combined strength – **per volume of space** – of such magnetic affectations is bound to progressively (i.e. exponentially) diminish the further and further away from their point of origin:

[View Figure 20](#)

Wherefrom can be surmised that the mass-coupling effect between two electromagnetic energies is actually not of an electric nature but of a magnetic nature (i.e. due to their mutually exerted magnetic affectations).

22. A Variety of Definitions Pertaining to the Operational Nature of Energies

The student will find the following definitions and concepts to be applicable not only to all oscillating electromagnetic energies but also to all scintillating dark energies.

22.1. The Correlation between the Concept of Energy and the Concept of Forces

The English word 'energy' was derived from the Greek word 'energeia', which literally means 'the capacity to perform work'. As such, the words 'energy' and 'energetic' can be used to refer to as well 'the work performed by an individual force' as 'the work performed by any aggregate set of forces'.

❖ The Scientific Definition of Energy

From a scientific perspective, the word 'energy' can be defined as 'a scalar quantity of the



amount of work that has been performed, is being performed, or can be performed'. So, within the context of that definition, the scientists are using the term **scalar** when referring to only the magnitude of something and the term **vector** when referring to as well the magnitude as the direction of movement of something.

For example, many physicists are using the scalar term 'the **speed** of an entity' when referring only to the magnitude of its movement and are using the vectorial term 'the **velocity** of an entity' when referring to as well the magnitude as the direction of that movement.

By reason that the concept of vectors will be occasionally used during the forthcoming explanations, it is important for one to know how to graphically combine a number of so-called **vector components** into a **resultant vector**. So, imagine there to be an energetic entity that is being impacted upon by five different forces (the vector forces F_1 to F_5). The way wherein to graphically determine the overall impact of these five forces upon that energetic entity (the resultant force F_R) can be portrayed as follows:

[View Figure 21](#)

❖ The Philosophical Definition of Energy

From a philosophical perspective, the term 'the energetic nature of forces' is synonymous to the term 'the lively nature of forces', wherefrom can be surmised that:

- ✓ the concept of energy is synonymous to the concept of Life
- ✓ every so-called objective force and every so-called subjective force is a lively / spirited expression of that but one all-inclusive Life

From an overall perspective then, the whole of creation can be defined as 'the energetic / lively / spirited manner wherein that all-inclusive Life is cosmologically expressing Itself in the form of all electromagnetic energies and in the form of all living creatures'.

22.2. The Concept of Work

Let it first be mentioned that, if the capacity of an entity to perform work remains dormant, then that entity is said to possess **potential energies** but if that capacity to perform work is being forcefully expressed, then that entity is said to exert **kinetic energies**.

Wherefrom can be surmised the various definitions of the concept of **work** with respect to all of the energies in creation:

- 1) The work / effort required to **divinely initiate** a new force or a coordinated set of new forces

Within the context of the objectified aspects of creation, this definition is pertaining to when God initially occasioned the emergence of all His relatively-long radiowave energies (thought energies) within a vast spherical expanse of His spiritual being.

- 2) The work / effort required to **divinely modify** an existing force or a coordinated set of existing forces

This definition is applicable to when God subsequently strengthened many of His thought



energies into His intermediate energies. The more powerful of which intermediate energies He thereafter gathered together into the spherical forms of all His primordial subatomic particles.

- 3) The work / effort required to **divinely relocate** an existing force or a coordinated set of existing forces

This definition is applicable to when God relocated all of His intermediate energies towards the centre of creation so as to start establishing as well the angelic region of creation as the human region of creation. In this regard, let it be re-emphasized that these energetic processes will be at length explained in Chapter 3 (The Spiritual Descent of Man), i.e. which will be conveying the factual significances of all the verses comprising the biblical story of creation as narrated by Moses.

Note that this mode of 'divine relocation' is very occasionally also being used by a spiritual master but then in a somewhat different way, i.e. by way of him / her first **de-materializing** the body at the current location and then **re-materializing** an identical or a similar body at another location.

- 4) The work / effort required to **mundanely initiate or modify** a force or a coordinated set of forces

As already mentioned in section 16, during such mundane events, not one of the observed forces is a new force but merely the outcome of the transformation / conversion of one or more existing forces.

In this regard, note that the forces required to mundanely move an ordinary object are inclusive of but not limited to:

- i) the forces required to overcome the inertia (resistance to change) of that object
- ii) the forces required to overcome the resistivity of the medium through which or across which that object is being moved

Every which mundane movement can then be either a uniform movement or an acceleration or a deceleration or an elevation or a rotation or a gyration.

22.3. The Concept of Power

The term **power** (**P**) can be defined as 'the amount of work (**W**) that has been done, is being done, can be done per unit of time (**t**)':

$$P = \frac{W}{t}$$

Yet can also be defined as 'the amount of energy (**E**) that has been applied, is being applied, can be applied per unit of time (**t**)':

$$P = \frac{E}{t}$$

The obvious similarity between these two equations yields the following notions:

- from a spiritual perspective, there is no fundamental difference between the concept of work and the concept of energy



- *from a mundane perspective, the energy of an entity is but seldom depleted all at once*
A typical example thereof is a fully charged battery whose chemical energies can be utilized for a number of different applications.

22.4. *The Correlation between the Concept of Inertia and the Concept of Operational Mass*

*The term **inertia** is defined as ‘the forceful resistance of an energetic entity to undergo any change to its current status’ while the term **operational mass** is defined as ‘the quantified measure of that forceful resistance’.*

*As such, it needs to be clearly understood that – as previously conveyed in subsection 7.1.1 – the operational mass of an entity is not a substantive feature but an energetic feature of that entity. And, as such, **only** in terms of how an energetic entity is always **forcefully** resisting its exposure to any other energetic entity. Wherefrom can be surmised that one is to nevermore mistake the weight or the volume of an entity for the mass of that entity, i.e. by reason that the weight of an entity is not an inertial property but a gravitational property and that the volume of an entity is even so not an inertial property but a spatial property.*

In this regard, furthermore note that when a worldly object is sensorially perceived to be in a state of immobility (not moving), then that is actually a misperception by reason that within that object:

- i) *all of its subatomic particles are constantly whirling and spinning at close to the speed of light*
- ii) *all of its electromagnetic energies are propagating themselves at the speed of light*

22.5. *How to Maintain the Distinction between the Various Operational Masses*

When considering all of the energetic entities within the ambit of creation, then the reasons for the occurrences of all their operational masses can be relayed as follows:

- *The operational mass of a gravitational force is consisting of two components:*
 - *the operational mass that it is exhibiting whilst energetically interacting with another gravitational force or with a dark energy or with an electromagnetic energy or with a subatomic particle*
 - *the operational mass that it is exhibiting whilst being exposed to the extremely low resistivity of the spiritual substance of God*

Needless to say that no present-day scientific instrument is capable of measuring the operational mass of an extremely faint individual gravitational force.

- *The operational mass of a dark energy is also consisting of two components:*
 - *the operational mass that it is exhibiting whilst energetically interacting with a gravitational force or with an electromagnetic energy or with a subatomic particle*
 - *the operational mass that it is exhibiting whilst being exposed to the extremely low resistivity of the spiritual substance of God*

Again, needless to say that no present-day scientific instrument is capable of measuring the operational mass of a dark energy.



- The operational mass of an electromagnetic energy is again consisting of two components:
 - the operational mass that it is exhibiting whilst energetically interacting with a gravitational force or with a dark energy or with another electromagnetic energy or with a subatomic particle
 - the operational mass that it is exhibiting whilst being exposed to the extremely low resistivity of the spiritual substance of God

In this regard, note that the electric forces and the magnetic forces of one and the same electromagnetic energy can never energetically clash (discord) with one another by reason that all of such constituent forces cannot but propagate themselves at exactly the same speed of light in a perfectly coordinated wavelike fashion within the tube-like bandwidth of that electromagnetic energy.

Once again, needless to say that no present-day scientific instrument is capable of measuring the operational mass of a singular electromagnetic energy.

- The operational mass of a subatomic particle is to be differently understood by reason that, contrary to the belief of most quantum mechanics physicists, every such subatomic particle is actually a spherical conglomeration of subatomic energies (as will be factually endorsed in Part IX). Therefore, by reason that a subatomic particle is not really a particle but a spherical conglomeration of subatomic energies, its operational mass is bound to consist of not two but three components:
 - The operational mass that it is exhibiting because of its every intrinsic electromagnetic energy being exposed to the magnetic affections of its every other intrinsic electromagnetic energy. As such, it due to their mutually-exerted strong magnetic affectations (their mass-coupling effects) that all of such electromagnetic energies are keeping themselves tightly configured in an overall spherical form (i.e. in the seemingly particulate form of a subatomic particle).

Wherefrom can be surmised that this portion of its operational mass ought to rather be referred to as *its intrinsic operational mass* instead of its rest mass, by reason that the latter term is hardly appropriate in view of the fact that all of its energies are dynamically propagating themselves at the speed of light.

In this regard, note that, if the intrinsic energies of a subatomic particle are not being overly impacted upon by external energies, then they will always propagate themselves in a perfectly coordinated fashion and will as such not collide with one another. Furthermore note that all of such intrinsic energies are actually propagating themselves in a number of clockwise and anti-clockwise layers, thusly occasioning that subatomic particle to have either an overall spin of $\frac{1}{2}$ (in the case of a fermion) or an overall spin of 1 (in the case of a gauge boson).

- The operational mass that it is exhibiting whilst energetically interacting with its outer environment, with all of the gravitational forces and dark energies and electromagnetic



energies and other subatomic particles that it is being exposed to. This second portion of its operational mass thusly being its **extrinsic operational mass**.

- The operational mass that its every intrinsic electromagnetic energy is exhibiting because of it being exposed to the extremely low resistivity of the spiritual substance of God.

23. The True Origin of all Gravitational Forces

The true reasons for the emergence of all gravitational forces has always been one of the greatest mysteries of Nature yet they can now be factually understood in terms of the extremely low resistivity of the spiritual substance / essence of God.

23.1. The True Reasons for the Emergence of all Conventional Gravitational Forces

The extremely low resistivity of God's spiritual substance is occasioning as well the electric energy content as the magnetic energy content of every electromagnetic energy to exceedingly slowly diminish over time, which will occasion it to not only elongate itself (as previously illustrated in Figure 14) but to also decrease its amplitude (as previously illustrated in Figure 15):

- ❖ The gravitational forces that are emerging as a result of the diminishment of the **magnetic** energy content

The easiest way to understand why and how these gravitational forces are bound to emerge is to consider the following thought experiment. Imagine placing two glass plates across the apexes of an electromagnetic energy, one across the highest and one across the lowest points of its oscillations. Now visualize that, over a period of billions of years, the resistivity of God's spiritual substance is occasioning the strength of the magnetic forces of that electromagnetic energy to ever so slowly diminish (to be converted back into His potential energies). That diminishment cannot but then occasion the apexes and consequently also the glass plates to extremely slowly 'move' towards the imaginary x-axis of that electromagnetic energy. It is such inwardly-directed forces (i.e. always attractive forces) that are mundanely known as **the conventional gravitational forces**.

[View Figure 22](#)

- ❖ The gravitational forces that are emerging as a result of the diminishment of the **electric** energy content

The extremely slow diminishment of the electric forces of an electromagnetic energy is even so bound to result in the emergence of exceedingly tiny gravitational forces. But these inwardly-directed gravitational forces are merely somewhat detracting from the outwardly-directed forces that are being occasioned by the then spatial elongation of that electromagnetic energy, which practically means that these kinds of 'electric' gravitational forces can never extend themselves outside the bandwidth of that electromagnetic energy.



As such, it is only the magnetically-exerted conventional gravitational forces (always attractive forces) that can be macroscopically observed to exist.

23.2. The True Reasons for the Emergence of all Unconventional Gravitational Forces

*The manner wherein **the unconventional gravitational forces** of the dark energies are bound to emerge in Nature is analogous to how the conventional gravitational forces of the electromagnetic energies are bound to emerge in Nature. For remember that every dark energy is consisting of but only one scintillating magnetic force, which practically means that the same thought experiment can be applied but without one then having to take into account any electric (forward-moving) forces.*

24. The Three-Dimensional Aspects of an Electromagnetic Energy

As previously mentioned in section 21, an electromagnetic energy is not propagating itself in a two-dimensional fashion but in a three-dimensional fashion:

[View Figure 23a](#)

[View Figure 23b](#)

As such, all of the magnetic forces of an electromagnetic energy are actually consisting of:

- 1) all of its primary magnetic forces, which are occasioning all of the up and down and all of the sideways microscopic movements of God's spiritual substance within the tube-like bandwidth of that electromagnetic energy (as shown in **pink** and in **blue** in Figures 23a and 23b)*
- 2) all of its magnetic affectations (around its tube-like bandwidth, not shown in Figures 23a and 23b), which are the natural result of all such microscopic expansions and contractions*
- 3) all of its conventional gravitational forces (also around its tube-like bandwidth, also not shown in Figures 23a and 23b), which are bound to naturally emerge due to the extremely slow deterioration of as well all of its primary magnetic forces as all of its magnetic affectations*

*All of which primary magnetic forces and magnetic affectations and conventional gravitational forces are thusly collectively constituting **the entire magnetic field of that electromagnetic energy.***





Part IX

The Operational Nature of Subatomic Particles

WHAT THE STUDENT WILL LEARN FROM THIS PART

- ✓ *Every subatomic particle is really but a spherical conglomeration of electromagnetic energies*
- ✓ *The correct interpretation of Albert Einstein's formula $E = mc^2$*
- ✓ *The non-existence of anti-matter versus the existence of anti-particles*
- ✓ *The factual reasons why every subatomic particle is deemed to have a dual nature*
- ✓ *The angular momentum of subatomic particles and, associated therewith, the concept of the Lorentz forces*
- ✓ *The so-called electric charge of a subatomic particle is actually a magnetic charge*
- ✓ *The intended purpose and the classification of the scientific gauge group theories*
- ✓ *The modi operandi of the energetic interactions between the quarkonic particles and, associated therewith, the concept of the colour confinement of the major quarks*
- ✓ *The spiritual significance of the Higgs mechanism*
- ✓ *The various facts and fictions pertaining to the string theories of the quantum string physicists*





As the operational nature of a subatomic particle needs to be understood in terms of not only a few but all of its different kinds of energetic interactions, the student is to first read through this entire Part so as to gain an overall impression of all its contents and to only then meticulously study all of its contents. Note, however, that this temporary change to the study methodology is not negating the intent of the two-staged study approach.

25. The Electromagnetic Nature of Subatomic Particles

This section serves to endorse the fact that every conventionally known subatomic particle is really and truly but a spherical conglomeration of electromagnetic energies.

25.1. The Energetic Conversion of One Subatomic Particle into Another

The following examples serve to show how the appearance and the functionality of a subatomic particle can be energetically changed.

25.1.1. The Energetic Conversion of a Proton into a Neutron

During the thermonuclear fusion of a proton and a highly energized electron, that electron is known to convert that proton into a neutron by way of changing one of its up quarks into a down quark:

[View Figure 24](#)

In this regard, note that – similar to the electrons and the quarks – scientists discovered that a neutrino can be extraordinarily energized. Hence that they are now referring to them:

- *still as neutrinos when they are having a normal energy content*
- *as **muon neutrinos** when their energy content is higher than normal*
- *as **tauon neutrinos** when they are having a significantly higher energy content*

As such, all muon neutrinos and tauon neutrinos are really but differently energized normal neutrinos.

25.1.2. The Energetic Conversions of other Subatomic Particles

During a wide variety of atom-smashing experiments, scientists noticed the occurrence of many other energetic conversions. To mention but a few of them:

- *a gluon can be energetically fissioned (split) into a mesonic quark-antiquark pair and, conversely, a mesonic quark-antiquark pair can be energetically fused (combined) back into a gluon*
- *a W-boson can be fissioned into a tiny up-type of quark and a tiny down-type of quark*
- *a negatively charged W-boson can be fissioned into a nuclear electron [with an overall charge of -1] and an anti-neutrino [having a negligible charge], which nuclear electron is then known to convert an up quark [with an overall charge of $+\frac{2}{3}$] into a down quark [with an overall charge of $-\frac{1}{3}$]*
- *a positively charged W-boson can be fissioned into a nuclear anti-electron [with an overall charge of +1] and a neutrino [having a negligible charge], which nuclear*



anti-electron is then known to convert a down quark [with an overall charge of $-\frac{1}{3}$] into an up quark [with an overall charge of $+\frac{2}{3}$]

- a Z-boson can be fissioned into a tiny fermion and a tiny anti-fermion

As such, it ought to be self-evident that not one of these kinds of energetic conversions could ever occur if it was not for the fact that every simple subatomic particle is actually consisting of a spherical conglomeration of electromagnetic energies.

25.2. The Energetic Manipulation of Simple Subatomic Particles

It is a well-known fact amongst all quantum physicists that every kind of low-energy (high-energy) simple subatomic particle can be energized (de-energized) into a high-energy (low-energy) simple subatomic particle by way of adding photons unto it (extracting photons from it). Thusly again endorsing the fact that every kind of simple subatomic particle and every kind of photonic particle is really and truly but a spherical conglomeration of electromagnetic energies. To mention but one example of such a manipulation:

If an electron be made to absorb a packet of electromagnetic energies in the form of a spherical photon, then that sudden increase in its energy content will occasion it to jump to a higher orbital (scientifically known as a **quantum leap**). Which process can then be repeated for as many times as is necessary for that electron to escape the nucleus and to thusly become a so-called **free electron**. And conversely, if—hypothetically speaking—it were possible to extract all of the electromagnetic energies from an electron, then that electron would simply cease to exist.

Special note

Scientists are currently trying to extract all of the electromagnetic energies from a specially selected assortment of subatomic particles by way of applying to them a variety of so-called laser cooling techniques (occasioning such subatomic particles to then assume the so-called fifth state of ordinary matter known as a Bose-Einstein condensate). Yet, it should be duly noted that it is impossible to extract all of the electromagnetic energies from a subatomic particle by reason that it will then start to energetically interact with the subatomic particles of the container wherein it is confined and it to thusly keep on energetically 'replenishing' itself.

25.3. The Phenomenon of Two Gauge Bosons Briefly Occupying the Same Volume of Space

The observed phenomenon that certain gauge bosons (such as the W-bosons and Z-bosons) are capable of momentarily passing through one another can, quite understandably, never be explained for as long as they are presumed to be 'solid' subatomic particles. That phenomenon can however be easily explained when acknowledging the fact that every such gauge boson is really but a spherical conglomeration of electromagnetic energies.

So, why is it that only the gauge bosons can pass through one another and not the fermions? Well the answer thereto is that:

- the mutually-exerted magnetic affectations of the electromagnetic energies of a gauge boson



are weak enough to allow the electromagnetic energies of another gauge boson to pass through them

- the mutually-exerted magnetic affectations of the electromagnetic energies of a fermionic particle are much stronger and are thusly not allowing the electromagnetic energies of any whichever other particle to pass through them

25.4. The Scientific Significance of the Formula $E = mc^2$

It is the misinterpretation of Albert Einstein's formula $E = mc^2$ that is occasioning so many people to wrongly assume the synonymy of energy and mass and, even worse, the synonymy of energy and matter. That is, because of them not yet understanding the true significance of that formula in terms of the energetic processes that are bound to occur during every nuclear fission chain reaction and every nuclear fusion chain reaction.

The energetic processes that are bound to occur during a nuclear fission chain reaction

During the enforced fission of highly unstable nuclei, a relatively small percentage (about 0.1%) of the **gluonic energies** of such nuclei – usually referred to as the mass defect but which should instead be referred to as **the energy defect** – are being explosively dispersed throughout the surrounding environment in the seemingly particulate forms of:

- i) gamma ray photons, many of which will then quite naturally fission into an assortment of X-ray photons and ultraviolet light photons and 'visible' light photons and infrared photons
- ii) other simple subatomic particles, **such as the aforementioned beta particles**
- iii) composite particles, **such as the aforementioned alpha particles**

That basic modus operandi of a nuclear fission chain reaction is invariably the same irrespective of the nuclear fission 'materials' being used, such as enriched uranium or enriched plutonium:

[View Figure 25](#)

The energetic processes that are bound to occur during a thermonuclear fusion reaction

The thermonuclear fusion of hydrogen nuclei into helium nuclei is even so occasioning a relatively small percentage (about 0.7%) of the gluonic energies of the hydrogen nuclei – again often incorrectly referred to as the mass defect instead of the energy defect – to be explosively dispersed throughout the surrounding environment in the form of many gamma ray photons. Many of which will then again quite naturally fission into an assortment of X-ray photons and ultraviolet light photons and 'visible' light photons and infrared photons

[View Figure 26](#)

Exactly the same kinds of thermonuclear fusion reactions are constantly occurring all throughout the extremely hot interior of the sun. That is, each and every second the sun is known to convert about 600 million metric tons of hydrogen nuclei into helium nuclei. Thusly resulting in such nuclei then each and every second releasing an amount of energies (the energy defect) that is equivalent to about 4 million tons of its operational mass. Which may well seem to be a formidable rate by



human standards but which is really but a tiny rate by cosmic standards, i.e. as evidenced by the fact that even after 4.6 billion years since its formation the sun is still consisting of about 75% hydrogen nuclei.

In this regard, note that the inner core of the sun is estimated to have a temperature of about 14,000,000 °C while the temperature at its surface is about 6,000 °C. As such, during their slow transition from the inner core to the outer layers of the sun, the released gluonic energies will at first manifest themselves as gamma ray photons. But will then, due to the lower and lower temperatures and pressures, subsequently fission into progressively less powerful photons. All of which will then be radiated into space by the electrons in the outer layers of the sun.

The correct interpretation of Albert Einstein's formula $E = mc^2$

At present, it is but seldom realized – even by the scientific community – that the formula $E = mc^2$ is not only applicable to every conventionally known subatomic particle but also to every singular electromagnetic energy and in fact also to every singular force. By reason that each and every kind of energetic entity does have at least some energy content E (expressed in eV) and will therefore be exhibiting at least some operational mass m (expressed in eV/c^2), i.e. as per that $E = mc^2$ formula.

In other words, the claim of so many scientists that one or other energetic entity (such as a simple photon for instance) does not have an operational mass is contradictory to the true meaning of Albert Einstein's $E = mc^2$ formula and is thusly an invalid claim.

In this regard, note that:

- i) The **electronvolt** (eV) is the scientific unit that quantum physicists use to denote the energy content (E) of a subatomic particle (as will soon be illustrated in Figures 28 and 29).

As indicated by the words 'electron' and 'volt' therein, **one** electronvolt is defined as 'the amount of energy / work / effort required to transit **one** electron across a potential difference of **one** Volt'.

- ii) The operational mass (m) of an energetic entity is conventionally but rather confusingly notated in eV/c^2 units (i.e. as per the restructured formula $m = E/c^2$). As such, in order to arrive at the actual value of the operational mass (m) of an energetic entity, its energy content (E) is to be divided by the square of the speed of light (c^2). For example, if a subatomic particle has an energy content (E) of 1MeV (i.e. 1,000,000 eV), then its operational mass (m) is:

$$m = \frac{E}{c^2} = \frac{1,000,000}{(3 \times 10^8)^2} \frac{\text{eV}}{(\text{m/s})^2} = 1.11111 \times 10^{-11} \frac{\text{eV}}{(\text{m/s})^2} = 0.000000000111111 \frac{\text{eV}}{(\text{m/s})^2}$$

As such, because of the energy content (E) and the operational mass (m) of an energetic entity always differing by the factor c^2 , they are not equal to one another but only proportional to one another.

The conventionally reported energy contents and operational masses of nuclear particles

The following table serves to portray how the quantum physicists are currently reporting the energy contents and the operational masses of the normal (i.e. not highly or very highly energized) simple and composite nuclear particles:

View Figure 27



25.5. The Non-Existence of Anti-Matter versus the Existence of Anti-Particles

The term 'anti-matter' is most definitely a misnomer:

- i) not only within the context of every subatomic particle, i.e. which is a spherical conglomeration of electromagnetic energies and which can thusly not have any 'anti-material' features
- ii) but also within the context of God's spiritual essence, which perfectly uniform substance can clearly also not have any 'anti-material' features

The term 'anti-particle', on the other hand, can be justifiably used but only within the context of the following notions:

- When considering two equally-strong but directionally-opposed forces, then any one of them can be regarded as 'a normal force' and the other one as 'its anti-force'. But bear in mind that both these forces are identically the same except for the fact that they are exerting themselves in opposite directions.
- On a larger scale, when considering two equally-strong but frequently-opposed electromagnetic energies, then any one of them can be regarded as 'a normal energy' and the other one as 'its anti-energy'. But again bear in mind that both these electromagnetic energies are identically the same except for the fact that they are propagating themselves in a so-called symmetrical (mirrored) fashion.
- On an even larger scale, when considering two as powerful subatomic particles whose intrinsic energies are frequently-opposed to one another [resulting in them then having an opposite spin and an opposite magnetic charge], then one of them can be regarded as 'a normal particle' and the other one as 'its anti-particle'. But once again bear in mind that both these subatomic particles are identically the same except for the fact that the electromagnetic energies of the one particle are frequently-opposed to the electromagnetic energies of the other particle.

In other words, whether an energetic entity is deemed to be a normal force / energy / particle or deemed to be an anti-force / anti-energy / anti-particle is merely a matter of convention. And does most certainly **not** mean that any such force or energy or subatomic particle has any 'anti-material' features.

Special notes

- In most instances, the assigned name of an anti-particle is the same as of its normal particle but with the prefix 'anti-' (e.g. an anti-quark or an anti-neutrino). It is only in a few instances that scientists decided to assign a different name to such an anti-particle. Such as the positron, for instance, in the case of an anti-electron.
- When a normal subatomic particle and its anti-particle are being made to forcefully collide with one another, then one might at first expect them to completely annihilate one another, i.e.



because of their electromagnetic energies being symmetrically opposed to one another. Yet they will, because of them spinning extremely rapidly in opposite directions, always explosively scatter all of their constituent energies throughout the surrounding environment in the form of:

- i) several smaller pairs of normal particles and anti-particles*
- ii) a multitude of simple photons*

25.6. The Dual Nature of Subatomic Particles

The claim that a subatomic particle has a dual nature (i.e. that it has at the same time both 'solid' and 'wavelike' properties) is being perpetuated by those scientists who are still failing to understand that every simple subatomic particle is actually a spherical conglomeration of electromagnetic energies and who are thusly failing to acknowledge that:

- o If a subatomic particle is propagating itself without encountering any significant obstacle, then it is bound to retain its overall spherical shape and will thusly appear to have a **particulate** form.*
- o But if a subatomic particle is encountering a significant obstacle, then some of its energies are bound to be weakened because of their exposure to that obstacle. Thusly occasioning them to lower their frequency and to lengthen their wavelength, and to thusly reveal their **wavelike** properties.*

*The verity thereof can also be surmised from the **Heisenberg Uncertainty Principle**, which is specifically stating that certain paired properties of a subatomic particle cannot be simultaneously measured. Which is why, whenever a scientist intends to measure either the one or the other of such a paired property, then he / she must make an upfront decision as to which one to measure. By reason that the methodologies that he / she will then have to apply to measure the one paired property is bound to automatically render the other paired property immeasurable. For example:*

- o When trying to determine the trajectory of a subatomic particle, then it needs to have a high energy content so that it will manifest itself as if it were a pinpoint particle. Yet it is that high energy content that is then occasioning its constituent electromagnetic energies to have such a high frequency and such a small wavelength that they can no longer be measured.*
- o Conversely, when trying to measure the frequency or the wavelength of the electromagnetic energies of a subatomic particle, then they must necessarily have a much lower energy content so that they become much more elongated. Yet which elongations will then be rendering the trajectory of that subatomic particle indefinite and thusly indeterminate.*

As such, the misconception that a subatomic particle has a dual nature is akin to the misconception that a spring – which can as well be compacted as elongated – has a dual nature. Instead, it should be duly acknowledged that a subatomic particle is actually a spherical conglomeration of many wavelike electromagnetic energies that, if they be de-energized (elongated), cannot but then begin to show their wavelike properties.



In this regard, let the student also take note of the fact that all other so-called uncertainty principles in the field of science are actually not indicative of any uncertainties in Nature but that they are indicative of the inability of scientists to gather all of the scientific data that they require to make the right kinds of predictions. To give but three typical examples thereof:

- *climatologists are still unable to predict medium-term and long-term weather patterns, because of them not having all of the relevant data*
- *quantum physicists are still unable to predict exactly where the so-called virtual subatomic particles will be appearing and disappearing within an atomic nucleus, because of their scientific instruments still being – relatively speaking – very primitive*
- *naturalists are still baffled by the way a leaf is appearing to chaotically move on the surface of a turbulent stream, which not surprisingly led to the formulation of all kinds of ‘chaos theories’*

It is the implausibility of all such uncertainty principles and chaos theories that led Albert Einstein to completely reject them. For in his mind, absolutely nothing in the whole of Nature can ever happen by chance but has to always be the natural result of the infallible operation of the cosmic law of cause and effect. Which is why he chose to declare:

- *“God does not play dice with the universe”*
- *“When the number of factors coming into play in a phenomenological complex is too large, scientific method in most cases fails us. One need only think of the weather, in which case prediction even for a few days ahead is impossible. Nevertheless, no one doubts that we are confronted with a causal connection whose causal components are in the main known to us. Occurrences in this domain are beyond the reach of exact prediction because of the variety of factors in operation, not because of any lack of order in nature”*

26. The Relative Energy Contents of the Steadily Appearing Subatomic Particles

It was previously mentioned that the energy content of a subatomic particle can greatly vary depending on how many of which specific kind of electromagnetic energies it is consisting of. The following table serves to illustrate to what extent a normal quark and a normal electron and a normal neutrino can be energized:

[View Figure 28](#)

27. The Angular Momentum of Subatomic Particles

*The **total angular momentum** of a subatomic particle is the vectorial sum of:*

- i) *Its **intrinsic angular momentum**, which can be defined as ‘the measure of its inherent rotation around its own axis’. It is this kind of momentum that scientists are referring to as the spin of a subatomic particle.*

Special note

When viewed in the direction of its forward movement, then a normal subatomic particle will



always appear to be spinning around its own axis in a clockwise manner while an anti-particle will always appear to be spinning around its own axis in an anti-clockwise manner.

- ii) Its **extrinsic angular momentum**, which can be defined as 'the measure whereto the spin of a subatomic particle is being hastened or slowed due to its exposure to the forces of other energetic entities'. As such, the extrinsic angular momentum of a subatomic particle will always be marginally accelerated by every nearby subatomic particle having a similar spin and marginally decelerated by every nearby subatomic particle having an opposite spin.

[View Figure 29](#)

The total angular momentum of a subatomic particle can therefore – from a functional perspective – be somewhat likened to the total angular momentum of the Earth in the sense that:

- The Earth also has its own intrinsic angular momentum, which is occasioning it to revolve only once around its own axis every 24 hours.

Yet bear in mind that, unlike the Earth, a subatomic particle is spinning many times around its own axis over the period of but a tiny fraction of a second.

- The Earth also has an extrinsic angular momentum, because of it at all times being exposed to the gravitational forces of the sun and of the moon and of the other planets.

28. The Origin of the Lorentz Force

The concept of the **Lorentz force** is an important concept in quantum physics. For it is the force that a subatomic particle is bound to experience whilst being exposed to the magnetic affectations of other energetic entities.

The reason for its emergence is best understood by means of the following metaphor:

Imagine a pool table whereupon a stationary billiard ball is spinning at a very fast speed in a clockwise direction. If then slightly touching that billiard ball with a cue, then it will start to move towards the right.

[View Figure 30](#)

The following illustration serves to show how, in a similar manner, an orbital electron is bound to experience a Lorentz force if it be subjected to a strong magnetic affectation.

[View Figure 31](#)

In the event that such electrons have been dislodged from their nuclei and if they then be subjected to a series of sufficiently strong one-sided magnetic affectations, then all of the Lorentz forces that they are bound to experience will compel them to assume a so-called **cyclotronic trajectory**:

[View Figure 32](#)

The Correlation between the Lorentz Force Law and the Faraday Law of Induction

Richard Feynman was the first scientist to recognize the correlation between:



- i) the *Lorentz Force Law*, which basically states that the electrons in an electrical wire will be compelled to move in a synchronized fashion when subjected to an external magnetic field (magnetic affectations)
- ii) the *Faraday Law of Induction*, which basically states that the synchronized movement of the electrons in an electrical wire is bound to result in them shifting their own magnetic field in the direction of that movement (magnetic affectations)

It was however only at a later stage that Albert Einstein, who was well aware of the writings of Richard Feynman, managed to mathematically reconcile the two sets of formulas. As such, it is ever since then that all technologists are using whichever of these two sets of formulas they are deeming the easiest to apply to a particular electrical application (such as to an electrical motor or an electrical generator or an electrical transformer).

29. The Magnetic Charge of Subatomic Particles

The purpose of this section is to unambiguously show that the so-called electric charge of a subatomic particle is actually a magnetic charge, as in fact so evidenced by the phenomenon that two subatomic particles with a similar (dissimilar) charge are always magnetically repelling (attracting) one another. The rationale whereof needs to be understood in terms of how every subatomic particle is bound to exert all of its electric and magnetic forces:

i) The electric forces of a subatomic particle

As clearly shown in Figure 19, the electric forces of an electromagnetic energy can only longitudinally propagate themselves within the confines of its 'tube-like' bandwidth. Thusly rendering it impossible for a subatomic particle to have an external electric field, which practically means that not one such subatomic particle can ever have an external electric charge.

ii) The internal magnetic field of a subatomic particle

When temporarily ignoring all gravitational forces, then the internal magnetic field of a subatomic particle can be thought to consist of:

- the primary magnetic forces of its constituent electromagnetic energies

These are the forces that are almost entirely being utilized to occasion the microscopic expansions and contractions of God's spiritual substance within the 'tube-like' bandwidth of every constituent electromagnetic energy.

- the magnetic affectations of its constituent electromagnetic energies

Most of these are being utilized to maintain the powerful magnetic mass-coupling effects between the constituent electromagnetic energies of that subatomic particle. Thusly resulting in it maintaining its overall spherical shape.

With a *mass-coupling effect* being defined as 'the observed outcome of two energetic entities mutually subjecting one another to their magnetic affectations'.

In other words, whichever magnetic forces are being utilized inside a subatomic particle cannot manifest themselves outside that subatomic particle. Excepting of course in the event that it should be subjected to, for instance, an atom-smashing experiment.



iii) *The external magnetic field of a subatomic particle*

The external magnetic field of a subatomic particle is therefore consisting of the remainder of the aforementioned magnetic affectations, i.e. of those that are not being utilized to maintain the mass-coupling effects between the electromagnetic energies of that subatomic particle. As such, it is the sum total of all such surplus magnetic affectations that scientists are referring to as the electric charge of a subatomic particle but which is actually the magnetic charge of that subatomic particle. Which is why, from here onwards, this chapter will no longer refer to the electric charge of a subatomic particle but will instead be referring to the magnetic charge of a subatomic particle.

Now, it is easier for one to understand the way wherein the external magnetic field of a subatomic particle is exerting itself in a three-dimensional fashion if such exertions be academically portrayed in a two-dimensional fashion. Which portrayal is usually consisting of an arbitrarily chosen number of concentric circles whereat the external magnetic affectations are appearing to have a diminishing strength. Yet let the student be reminded of the fact that it is not the individual strength of every such magnetic affectation that is diminishing over distance but only their combined strength per volume of space (i.e. because of, as illustrated in Figure 20, them then becoming all the more widely dispersed over space).

[View Figure 33](#)

Let it lastly be mentioned that scientists adopted the magnetic charge of a proton as the standard against which they are comparing the magnetic charge of every other subatomic particle. Hence that the magnetic charge of a proton is scientifically also known as *the elementary charge*:

[View Figure 34](#)

30. *A Classification of the Scientifically Applied Gauge Group Theories*

Quantum physicists are using a number of *gauge group theories* to try to better understand how the different kinds of subatomic particles are energetically interacting with one another. So, let us first consider the most basic definition of a gauge group and then the manner wherein such gauge group theories are being applied in the field of quantum physics.

The most basic definition of a gauge group

From a most generic perspective, a *gauge group* can be defined as 'a group of entities that can be appraised or measured (gauged) to have one or more identical or comparable features'. In terms of that definition, the whole of creation can be referred to as one *Grand Gauge Group* in that all of its energies are actually the mental powers of God. However, by reason that the quantum physicists are not yet considering the mental and the spiritual aspects of creation, they have adopted their own kinds of *gauge group theories* wherewith they are trying to mathematically model the energetic behaviours of the different kinds of subatomic particles in terms of their so-called *two-dimensional symmetries* and *three-dimensional supersymmetries*. In this regard, note that:



- the terms 'symmetries' and 'supersymmetries' were somewhat ill-conceived by reason that they are not necessarily referring to mirror images but that they can also refer to any kind of similar quantum-physical features such as a similar energy content or a similar magnetic charge or a similar angular momentum
- unlike the quantum mechanics physicists, the quantum string physicists are defining their supersymmetries in view of the interrelationships between the 'material' aspects of Nature and the 'energetic' aspects of Nature

The various interpretations whereof are now known as the different *string theories*, the most popular whereof will soon be conveyed in section 32.

How scientists are applying the gauge group theories

Their gauge group theories are based on a wide variety of intricate concepts known as parities and chiralities and isospins and Langrarian invariants and as abelian & non-abelian groupings and as quantum gauge fields, and so on. What the average student of these teachings is concerned, let it suffice for him / her to only acknowledge that:

- All subatomic particles have been categorized into three quantum gauge groups – known as the $U(1)$ and $SU(2)$ and $SU(3)$ gauge groups – as a means to try to reconcile the properties of two or more subatomic particles before and after their energetic interactions.
- To give but one example of the practicality of that categorization. Many years ago, scientists succeeded in fusing a proton and a highly energized electron into a neutron but noticed that the spin of the resultant neutron did not exactly match the vectorial sum of the spins of the proton and the electron. Hence that they began to search for a 'missing particle' whose spin was to match the observed discrepancy, which they then found to be a tiny neutrino.
- The quantum mechanics physicists are continuing to apply these quantum gauge group theories in the hope that they will eventually be able to factually understand the common origin of all strong nuclear and conventional electromagnetic and weak nuclear forces.

31. The Energetic Interactions between the Quarkonic Particles

The main intent of this section is to scientifically endorse the fact that the gluons and the W -bosons and the Z -bosons and the mesonic quarks of a nucleon are actually the resultant outcome of the powerful energetic interactions between the three major quarks of that nucleon. All of which energetic interactions can, contrary to the opinion of some mathematicians, be straightforwardly understood from a process-related perspective.

31.1. The Basic Modus Operandi of the Major Quarks

Even as the orbital electrons are capable of emitting and absorbing electronic photons, so are the major quarks of a nucleon also capable of emitting and absorbing *quarkonic photons*. Each of which is consisting of but a few gamma ray energies, thusly rendering their size so small that they cannot be detected by any present-day scientific instrument. Excepting when, as will soon become apparent, the mutually exerted magnetic affectations of such quarkonic photons are compelling



them to aggregate themselves either into a fleetingly appearing gluon or W-boson or Z-boson or into a mesonic quark.

Now, the reason why such quarkonic photons cannot escape their nucleon (proton or neutron) can be relayed as follows:

The major quarks of a nucleon are not only confined to a very small volume of space but they are also extremely powerful and thusly bound to exert very powerful magnetic affectations. Hence that every quarkonic photon being emitted by a major quark cannot but then always follow, as previously explained in section 28, a sharply-curved cyclotronic trajectory back towards the centre of that proton / neutron. This practically means that, under normal circumstances and apart from the very few quarkonic photons that are intermediating the internucleonic forces (these will soon be explained in subsection 31.4), not one other such quarkonic photon can ever escape that proton / neutron.

Another major aspect of the *modus operandi* of the major quarks is known as 'the colour confinement of the major quarks', as will be explained in subsection 31.7.

31.2. The Basic Modus Operandi of the Gluons

*The gluons are those fleetingly appearing-and-disappearing aggregations of quarkonic photons whose strong nuclear forces are known to stabilize the triangular structure of the three major quarks. Hence that the magnetic affectations exerted by such gluons are also known as the **binding energies** of every proton and of every neutron.*

*Now, under normal circumstances, such gluonic energies are being fully utilized to maintain the stability of the protonic or neutronic structure, which practically means that their strength cannot be measured beyond the perimeter of that protonic or neutronic structure. Thusly explaining why most scientists are still under the impression that, as shown in Figure 27, the total energy content of a gluon is less than 20MeV. Yet the falsity whereof is actually evidenced by the enormous amounts of energies of even a tiny fraction of such gluonic energies / powers being released into the surrounding environment during a nuclear fission chain reaction or a nuclear fusion chain reaction. For, in reality, it simply cannot be that the total energy content of a gluon (intermediating the **strong** nuclear forces) can ever be smaller than the total energy content of a W-boson or a Z-boson (intermediating the **weak** nuclear forces).*

31.3. The Basic Modus Operandi of the W-bosons and the Z-bosons

The W-bosons and the Z-bosons are those fleetingly appearing-and-disappearing aggregations of quarkonic photons whose weak nuclear forces are known to very slowly destabilize the nuclear structure of every proton and of every neutron.

*The reason why the **W-bosons** are having that destabilizing effect is that they are not always transferring all of the energies that they are receiving from one major quark (i.e. in the form of quarkonic photons) to the next major quark. The resultant difference then being an extremely tiny energy defect (loss of energies). Hence that they are, in a cyclical fashion, actually occasioning the energy contents of the three major quarks to extremely slowly diminish, which is then resulting in*



an as slow weakening of the gluonic / binding energies of the three major quarks. The actual processes whereof can be relayed as follows:

As previously explained in subsection 25.1.2, a negatively (positively) charged *W*-boson can be thought of as the combination of a nuclear electron (nuclear anti-electron) and an anti-neutrino (neutrino). As such, during the exchange of such a negatively (positively) charged *W*-boson between two major quarks, it is only the nuclear electron (nuclear anti-electron) that will be exchanged between the major quarks and that will thusly change:

- i) the 'donor' up quark (down quark) into a down quark (up quark)
- ii) the 'recipient' down quark (up quark) into an up quark (down quark)

This practically means that, as shown in Figure 35, the tiny anti-neutrino (neutrino) of that negatively (positively) charged *W*-boson will then not be absorbed by the recipient major quark.

[View Figure 35](#)

In this regard, let it be emphasized that the energetic exchanges of the *W*-bosons between the three major quarks are always occurring in a perfectly synchronized fashion. So that every proton [consisting of two up quarks and one down quark] is bound to quite naturally remain a proton and so that every neutron [consisting of one up quark and two down quarks] is bound to naturally remain a neutron.

The reason why the **Z-bosons** are even so having a destabilizing effect cannot be that easily conveyed in layman's terms. As such, let it suffice for the student to acknowledge that it has been both mathematically proven and experimentally verified that the exchange of the *Z*-bosons between the three major quarks is also having a destabilizing effect on the entire nucleus, i.e. because of the then even so extremely slow weakening of all its gluonic / binding energies.

31.4. The Basic Modus Operandi of the Mesonic Quarks

Because of every major quark having a magnetic north pole and a magnetic south pole, some of the quarkonic photons and other tiny particles will be magnetically drawn towards these poles where they are bound to aggregate into a steadily appearing mesonic quark (at the one pole) and a steadily appearing mesonic anti-quark (at the other pole).

During a wide variety of atom-smashing experiments at all kinds of different energy levels, scientists discovered what they are believing to be many different kinds of mesonic quarks and mesonic anti-quarks. The detailed classifications and names whereof are inconsequential to the seeker of Truth by reason that all of such seemingly different mesonic quarks and anti-quarks are really but differently configured conglomerations of the same kinds of quarkonic photons.

Special note

It has been scientifically verified that these mesonic quarks (mesonic anti-quarks) are actually absorbing the neutrinos (anti-neutrinos) of the *W*-bosons, i.e. whenever such a *W*-boson is being fissioned into an anti-electron and a neutrino (an electron and an anti-neutrino). Now, partly because of these ongoing absorptions, the mesonic quarks and anti-quarks will – similar to the



major quarks – then also be emitting their own quarkonic photons. Some of which will then be breaching the perimeter of the nucleon and will thusly – because of their magnetic affectations – help to maintain the magnetic bonds between all of the protons and all of the neutrons of the atomic nucleus. As such, it is these kinds of ‘escapist’ magnetic forces that are then scientifically known as *the internucleonic forces*.

31.5. The Emergence of the Ghost Particles

Every so-called ghost particle can now be understood to be a very fleetingly appearing-and-disappearing aggregation of but a very few quarkonic photons that are bound to occasion some very tiny fluctuations in the force field of the proton / neutron.

31.6. The Non-Existence of Gravitons

By virtue of the fact that the emergence of all the conventional gravitational forces is actually due to the extremely slow deterioration of all electromagnetic energies in creation, it is no longer necessary for any quantum physicist to presume the existence of gravitons.

31.7. The Colour Confinement of the Major Quarks

The term ‘*the colour confinement of the major quarks*’ is meant to refer to the way wherein the three major quarks of a proton / neutron are remaining confined to the interior of that proton / neutron. From an academic perspective, the relevant processes need to be understood not only in terms of the energetic confinement itself but also in terms of how the three major quarks are cyclically exchanging their so-called colour charges.

The energetic confinement of the three major quarks

Let the student first be reminded of the relative positioning of the three major quarks within every nucleon:

[View Figure 36](#)

Now, whenever quantum physicists are trying to separate the three major quarks of a nucleon during an atom-smashing experiment, then they are invariably finding it impossible to do so. By reason that every major quark is consisting of many gamma ray energies and thusly of many potential quarkonic photons. All of which quarkonic photons will, if one tries to separate the major quarks, then quite naturally reposition themselves to where they used to be, i.e. because of the magnetic pull of the proton’s / neutron’s gluonic (binding) energies.

As such, the natural confinement of the three major quarks within a proton / neutron is in fact always being enforced by the gluonic (binding) energies of that proton / neutron.

The affiliated manner wherein the three major quarks are cyclically exchanging their colour charges

The way wherein quantum physicists are trying to understand the underlying reasons for that confinement is by means of the arbitrary assignment of a different primary colour to each of the three major quarks – i.e. red, green, and blue. As such, let it be duly noted that these three



arbitrarily assigned colours are only meant to facilitate the understandings of how the three major quarks are cyclically exchanging their so-called **colour charges**.

View Figure 37

During the course of their experiments, it became apparent that:

- the three major quarks are selectively exchanging their colour charges with one another in the form of eight different kinds of gluons (as represented by the so-called Gell-Mann matrices)
- every such gluon has not one but two colour charges

For in the rather exotic language of such 'colour terminologies', a gluon can have for instance both an anti-red colour charge and a green colour charge and is thusly capable of changing a red quark into a green quark.

Thusly ensuring:

- i) not only the confinement of the three major quarks in the proton / neutron, i.e. because of the strong nuclear forces of such gluons
- ii) but also the concerted propagation of such three major quarks on one or other quark orbital, i.e. because of every such kind of gluon exerting its strong nuclear forces in a different pattern and thusly in a different direction

Special notes

- As already mentioned in the special notes to Figure 37, it is important for one to henceforth maintain a clear distinction between the magnetic charge of a major quark and the colour charge of a major quark. By reason that:
 - The exchange of the nuclear electron (nuclear anti-electron) of a negatively (positively) charged **W-boson** between two major quarks is bound to change the **magnetic charges** of such major quarks, as depicted in Figure 35.
 - The exchange of a **gluon** between two major quarks is bound to change the **colour charges** of such major quarks, to change the **direction** wherein they are predominantly exerting their magnetic affectations / forces towards one another.
- Although the powerful forces of the gluons are known to keep the major quarks confined within the perimeter of the nucleon, such major quarks will nevertheless not collapse into one another because of their differently oriented electromagnetic forces (i.e. at a variance of 120° to one another). As such, if and when such two fermionic major quarks should come too close to one another such as in a highly-pressurized environment, then they will simply begin to repel one another.

In this regard, specifically note that this does not contradict the fact that two fleetingly appearing-and-disappearing bosonic particles can be momentarily occupying the very same volume of space (i.e. as previously explained in subsection 25.3).

31.8. The Overall Observed Effect of all the Quarkonic Interactions

Due to the very dynamic energetic interactions that are bound to occur within every proton and



every neutron, the aforementioned gluons and W-bosons and Z-bosons and mesonic quarks will quite naturally also be interacting with one another. Hence that every proton and every neutron is actually consisting of not only the conventionally known three major quarks and gluons and W-bosons and Z-bosons and mesonic quarks but also of a very intricate cloud of so-called spin-off particles. For the purpose of these teachings, however, it will suffice for the student to only understand the basic *modi operandi* of all the main quarkonic particles as they were explained in subsections 31.1 to 31.7.

31.9. The Higgs Mechanism

This subsection serves to explain at first how the Higgs bosons and the Higgs mechanism are currently being understood by the quantum physicists and then how the concepts thereof ought to be understood from a much more profound spiritual perspective.

31.9.1. The Current Assumptions about the Higgs Bosons and the Higgs Mechanism

Although the Higgs bosons themselves have at the time of this writing not yet been proven to actually exist, the quantum mechanics physicists are nevertheless already convinced that it is such Higgs bosons that are somehow occasioning the occurrence of the Higgs mechanism (i.e. the occasional splitting of larger subatomic particles into smaller subatomic particles for no apparent reason). So, based on the outcome of their many calculations, they are now assuming that:

- the Higgs bosons must necessarily be scalar particles (i.e. that do have a magnitude but no propagational direction)
- their average energy content must be at least 114 GeV, which is about 240,000 times the energy content of an orbital electron and which is of course – as already mentioned – beckoning the question as to why the actual existence of such Higgs bosons has not yet been experimentally proven
- they do not have any symmetric or supersymmetric features yet they must ‘somehow have broken the symmetry of the erstwhile electroweak forces’

In this regard, note that it is the Big Bang Theory that gave rise to the irrational concept of such ‘electroweak forces’. For it is generally assumed by most astrophysicists that during the earliest stages of the alleged Big Bang explosion there could as yet not have been a separation between the conventional **electromagnetic** forces and the **weak** nuclear forces, that all of them must then have existed in the form of **electroweak** forces. And that – in their opinion – it was only at a later stage, when the extremely high ambient temperatures and pressures started to subside, that the Higgs mechanism must have somehow split such electroweak forces into the conventional electromagnetic forces and the weak nuclear forces.

Well, as already mentioned before, Part XII of this chapter will be imparting the factual reasons why that Big Bang Theory is a fallacy.



- *all known-to-exist subatomic particles must be deriving at least some of their operational mass from such Higgs bosons*

What this particular assumption is concerned, note that there is a major difference of opinion between the quantum mechanics physicists and the quantum string physicists by reason that:

- *the quantum mechanics physicists are still of the opinion that all fermionic particles are material particles*
- *the quantum string physicists are already of the opinion that the Higgs bosons are the only real material particles and that, as such, all other subatomic particles can only consist of what they are referring to as energetic strings (strings of energies)*

Let it lastly be mentioned that the experiments conducted by the quantum mechanics physicists at the Large Hadron Collider of CERN near Geneva in Switzerland already gave some indications but not yet any conclusive evidence of the actual existence of the Higgs bosons.

31.9.2. The True-to-Life Significance of the Higgs Bosons and the Higgs Mechanism

From a spiritual perspective, the true-to-Life significance of the Higgs bosons and of the Higgs mechanism can be relayed as follows:

- *The Higgs bosons themselves*

It was previously explained in section 9 that the quantum-physical concept of the Higgs bosons is actually synonymous with as well the astrophysical concept of dark matter as the metaphysical concept of the ether as the theosophical concept of the spiritual essence of God. And that, as such, 'all of such Higgs bosons' are in their totality actually comprising the undivided substantive essence of God.

- *The Higgs mechanism*

It was previously relayed in section 10 that the substantive essence of God has an extremely low resistivity. Thusly occasioning all electromagnetic energies, including those of every subatomic particle, to extremely slowly convert themselves back into the potential energies of God. Which can then occasion, for instance, an unstable nucleus to suddenly fission / split / break down into two or more smaller nuclei.

The following analogy serves to explain why the mathematical calculations, as mentioned in subsection 31.9.1, are suggesting a Higgs boson to be much more powerful than an orbital electron:

Imagine a lake to be filled not with water but with such an extremely sticky substance that it is impossible to scoop up any portion of it, no matter how hard one tries. Now, that is somewhat comparable to how the quantum mechanics physicists are trying to forcibly remove one 'Higgs boson' from the surrounding 'Higgs bosons' but which the extreme



inelasticity of God's spiritual substance is not allowing them to do. No matter how hard they try.

32. The String Theories of the Quantum String Physicists

*The **string theories** of the quantum string physicists are based on the premise that, excepting for what they believe to be the Higgs bosons, all other subatomic particles do not have a material nature but a purely energetic nature in the form of **energetic strings**. Because of such string theories having been mathematically derived from but a few facts and from far too many assumptions, there is no need for one to study them but to only briefly read through them so as to familiarize oneself with how such quantum string theorists did arrive at their theories:*

A Few Preliminary Notions

- The quantum string physicists are not yet acknowledging every such energetic string to actually consist of a clockwise or an anti-clockwise layer of many singular electromagnetic energies.*
- They are still believing the gravitons to actually exist.*
- As mentioned in section 30, they are defining the supersymmetries in Nature in terms of the interrelationships between the material aspects of Nature and the energetic aspects of Nature and thusly between the Higgs bosons and all of the energies in Nature.*

The Logical Aspects of Their String Theories

Whilst they were trying to mathematically model the energetic strings in such a way that they would conform to the operational nature of the four fundamental forces, it became apparent that:

- i) every two energetic strings had to either strongly or weakly resonate with one another
So they decided to call the strongly resonating ones closed strings (denoted as C) and the weakly resonating ones open strings (denoted as O).*
- ii) there could only be five possible string combinations, namely OOO and CCC and OOOO and CO and COO, of which the CCC combination was the most likely one*

Because they are still believing the gravitons to actually exist, they are presuming every such graviton to consist of but one special kind of energetic string with a very tiny amplitude / strength.

The Illogical Aspects of Their String Theories

These are the outcomes of them trying to incorporate the presumed existence of all kinds of space-time relativities into their string theories:

- the mathematical calculations thereof are suggesting the universe to have not just three but at least ten spatial dimensions, the extra seven or more of them then being referred to as the hidden dimensions of Nature*
- to try to justify the possible existence of such hidden dimensions, they are equating them to 'some kinds of spatial compactifications that are probably contained within a variety of microscopically small membranes'*

In this regard, let it be duly noted that if the mathematics of differential and integral calculus or of any other as complex mathematical system not be judiciously applied, then that is bound to result in



all kinds of ludicrous outcomes. A typical example thereof is when a team of astrophysicists and quantum physicists tried to calculate the spatial bounds of a cosmic black hole, which – because of their failure to use their common sense – resulted not only in utterly impractical distances but also in that black hole to presumably have less than one spatial dimension.

A Very Basic Overview of the Different String Theories

Note that all of these are based on the presumed existence of all kinds of space-time relativities:

- *The earliest string theories, known as the non-symmetric bosonic string theories, are suggesting the universe to have 26 spatial dimensions. In the broadest terms, these theories are presuming all matter and all energies to have a separate existence (i.e. them to not have a common origin). They are furthermore presuming the actual existence of tachyons (i.e. of those kinds of subatomic particles that would have to propagate themselves faster than the speed of light).*
- *The more recent string theories – known as the type I, IIA, IIB, HO, and HE supersymmetric string theories – are suggesting the universe to have 10 spatial dimensions. Unlike the earliest string theories, they are presuming all matter and all energies to have a common origin:*
 - *The type I supersymmetric string theories are postulating there to exist:*
 - i) *one supersymmetry in a 10-dimensional framework*
 - ii) *only non-oriented open strings and closed strings*
 - *The type II supersymmetric string theories are postulating there to exist two supersymmetries in a 10-dimensional framework. These theories have been sub-categorized into type IIA (non-chiral / parity conserving) theories and type IIB (chirality / parity violating) theories.*
 - *The heterotic (H) supersymmetric string theories are various combinations of one or other non-symmetric bosonic string theory and of one or other type I supersymmetric string theory. These have been sub-categorized into the HO supersymmetric string theories with a gauge group symmetry of $SO(32)$ and the HE supersymmetric string theories with a gauge group symmetry of $E8 \times E8$. All of which are also presuming the universe to have 10 spatial dimensions.*

In this regard, note that the various calculations pertaining to all of these more recent string theories cannot be reconciled with one another. Yet such is not deterring yet another faction of quantum string physicists from entertaining the claim that each of such different string theories is really but a different aspect of one overall 11-dimensional supersymmetric string theory, which they are referring to as the M-Theory.

What all of the above string theories are concerned, it ought to go without saying that it is utterly irrational to believe that there could be either more or less than 3 spatial dimensions. As such, it is time for all quantum string physicists to start applying their plain common sense to all of their theories. Lest they will never be able to understand the true nature and the true essence of all creation.





Part X

The Operational Nature of Atoms

WHAT THE STUDENT WILL LEARN FROM THIS PART

- ✓ *How the atoms are forming their molecular and ionic and metallic bonds*
- ✓ *The different kinds of plasmas: chemical plasmas, nuclear plasmas, diffused plasmas*
- ✓ *The atomic structure of organic tissues*





This Part serves to explain why and how, excepting for the inert gases (group VIII in the Periodic Table of Elements), all other types of atoms will always try to form a **molecular bond** or an **ionic bond** or a **metallic bond** with one another. The scientific notation of every such bond then consisting of the symbols of the bonded atoms and the manner wherein they are bonded. A typical example thereof being SiO_2 (silicon dioxide, ordinary sand) wherein every 1 silicon atom (Si) is bonded to 2 oxygen atoms (O).

33. The Concept of Valence Electrons

The electrons in the outermost electron shell of an atom are known as its **valence electrons**. Hence that one of the main purposes of the Periodic Table of Elements (see Figure 38) is to portray all of the different kinds of atoms in terms of how many valence electrons they have. That is, all of the elements in Group I have 1 valence electron; all of the elements in Group II have 2 valence electrons; and so on.

[View Figure 38](#)

34. The Formation of a Molecular Bond

A **molecular bond** is consisting of two or more atoms that are sharing their valence electrons in such a way as for every atom to then appear to have a complete outermost electron shell. Thusly resulting in every such shared electron then orbiting not only its own nucleus but also the nucleus of the other atom(s).

In most cases, it is the non-metal atoms that are forming such molecular bonds. To give but two examples thereof:

- A water molecule (H_2O) is consisting of 2 hydrogen atoms (H) and 1 oxygen atom (O). The reason why they are forming a molecular bond can be explained as follows:
 - i) each hydrogen atom has but 1 electron and is thus 1 electron short to complete its one and only electron shell
 - ii) the oxygen atom has 2 electrons in its first shell (which is complete) and has 6 electrons in its second shell (its outermost shell) and is thus 2 electrons short to complete that second shell

While these two types of atoms cannot acquire more electrons in their isolated state, they can nevertheless do so in a conjoint state, i.e. by way of them establishing a molecular bond. For that is enabling the oxygen atom to 'use' the 2×1 electrons of the hydrogen atoms and each hydrogen atom to 'use' 1 of the 6 valence electrons of the oxygen atom. So that every atom is then appearing to have a complete outermost shell.

[View Figure 39](#)

- A methane (CH_4) molecule is consisting of 4 hydrogen atoms (H) and 1 carbon atom (C). In this case:
 - i) each hydrogen atom has but 1 electron and is thus 1 electron short to complete its one and only electron shell
 - ii) the carbon atom has 2 electrons in its first shell (which is complete) and has 4 electrons in its second shell (its outermost shell) and is thus 4 electrons short to complete that second shell

Once again, while these two types of atoms cannot acquire more electrons in their isolated state,



they can nevertheless do so in a conjoint state, i.e. by way of them establishing a molecular bond. For that is enabling the carbon atom to 'use' the 4 x 1 electrons of the hydrogen atoms and each hydrogen atom to 'use' 1 of the 4 valence electrons of the carbon atom. So that every atom is then again appearing to have a complete outermost shell.

View Figure 40

In this regard, note that if a molecule is consisting of but two types of atoms, then it is said to be a **diatomic molecule** (the word 'diatomic' means 'consisting of two atoms'). Such as water (H_2O) for instance. But if such two atoms are then moreover also of the same type, then they are said to be a **diatomic element**. A typical example thereof is the way wherein hydrogen (H) is appearing in the Earth's atmosphere, i.e. in the form of the diatomic element H_2 (structurally denoted as $H-H$).

35. The Formation of an Ionic Bond

In the case of an **ionic bond**, the atoms are first increasing (decreasing) the number of their valence electrons prior to them establishing that ionic bond, by way of them then taking such electrons away from one or more weaker atoms (giving such electrons away to one or more stronger atoms).

An ionic bond is usually consisting of an ionized non-metal atom and an ionized metal atom by reason that:

- A non-metal atom is usually but a few valence electrons short to complete its outermost shell and will thusly try to wrest such missing electrons away from weaker atoms. Whereafter it is then said to be a **negatively charged ion** (also known as an **anion**) in that it will then have a greater number of [negatively charged] electrons than [positively charged] protons.
- A metal atom usually has but a few valence electrons in its outermost shell, which it then tends to give away to some stronger atoms. Thusly effectively making the next inner shell a complete outermost shell. Whereafter it is then said to be a **positively charged ion** (also known as a **cation**) in that it will then have a smaller number of [negatively charged] electrons than [positively charged] protons.

It is only when such a negatively charged ion attaches itself to (i.e. magnetically sticks to) such a positively charged ion that they are said to form an ionic bond. As such, specifically note that in the case of an ionic bond the bonding process is not being actualized by the sharing of electrons but is being actualized by the two ions continuing to magnetically attract one another. To give but one example thereof:

A non-metal chlorine atom (Cl) has 7 valence electrons (2, 8, 7) but is often found in Nature in its ionized state with 8 valence electrons (with 1 electron more) and thusly as a negatively charged ion (an anion). And a metal sodium atom (Na) has 1 valence electron (2, 8, 1) but is often found in Nature in its ionized state with 8 valence electrons (with 1 electron less) and thusly as a positively charged ion (a cation). As such, these two atoms are bound to ionically bond into sodium chloride ($NaCl$), otherwise also known as common table salt.

Special note

It often occurs in Nature that a larger (more complex) molecule does become ionized, in which case it is then known as an **ionic molecule** (i.e. because of it then having both molecular and ionic properties).



36. The Formation of a Metallic Bond

A metallic bond is typically consisting of, as the name implies, two or more types of metal atoms. The mutually exerted strong magnetic forces of such atoms – i.e. of their magnetic affectations – are occasioning their nuclei to remain tightly configured in a so-called **three-dimensional lattice structure**, which is why a metallic bond tends to be much stronger than either a molecular bond or an ionic bond.

Such metallic substances are known to be good to excellent electrical conductors, i.e. because of their nuclei being so tightly configured in a three-dimensional lattice structure that the orbits of their valence electrons are often very close to one another. As such, if one connects the wires of a battery to a metallic substance, then that will compel the valence electrons to start ‘flowing’ in a perfectly coordinated fashion – via such almost overlapping orbitals – from every previous atom to every next atom. Thusly resulting in what is known as ‘an electrical current’, which practically means that:

- there will then be a perfectly coordinated flow of electrons out of the battery through the one wire into and through the metallic substance and out of that metallic substance through the other wire back into the battery
- the perfectly coordinated flow of electrons from every previous atom to every next atom throughout that metallic substance is bound to preserve the near neutrality of every atom in that metallic substance, i.e. because of every such atom then nearly always having as many electrons as protons

Now, to ensure that a metallic substance has the right kind of properties for a particular application, metallurgists are often combining two or more kinds of metals into a metallic mixture, then known as **an alloy**. A typical example thereof is bronze, which is a mixture of copper (Cu) and tin (Sn). Or they might add smaller quantities of other metals and / or non-metals to a base metal. A typical example thereof is ordinary steel, which is mainly consisting of iron atoms (Fe) but whereto they added a small percentage of carbon atoms (C).

Special note

Some science teachers are claiming there to be no fundamental difference between a metallic bond and a molecular bond. That claim is false in that the valence electrons in a metallic substance are not being shared in a molecular fashion but they are continually changing ‘their allegiance’ from every previous atom to every next atom in a perfectly coordinated fashion when coerced to do so by, for instance, an electromotive force.

Other science teachers are claiming that, in a metallic substance, the valence electrons are altogether forming ‘a random cloud of electrons’ and that the then electron-deficient atoms must necessarily be positively charged ions. That claim is also false in that, under normal circumstances, every atom in a metallic substance will nearly always retain as many electrons as protons (i.e. remain neutrally charged) and can thusly not be a positively charged ion. The only exception thereto is when a metallic substance be subjected to extraordinary circumstances, such as to a very high voltage. In which case, the valence electrons will become so energized that they can literally ‘jump out’ of that substance into the surrounding air (known as **a corona effect**), thusly effectively changing the affected atoms into positively charged ions.



37. The Concept of Plasmas

*In the world of quantum physics, a plasma can be either a **chemical plasma** or a **nuclear plasma** or a **diffused plasma**.*

❖ The chemical plasmas

The more an ordinary substance be heated (energized), the further away from the nuclei its electrons will be orbiting until they are eventually escaping the nuclei. It is the combination of such free electrons and ionized nuclei that is then effectively constituting a chemical plasma. Conversely, when a partial or a complete chemical plasma be cooled down (de-energized), then the process will be reversed and the free electrons and the ionized nuclei will be recombining / restructuring themselves into normal atoms.

To mention but a few naturally occurring chemical plasmas:

- *in the Earth's atmosphere, where the atoms are being ionized by lightning strikes*
- *in the Earth's ionosphere, where the atoms are being ionized by the ultraviolet rays of the sun*
- *in the aurora borealis and the aurora australis, where the atoms are being ionized by the magnetic forces of the Earth*

To mention but a few examples of where such chemical plasmas are being technologically applied:

- *in fluorescent tubes*
- *in neon signs*
- *in cellphone displays*
- *in plasma TV screens*

Special note

*The so-called **plasma density** of a chemical plasma is referring to the number of free electrons per unit of volume and is, as such, also indicative of its electrical conductivity.*

❖ The nuclear plasmas

The continued heating (energizing) of a chemical plasma will eventually occasion its nuclei to break down. It is all of such disarrayed nuclear subatomic particles that are then effectively constituting a nuclear plasma. As is the norm in the extremely hot and pressurized interior of every sun.

❖ The diffused plasmas

A diffused plasma is a greatly dispersed plasma with a plasma density of but a few subatomic particles per cubic meter. As astrophysically existing between all celestial bodies throughout the entire universe.

In this regard, note that the observable cosmos is actually consisting of more than 99.9% plasmas and thusly of less than 0.1% ordinary solids and liquids and gases. For not only are all of the suns / stars primarily consisting of nuclear plasmas but all interplanetary and interstellar and intergalactic spaces are also replete with all kinds of diffused plasmas.



38. The Molecular Structure of Organic Tissues

Every so-called organic molecule is but an intricate combination of carbon atoms and some other common kinds of atoms (hydrogen, oxygen, nitrogen) and can also contain less common kinds of atoms (such as phosphorus, magnesium, calcium, iron). A typical example thereof is the amino acid **isoleucine** ($C_6H_{13}NO_2$) whose chemical structure can be portrayed as follows:

[View Figure 41](#)

In this regard, it is often claimed by evolutionary theorists that the emergence of Life could only have been the result of the chance-like appearance of such intricate molecules. And that, as such, the mind can only be a by-product of the body and that, as such, the soul can only be a by-product of the mind. In stark contrast thereto, the next chapter (*The Spiritual Descent of Man*) will at length explain that:

- i) God is actually manifesting Himself in the individualized capacity of every living creature and that, as such, it is the spiritual soul of a living creature that is utilizing its mental powers to operationally manage and control its physical body.
- ii) there is a straightforward correlation between the DNA structure of a living creature and its mental capabilities

In fact, that next chapter will clearly show God to actually express Himself in the form of every living creature whilst at all times apportioning His expressions through the form of every such living creature in exact accordance with its intended purpose in creation.





Part XI

The Operational Nature of Solids and Liquids and Gases

WHAT THE STUDENT WILL LEARN FROM THIS PART

- ✓ *The forces that are enabling the metamorphic changes of ordinary substances*
- ✓ *The modi operandi of such metamorphic changes*
- ✓ *Some basic definitions pertaining to the characteristic nature of solids and liquids and gases*





39. The Forces that are Enabling the Metamorphic Changes

This section serves to explain the kinds of forces that are enabling an ordinary substance to change its appearance from being solid to being liquid to being gaseous and vice versa.

39.1. The Vibratory Forces

The vibratory forces of an ordinary substance can be categorized into:

- i) *the vibratory forces that are due to the orbital movements of the electrons around the nuclei*

*What these forces are concerned, every kind of atom and in fact every one of its isotopes has its own unique **pattern of vibration** that is commensurate with:*

- *the number of its electrons*
- *the way wherein the electrons are orbiting the nucleus*
- *the number of its nucleons (protons and neutrons)*

As such, every kind of bonded substance will also have its own unique pattern of vibration equalling the vectorial sum of the patterns of vibration of its constituent atoms.

- ii) *the vibratory forces that are due to the valence electrons of one atom repelling the valence electrons of another atom whenever they are coming close to one another*

As previously mentioned, the more a substance be heated, the further away from the nucleus the electrons will be orbiting. Thusly resulting in the valence electrons of every two adjacent atoms to then every so often forcefully repel one another (i.e. because of their similar magnetic charges). As such, it is forcefulness of all such cyclically occurring repulsions in a heated substance that will be occasioning all of the atoms in that substance to distance themselves from one another.

It will soon become apparent that it is not the first kind but the second kind of such vibratory forces that are primarily occasioning the metamorphic changes of an ordinary substance.

39.2. The Intermolecular Forces

Let it first be mentioned that the conventional term 'intermolecular forces' is a misleading term in that such forces are not only applicable to all molecular bonds but also to all other bonds. The way wherein these forces are exerting themselves can be explained in terms of the following example:

In their own right, the elements sodium (Na) and chlorine (Cl) are two so-called 'aggressive' elements in that the solid element sodium is an alkali metal that can burn the skin and the gaseous element chlorine is an acid non-metal that can not only burn the skin but also the respiratory system. However, when they are chemically combined into sodium chloride (NaCl) – which is ordinary table salt – then their magnetic forces are primarily being utilized to maintain the ionic bonds and will thusly hardly be noticeable outside such ionic bonds. Excepting for a small remainder of such forces that are then occasioning that table salt to assume its granular structure.

Such forces can however greatly differ from one kind of substance to another in that they can



range from being relatively very weak (such as the Van der Waals forces) all the way through to being relatively very strong (such as in the case of the so-called network bonds). Hence that, depending on the strength of such forces and the way wherein they are exerting themselves, a solid substance is known to assume either a granular structure (such as table salt) or a linear structure (such as asbestos) or a plate-like structure (such as mica) or a network structure (such as a diamond).

39.3. The Gravitational Forces

The only gravitational forces that need to be considered within the context of the metamorphic changes of all ordinary solids and liquids and gases are the gravitational forces of the Earth. By reason that the intra-atomic gravitational forces of a mundane object are, comparatively speaking, so insignificantly small that they can be completely ignored.

40. The Modi Operandi of the Metamorphic Changes

This section serves to explain how the aforementioned forces are interactively occasioning the occurrence of the metamorphic changes. As the modi operandi of such changes in a natural environment are basically the same for all worldly substances, the following explanations will use the substance of water as an example of how its appearance can be changed from being solid to being liquid to being a gas. Yet bear in mind that the hereafter mentioned vibratory forces are, excepting for the natural gases, only those mentioned in ii) of subsection 39.1:

- At a temperature below 0°C , the vibratory forces (repelling forces) of the water molecules are – comparatively speaking – much weaker than their intermolecular forces (attractive forces) and the gravitational forces (attractive forces). Thusly resulting in the water molecules retaining a fixed position in relation to one another on the surface of the Earth (the appearance of solid ice).
- At a somewhat higher temperature than 0°C , the vibratory forces (repelling forces) of the water molecules are – comparatively speaking – somewhat stronger than their intermolecular forces (attractive forces) but still weaker than the gravitational forces (attractive forces). Thusly resulting in the water molecules then easily changing their position in relation to one another on the surface of the Earth (the appearance of liquid water).
- When increasing the temperature to 100°C , then the vibratory forces of the water molecules (repelling forces) are bound to become much stronger than – comparatively speaking – both their intermolecular forces (attractive forces) and the gravitational forces (attractive forces). Thusly resulting in the water molecules then all the more repelling one another so violently that they are ‘escaping’ into the atmosphere (the appearance of gaseous steam).

Special notes

- The **melting point** of a substance can be defined as ‘the temperature whereat that substance is changing its appearance from being solid to being liquid’.
- The **boiling point** of a substance can be defined as ‘the temperature whereat that substance is changing its appearance from being liquid to being gaseous’.



- For every substance, that melting point and boiling point is known to vary with the prevailing atmospheric conditions. For example, in a natural setting, the boiling point of water is 100°C at sea level but somewhat less than 100°C at higher altitudes (i.e. by reason that the atmospheric pressure is somewhat lower at higher altitudes).
- The melting and boiling points of certain substances, such as dry ice, are so close to one another that such substances appear to directly change from being solid to being gaseous and vice versa.

From an overall perspective however, let the student be reminded that all mundane substances are actually consisting of but a very limited range of exactly the same kinds of subatomic particles (electrons, quarks, gluons, W-bosons, Z-bosons, mesonic quarks). Each and every one of these actually consisting of a spherical conglomeration of God's electromagnetic energies.

41. Some Basic Definitions Pertaining to all Solids and Liquids and Gases

- The **volume** of a solid or liquid or gas can be defined as 'the three-dimensional extent of space being occupied by that solid or liquid or gas'.
- The **operational mass** of a solid or liquid or gas can be defined as 'the quantified measure of its forceful resistance to undergo any changes to its energetic status'.
- The **density** of a solid or liquid or gas can be defined as 'the quantified measure of its operational mass per unit of volume'.
- The **weight** of a solid or liquid or gas can be defined as 'the quantified measure of all the gravitational forces that it is being subjected to'. As mathematically expressed by the formula:

$$F_g = m \times g$$

Wherein **F_g** serves to denote the extent of the gravitational forces [in Newtons] and **m** the operational mass [in kilograms] and **g** the localized rate of gravitational acceleration [in m/s²].

As such, the weight of an object can substantially differ from one astrophysical environment to another. For instance, the very same object is weighing about six times less on the moon than on the Earth by reason that the gravitational acceleration **g** on the moon (1,625 m/s²) is about six times smaller than the gravitational acceleration **g** on the Earth (9,8226 m/s²). And it will be weightless in the absence of any gravitational forces.





Part XII

The Spiritual Origin of the 'Physical' Cosmos

WHAT THE STUDENT WILL LEARN FROM THIS PART

- ✓ *How one's human senses are belying the true energetic nature and the true spiritual Essence of all worldly things*
- ✓ *The correlation between one's worldly experiences and one's spiritual experiences*
- ✓ *The true origin of one's sensorial experiences*
- ✓ *The spiritual significance of the law of energy conservation*
- ✓ *The verity of spiritual creation versus the falsity of the Big Bang Theory*
- ✓ *How to wholistically understand the operational nature of creation within the context of the existential essence of the Creator*





42. The Modus Operandi of One's Sensorial Experiences

The only way to resolve the seeming contradiction between the cosmos to actually consist of the invisible spirit and the invisible energies of God yet to also appear to consist of numerous visible entities is to learn to understand the modi operandi of one's sensorial experiences.

42.1. The Basic Functionalities of the Five Human Senses

*What one's external environment is concerned, one's **five human senses** can only derive their inputs from one's **sensory nervous system**, which is basically consisting of:*

- *the various kinds of nerve receptors in the eyes, ears, nose, tongue, and skin*
- *the five affiliated sets of optical and auditory and olfactory and gustatory and tactile nerve wires that are electrically and electrochemically conveying the sensory impressions from the nerve receptors to the brain*

*In this regard, note that a sensory nerve wire is consisting of a bundle of fibres that are covered by a myelin sheath (**neurilemma membrane**) and that are capable of electrically (**electrochemically**) transmitting sensory information. Yet bear in mind that such **electrochemical** transmissions are actually also electrical transmissions but then by way of the neurotransmitters 'ionically firing' their signals across the synaptic gaps⁵.*

- *those portions of the brain that are receiving such electrically-conveyed sensory impressions, i.e. in the form of electrical currents*
- *that portion of one's spiritual awareness that is 'converting' such electrical currents into the sensations of sight and hearing and smell and taste and touch*

Hence that one's sensory nervous system can be likened unto a very sophisticated telephone system whose electrical operation is enabling one to gain all kinds of sensorial impressions that one is then experiencing in one's spiritual awareness as the sensations of sight and sound and smell and taste and touch.

*This practically means that, contrary to what most people tend to believe, all of one's sensations of sight and sound and taste and smell and touch are actually existing **only** in one's spiritual awareness and thusly absolutely nowhere else.*

This explanation is rendering it perfectly possible for the entire cosmos to actually consist of the invisible spirit and the invisible energies of God yet for one to also delusively experience that cosmos in one's spiritual awareness in the form of all kinds of dreamlike visual and auditory and olfactory and gustatory and tactile sensations. That is, as a world of cosmic delusion that is belying the true energetic nature and the true spiritual essence of all 'worldly things'.

42.2. The Human Sense of Sight

Without the medium of light, there can be no visual impressions. This practically means that one

⁵ A synaptic gap is the space between two neurons across which they are transmitting their electrical or electrochemical signals.



can only perceive – by means of the photoreceptors in one's eyes – the light energies being emitted by or reflected from all kinds of worldly things and thusly never such worldly things themselves.

The way wherein 'one sees things' ought to therefore be understood as follows:

The light energies reaching one's eyes are occasioning the photoreceptors in one's eyes to generate tiny electrical currents. The scope and the range of such tiny electrical currents then always being in exact accordance with the scope and the range of the light energies being received by the photoreceptors. Whereafter these tiny electrical currents are then being relayed by the 'optical' nerve wires to the brain wherein one's spiritual awareness is then 'converting' them into visible images (the sensations of sight). The cerebral and the cognitive processes thereof actually being very similar to when one is dreaming a vivid dream at night.

As such, the only reason why such light energies – which are altogether comprising but a very small range of all the invisible electromagnetic energies of God – are still mundanely being referred to as visible light energies is because of their ability to invoke in one's spiritual awareness all kinds of visible images that appear to be very real (the sensations of sight). Yet all of which dreamlike images are in effect, as so divinely ordained, actually very delusive in that they are contrary to the true energetic nature and the true spiritual essence of all worldly things.

Another way of arriving at the same conclusions is to profoundly contemplate why and how one is capable of simultaneously perceiving so many different images of oneself in a so-called hall of mirrors.

And still another way of arriving at the same conclusions is to duly consider how a television screen is displaying its images. That is, when viewed from a distance, then such images appear to be very real but, when viewed from close by, then they are actually consisting of the light energies being emitted by a large assortment of tiny pixels. In a somewhat comparable way, within the human region of creation, the spirit of God can be likened unto a three-dimensional 'cosmic screen' and His subatomic particles to innumerable tiny 'pixels'. As such, when His light energies are being emitted by such tiny pixels or being deflected by the subatomic force fields of such tiny pixels, then the resultant images thereof in one's spiritual awareness will appear to be very real yet they are actually very delusive. For remember that, contrary to how all worldly substances are being mundanely perceived, all of them are actually consisting of more than 99.999999999999 % seemingly empty space and of less than 0.000000000001 % subatomic particles. Wherefrom can be surmised that it is the strength of the forces between such subatomic particles that will then be determining the extent whereto a worldly substance will appear to be either transparent or opaque (i.e. the extent whereto that worldly substance is then allowing or not allowing the 'visible' light energies to pass through itself).

42.3. The Human Sense of Hearing

In this regard, let it first be noted that:

- *all of one's human sensations of sound are, by definition, even so existing only in one's spiritual awareness*
- *the average human being can only hear a very limited range of sound energies, i.e. only*



those with a frequency of between 20 Hz and 20,000 Hz

- *unlike an electromagnetic energy, a sound wave can only propagate itself as a so-called pressure wave across an atomically-structured medium*

[View Figure 42](#)

Now, the way wherein one experiences the sensations of sound can be relayed as follows:

Whenever a sound wave reaches the outer ear, then the reverberations thereof are being conveyed via the eardrum to the inner ear (the cochlea). Thusly occasioning the auditory nerve receptors in each inner ear to generate a commensurate scope and range of tiny electrical currents that are then being relayed by the 'auditory' nerve wires to the brain, wherein they are then invoking in one's spiritual awareness the sensation of a sound.

42.4. The Human Senses of Taste and Smell

When tasting (smelling) a food for instance, then one's 'gustatory' ('olfactory') nerve receptors in the mouth (nose) are being exposed to the chemical energies in that food or, more precisely, to the electronic energies in that food. These so-called chemical cues are then being electrically relayed by the 'gustatory' ('olfactory') nerve wires to the brain, wherein they are then invoking in one's spiritual awareness the sensation of a taste (smell). So let it again be duly acknowledged that the sensations of taste and smell are, even as the sensations of sight and sound, existing only in one's spiritual awareness and thusly nowhere else.

42.5. The Human Sense of Touch

In the skin, there are three different kinds of nerve receptors, known as the thermoreceptors (reacting to temperature stimuli) and the mechanoreceptors (reacting to pressure stimuli) and the nociceptors (reacting to pain stimuli). Especially what the mechanoreceptors are concerned, it is important for one to understand how they – in collaboration with the human sense of sight – are occasioning one to falsely believe in the corporeality of all worldly things:

In this regard, let it again be strongly emphasized that every worldly substance is actually consisting of more than 99.999999999999 % seemingly empty space and of less than 0.000000000001 % subatomic particles and is thusly actually consisting of about 10 000 000 000 000 times more empty space than subatomic particles. As such, it is not the extremely tiny subatomic particles in and by themselves but all of their mutually exerted force fields (across the empty spaces) that are bound to naturally resist any external forces being applied to them.

*Therefore, when touching a brick for instance, then the applied **contact force** will occasion that brick to resist that contact force. It is all of such resistive forces that are then occasioning the mechanoreceptors in one's skin to generate a commensurate stream of tiny electrical currents. That are then being electrically relayed by one's 'tactile' nerve wires to one's brain, wherein they are then invoking in one's spiritual awareness the false impression of that brick being a 'solid' object (the sensation of touch).*



Needless to say that this principle is not only applicable to all 'solid' objects but also to all 'liquid' substances (such as water) and to many 'gaseous' substances (such as the air).

42.6. The True Origin of All Sensorial Experiences

The very fact that one's sensations of sight and sound and taste and smell and touch can only be experienced in one's spiritual awareness practically means that all of such sensorial experiences are actually not worldly experiences but spiritual experiences. Yet all of which have been divinely ordained to delude one into thinking that one is living in a material world instead of in a spiritual world. For there was no other way, excepting by means of the imposition of that spell of cosmic delusion, that every living creature could ever have its own sense of identity (i.e. of it being seemingly separate from everything else and everybody else).

That such is indeed the case can also be surmised from the following comparison:

- *During the daytime, one's sensations of sight and sound and taste and smell and touch are – in a dreamlike fashion – being invoked in one's spiritual awareness by one's exposure to all kinds of external energies. Thusly yielding the delusion of one living in a material world.*
- *Whilst sleeping at night, one's sensations of sight and sound and taste and smell and touch are – also in a dreamlike fashion – being invoked in one's spiritual awareness by one's exposure to an intricate combination of one's subconscious emotional energies and one's superconscious creative energies. Thusly resulting in the occurrences of one's nightly dreams.*

In this regard, note that the modi operandi of the four different kinds of nightly dreams (ordinary dreams, extrasensory dreams, revelatory dreams, and prophetic dreams) will be duly explained in Chapter 5 (The Spiritual Ascent of Man).

43. The True Significance of the Law of Energy Conservation

*The **law of energy conservation** is stating that an energy cannot be created or destroyed but can only be converted from one form of energy into another form of energy. Subsection 22.2 (The Concept of Work) has clearly shown that law to be as applicable to all spiritual (esoteric) phenomena as it is for all worldly (exoteric) phenomena, such as when:*

- *at the advent of His creation, God changed (converted) many of His dormant energies into kinetic energies so as to occasion the appearance of all His thought energies (the relatively-long radiowave energies)*
- *He then changed (converted) many such thought energies into all of His relatively-short radiowave energies and microwave energies and infrared energies and light energies and ultraviolet energies and X-ray energies and gamma ray energies.*

The last two whereof He then 'gathered together' into the spherical forms of all His primordial subatomic particles

As such, the various manners wherein God chose to cosmologically express Himself as the whole of creation were most certainly not in contravention of the law of energy conservation. All of which



energies will eventually be converted back into His dormant energies (i.e. after the purpose of His creation will have been fulfilled).

44. The Verity of Spiritual Creation versus the Falsity of the Big Bang Theory

This section serves to convey at first the kind of reasoning that led to the formulation of the Big Bang Theory and then how the true origin of creation ought to be correctly understood.

44.1. The Reasoning that led to the Formulation of the Big Bang Theory

The Big Bang Theory is primarily based on two premises, namely the red-shifting of the light energies being emitted by the distant galaxies and the general relativity theory of Albert Einstein. Hence that, based on all of the computations thereof, most astrophysicists are of the opinion that the entire cosmos is currently expanding at an exponential rate. Unwilling to consider any other explanations than their own, they extrapolated that seemingly ongoing expansion back in time and thusly concluded that the entire cosmos could only have come into existence due to 'the Big Bang explosion' of an inconceivably compact entity of about the size of a basketball. Which they are still believing to have contained all of the innumerable energies and all of the innumerable forces of all the present-day billions and billions and billions of gargantuan galaxies. Yet, as already mentioned on a previous occasion, there is not one such astrophysicist who can rationally explain where that inconceivably compact entity would have come from in the first place.

In terms of that Big Bang Theory, that basketball-sized object must have been not only inconceivably dense but also inconceivably hot. Which is why it is assumed that, during that alleged Big Bang explosion, some of its thermal energies must have been absorbed by the then-forming primordial hydrogen atoms and that the rest of such thermal energies are still propagating themselves throughout space in the form of the so-called Cosmic Microwave Background Radiation (CMBR). Hence that nearly all astrophysicists are still of the opinion that the CMBR is a remnant feature of, what they believe to have been, a Big Bang explosion.

And this despite the fact that there is already more than sufficient evidence that there is, to say the least, a direct correlation between that CMBR and all of the dark energies in the observable cosmos. Wherefrom can be surmised that the CMBR is actually indicative of the energy content (heat content) of all the dark energies throughout the observable cosmos and can therefore not be a remnant feature of any alleged 'Big Bang explosion'.

As such, it is important for one to acknowledge that, even as the general relativity theory, the big bang theory is also a wrongly-conceived theory in that:

- 1. the redshift-versus-distance relationship (known as Hubble's Law) needs to be correctly understood in terms of the actual energetic processes involved*

By reason that the red-shifting of the energies being emitted by the distant galaxies is not due to such galaxies receding from the Earth but is due to such emitted energies being



impacted upon by the gravitational forces of such distant galaxies (as previously explained in section 10).

2. *the CMBR is not the result of any Big Bang explosion but is in fact indicative of the heat content of the dark energies of God*

44.2. How to Correctly Understand the True Origin of Creation

All of the scientific conundrums that the astrophysicists and the quantum physicists are faced with can be entirely resolved if they are prepared to acknowledge, in addition to all of the quantum-physical aspects of creation, also all of the mental and the spiritual aspects of creation. This practically means that they must be prepared to acknowledge all of the following facts:

- 1) *The very first kinds of electromagnetic energies that God made to appear on the substance (face, countenance) of His being (spirit) were all of His relatively-long radiowave energies (thought energies).*
- 2) *Whereafter He strengthened a large portion of such thought energies into all of His relatively-short radiowave energies and microwave energies and infrared energies and the 'visible' light energies and ultraviolet energies.*
- 3) *Whereafter He 'relocated' all of such intermediate energies towards the centre of His creation, which thusly became the so-called initial angelic region and which thusly also resulted in the archangelic region then consisting of naught but thought energies.*
- 4) *Whereafter He established (i.e. decided upon) a macroscopic spherical boundary in the midst of that initial angelic region that was to 'divide' the energywaves that He required to energetically configure the final angelic region from the energywaves that He required to energetically configure the human region.*

Note that, from here onwards, the following explanations are pertaining only to the formation of the human region in creation:

- 5) *Whereafter He 'relocated' all of the electromagnetic energies below that boundary (firmament) to the centre of creation so as to start finalizing the formation of the human region, which thusly resulted in there then being a vast expanse of so-called empty space between that boundary (firmament) and the human region.*
- 6) *Whereafter He strengthened a large portion of His infrared energies and 'visible' light energies and ultraviolet light energies into a perfect ratio of X-ray energies and gamma ray energies. And He 'gathered together' all of such X-ray and gamma ray energies into the spherical forms of, respectively, all primordial electrons and all primordial quarks. All of which then became all of the primordial hydrogen atoms, thusly automatically resulting in the emergence of all their gluons and W-bosons and Z-bosons and mesonic quarks.*
- 7) *Whereafter He allowed the natural processes within the human region of His creation to run their evolutionary course. That is, He allowed the gravitational forces to congregate most of His primordial hydrogen atoms into billions and billions of massive so-called **first-generation suns**. Whose interior layers then soon attained the necessary pressures and temperatures to*



support the thermonuclear fusion of their hydrogen atoms at first into helium atoms and then into heavier types of atoms.

- 8) At the end of the lifespan of such a first-generation sun, it is known to at first collapse unto itself and to then undergo what is scientifically known as *a supernova explosion*. During that explosion, most of its atoms are being widely dispersed throughout space but then start to coalesce into many so-called *second-generation galaxies*. Each of which is then at first consisting of a gigantic cloud of hydrogen atoms and heavier atoms but which are then reconfiguring themselves into a large number of so-called *third-generation solar systems*. Each of which solar systems is then consisting of a relatively much smaller sun and a variety of planets and moons and asteroids and comets.

In fact, it is not uncommon for astrophysicists to occasionally witness the occurrence of such a supernova explosion, which practically means that these kinds of evolutionary processes are even now still naturally occurring throughout the observable cosmos.

In this regard, let the student be reminded that the next chapter of these teachings (*The Spiritual Descent of Man*) will be at length conveying:

- i) the true-to-Life significance of the story of creation as narrated by Moses in the first Genesis chapter
- ii) how the evolutionary processes in Nature need to be correctly understood within the context of the verity of spiritual creation

45. How to Ascertain Oneself of the Perfect Unity of All Creation

The way to ascertain oneself of the perfect unity of all creation is for one to keep on studying the principles of Truth until one has come to fully realize the whole of creation to actually be a cosmological expression of God. That the whole of creation is actually consisting of His substantive spirit whereupon He willfully activated all of His electromagnetic energies and in which creation He then chose to express Himself as all of the different kinds of life forms.

[View Figure 43](#)

That classification is clearly showing there to be but one lively Substance to all of the quantum-physical and mental and spiritual realities of Life and there to thusly be but only one all-inclusive Life. Or, to convey that same notion in different terms:

When duly ignoring all of the delusive appearances and events in creation, then there is throughout the entirety of that creation but only one Life (the essence of Life) variedly expressing itself as every lively energy and as every lively creature ⁶.

Wherefrom can be straightforwardly surmised that the true knowledge of all creation is actually the true knowledge of God in His lively capacity as that creation.

⁶ As will be further endorsed by the next three chapters of these teachings.



That certainty, however, being conditional on one having to study and to keep on re-studying all of the principles of Truth in this second chapter until such time that one has regained the fullest realization that there is in reality but only one highest Truth: God alone.

46. The Reality of God versus the Deceptiveness of Cosmic Delusion

The contradiction between the way wherein the world is factually existing and the way wherein one is sensorially perceiving that world cannot be any otherwise explained than that one's five ordinary senses are deceiving / deluding one to live in a material world instead of in a spiritual world. The overall extent whereof, as applicable to all living creatures, thusly constituting a spell of cosmic delusion.

So, how is one to extricate oneself from that spell of cosmic delusion? Well, the means thereto is for one to henceforth always maintain a clear distinction between:

- i) the delusive appearances of all worldly things (cosmic delusion)*
- ii) their true energetic natures (the invisible mental powers of God)*
- iii) their true spiritual Essence (the invisible spiritual substance of God)*

In this regard, let it be duly noted that it is due to that spell of cosmic delusion that one is believing oneself to live in a world that appears to be far from perfect but which actually is, from as well a spiritual as an energetic perspective, in and by itself absolutely perfect. As can also be surmised from the following narrative:

Imagine a person who, whilst living in a perfect environment, is lacking the understanding of how to righteously interact with that environment and who is thusly engaging in all kinds of unrighteous activities that are occasioning him / her to experience all kinds of physical pains and mental agonies. So, although that person is actually living in a perfect environment, he / she will nevertheless be experiencing that environment as if it were an imperfect (pain-invoking and stress-invoking) environment.





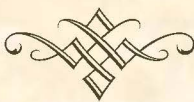
To Conclude this Second Chapter

This chapter has clearly shown the whole of creation to actually be a cosmological expression of God. But which He made to delusively appear to all of His living creatures as a physical world instead of a spiritual world. And thusly as a world that, if so perceived only with the ordinary senses, will then appear to be devoid of all spirituality.

The task at hand for every genuine seeker of Truth then is to keep on re-studying these principles of Truth (the science of Life) until such time that one has come to fully understand all of the interrelationships between all of the quantum-physical and all of the mental and all of the spiritual aspects of Life. For it is the only way wherein one can ever come to factually understand that there is in reality but only one all-inclusive Truth (God alone).

Yet, let the student be reminded that the study of these principles is only comprising the first phase of one's spiritual education. For the second phase of one's spiritual education will have to consist of one learning to understand all of the correlations between the principles of Truth (the science of Life) and the methods of Truth (the art of living), as conveyed in chapters 3 to 5. And the third phase of one's spiritual education will have to consist of one learning to understand all of the procedural aspects of the methods of Truth, as conveyed in chapters 6 and 7. Whereafter one will then have to righteously practice all of such methods of Truth in the real world of Truth, as per the strategic and the tactical guidelines in chapter 8. So as for one to then complete one's spiritual training, during which one will have to re-spiritualize each and every attitudinal and behavioural aspect of one's everyday lifestyle until such time that one has regained the utmost God-realization.





An Overview of the Contents of the Third Chapter

The next chapter of these teachings, entitled 'The Spiritual Descent of Man' serves to at first convey the true-to-Life significance of every verse of the first three Genesis chapters and to then convey how the various processes of natural evolution need to be correctly understood within the context of the verity of spiritual creation.

Part I: The True-to-Life Significance of the First Three Genesis Chapters

- 1. The First Genesis Chapter: The Biblical Story of Creation*
 - 1.1. The Story of Creation as Narrated by Moses from a Cosmological Perspective*
 - 1.2. The Sequel to the Story of Creation as Narrated by Moses from a Terrestrial Perspective*
 - 1.3. The Realistic Meaning of the Six Days of Creation*
 - 1.4. The Cosmological Significance of God's Holy Trinity*
 - 1.4.1. The Energetic Constituents of God's Holy Trinity*
 - 1.4.2. How to Esoterically Reunite Oneself with God's Holy Trinity*
- 2. The Second Genesis Chapter: The Physiological Make-Up of Man*
- 3. The Third Genesis Chapter: The Psychological Make-Up of Man*

Part II: How to Understand the Various Processes of Natural Evolution within the Context of the Verity of Spiritual Creation

- 4. Introduction to the Subject of Natural Evolution*
- 5. The Researches Already Conducted by a Variety of Different Scientists*
 - 5.1. The Research Conducted by Charles Darwin*
 - 5.2. The Modern Evolutionary Synthesis*
 - 5.3. The Research Conducted by the Paleontologists*
- 6. The Theories and Verities of Natural Evolution*
 - 6.1. The Theory of Abiogenesis*
 - 6.1.1. The Assumptions Underlying that Theory*
 - 6.1.2. The Major Shortcomings of that Theory*
 - 6.2. The Divinely Ordained Course of Natural Evolution*
 - 6.2.1. The True Meaning of 'The Advent of Life'*
 - 6.2.2. The Spiritual and the Mental Aspects of Life*



6.2.3. The Astonishing Complexity of the DNA Molecules

6.2.4. The Astonishing Complexity of the Cellular Activities

6.2.5. The Irrefutable Proof of the Verity of these Truths

6.3. The Paleontological Theories of Natural Evolution

6.3.1. Some Preliminary Notions

6.3.2. The Two Prevailing Paleontological Theories

6.3.3. The Similarities and Dissimilarities of the Major Life Forms

6.3.4. The Advent of Humankind

7. Some Additional Notions that Need to be Borne in Mind

Addendum: The True Meaning of the Biblical References to the Holy Trinity of God



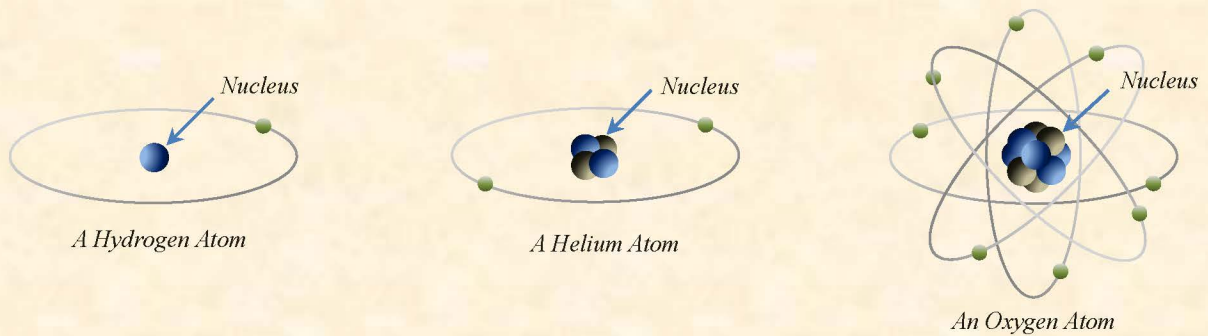
The Illustrations in Chapter 2

<i>Figure 1: Three Examples Illustrating the Generic Structure of Complete Atoms</i>	111
<i>Figure 2: The Periodic Table of Elements</i>	112
<i>Figure 3: Some Typical Examples of the Electronic Configuration of Atoms</i>	113
<i>Figure 4: The Most Common Distribution of the Electrons within the Various Sub-shells</i>	114
<i>Figure 5: A Two-Dimensional Representation of the Electron Shells and the Sub-shells and the Orbitals of a Sulphur Atom</i>	115
<i>Figure 6: The Basic Configuration of the Major Quarks within a Proton / Neutron</i>	116
<i>Figure 7: The Mesonic Quark and Mesonic Anti-Quark of a Major Quark</i>	117
<i>Figure 8: The Suggested Re-Classification of All Simple Subatomic Particles</i>	118
<i>Figure 9: A Two-Dimensional View of the Propagation of an Electromagnetic Energy</i>	119
<i>Figure 10: The Quantum Length of a Singular Electromagnetic Energy</i>	120
<i>Figure 11: The Wavelength of a Singular Electromagnetic Energy</i>	121
<i>Figure 12: The Scientific Notations of the Orders of Magnitude</i>	122
<i>Figure 13a: A Graphical Representation of the Electromagnetic Spectrum</i>	123
<i>Figure 13b: A Tabular Representation of the Electromagnetic Spectrum</i>	124
<i>Figure 14: The Electric Elongation / Contraction of an Electromagnetic Energy</i>	125
<i>Figure 15: The Magnetic Weakening / Strengthening of an Electromagnetic Energy</i>	126
<i>Figure 16: An Analogy Illustrating the Conceptual Difference between the Actual Speed and the Apparent Speed of an Entity</i>	127
<i>Figure 17: The Different Kinds of Polarized Trajectories of an Electromagnetic Energy</i>	128
<i>Figure 18: A Typical Example of How to Mundanely Initiate a Series of Oscillations</i>	129
<i>Figure 19: A Two-Dimensional Representation of the Electric Forces and the Magnetic Forces and the Magnetic Affections of an Electromagnetic Energy</i>	130
<i>Figure 20: A Greatly Simplified Representation of the Radially Dispersed Magnetic Affections</i>	131
<i>Figure 21: How to Graphically Combine a Number of Forces into a Resultant Force</i>	132
<i>Figure 22: The Emergence of the Conventional Gravitational Forces due to the Diminishment of the Magnetic Energy Content of an Electromagnetic Energy</i>	133
<i>Figure 23a: The Three-Dimensional Aspects of the Propagation of an Electromagnetic Energy</i>	134
<i>Figure 23b: A 3-D View of the Relevant Expansions and Contractions of God's Spiritual Substance over the Span of Several Wavelengths</i>	135
<i>Figure 24: The Thermonuclear Fusion of a Proton and a Highly Energized Electron into a Neutron</i>	136

<i>Figure 25: A Typical Example of a Nuclear Fission Chain Reaction</i>	137
<i>Figure 26: A Typical Example of a Thermonuclear Fusion Reaction</i>	138
<i>Figure 27: The Conventionally Reported Energy Contents and Operational Masses of the Nuclear Particles</i>	139
<i>Figure 28: The Relative Energy Contents and Operational Masses of the Quarks and the Electrons and the Neutrinos</i>	140
<i>Figure 29: The Direction of the Spin of a Normal Subatomic Particle</i>	141
<i>Figure 30: A Simple Metaphor to Illustrate the Reason for the Emergence of the Lorentz Force</i>	142
<i>Figure 31: The Direction of the Lorentz Force that an Electron is Bound to Experience when subjected to a Sufficiently Strong Magnetic Affection</i>	143
<i>Figure 32: The Cyclotronic Trajectories of Subatomic Particles that are being subjected to a Series of Very Strong Magnetic Affections</i>	144
<i>Figure 33: A Two-Dimensional Representation of the External Magnetic Field of a Subatomic Particle</i>	145
<i>Figure 34: How Scientists Tend to Portray the Comparative Magnetic Charges of the Subatomic Particles</i>	146
<i>Figure 35: The Changing of a Down Quark into an Up Quark and Vice Versa</i>	147
<i>Figure 36: The Triangular Configuration of the Three Major Quarks of Every Proton / Neutron</i>	148
<i>Figure 37: The Arbitrarily-Assigned Colours of the Three Major Quarks</i>	149
<i>Figure 38: The Periodic Table of Elements</i>	150
<i>Figure 39: The Chemical Structure of an H₂O (ordinary water) Molecule</i>	151
<i>Figure 40: The Chemical Structure of a CH₄ (methane) Molecule</i>	152
<i>Figure 41: The Chemical Structure of the Amino Acid Isoleucine (C₆H₁₃NO₂)</i>	153
<i>Figure 42: A Graphical Portrayal of the Propagation of the Pressure Waves (Sound Waves) through the Air</i>	154
<i>Figure 43: The Perfect Unity of Creation</i>	155



Three Examples Illustrating the Generic Structure of Complete Atoms



Special notes

Legend

-  Proton
-  Neutron
-  Electron

- Of the 118 different types of atoms that are known to exist, 90 of them are known to occur naturally. While the other 28 types of atoms can be artificially produced from the naturally occurring ones but usually for no longer than a fraction of a second, i.e. by reason that their nuclei are extremely unstable.
- Unlike the above academic representations, every atom is in reality invisible. The factual explanations of how the light energies, either emitted by such invisible atoms or reflected from the force fields of such invisible atoms, do invoke in one's spiritual awareness the overall appearance of solids and liquids and gases are at length conveyed in Part XII.
- The protons and the neutrons of an atom are also known as the **nucleons** of that atom.

Figure 1

[Back](#)

The Periodic Table of Elements

	I	II											III	IV	V	VI	VII	VIII
1	1 H 1																	2 He 4
2	3 Li 7	4 Be 9											5 B 10	6 C 12	7 N 14	8 O 16	9 F 19	10 Ne 20
3	11 Na 23	12 Mg 24											13 Al 27	14 Si 28	15 P 31	16 S 32	17 Cl 35	18 Ar 40
4	19 K 39	20 Ca 40	21 Sc 45	22 Ti 48	23 V 51	24 Cr 52	25 Mn 55	26 Fe 56	27 Co 59	28 Ni 59	29 Cu 64	30 Zn 65	31 Ga 70	32 Ge 73	33 As 75	34 Se 79	35 Br 80	36 Kr 84
5	37 Rb 86	38 Sr 88	39 Y 89	40 Zr 91	41 Nb 93	42 Mo 96	43 Tc 98	44 Ru 101	45 Rh 103	46 Pd 106	47 Ag 108	48 Cd 112	49 In 115	50 Sn 119	51 Sb 122	52 Te 128	53 I 127	54 Xe 131
6	55 Cs 133	56 Ba 137	* 57-71	72 Hf 178	73 Ta 181	74 W 184	75 Re 186	76 Os 190	77 Ir 192	78 Pt 195	79 Au 197	80 Hg 201	81 Tl 204	82 Pb 207	83 Bi 209	84 Po 209	85 At 210	86 Rn 222
7	87 Fr 223	88 Ra 226	** 89-103	104 Rf 263	105 Db 262	106 Sg 266	107 Bh 264	108 Hs 269	109 Mt 268	110 Ds 272	111 Rg 272	112 Cn 277	113 Nh 284	114 Fl 289	115 Uup 288	116 Uuh 292	117 Uus 294	118 Uuo 294

* The Lanthanide series	57 La 139	58 Ce 140	59 Pr 141	60 Nd 144	61 Pm 145	62 Sm 150	63 Eu 152	64 Gd 157	65 Tb 159	66 Dy 163	67 Ho 165	68 Er 167	69 Tm 169	70 Yb 173	71 Lu 175
-------------------------	-----------------	-----------------	-----------------	-----------------	-----------------	-----------------	-----------------	-----------------	-----------------	-----------------	-----------------	-----------------	-----------------	-----------------	-----------------

** The Actinide series	89 Ac 227	90 Th 232	91 Pa 231	92 U 238	93 Np 237	94 Pu 244	95 Am 243	96 Cm 247	97 Bk 247	98 Cf 251	99 Es 252	100 Fm 257	101 Md 258	102 No 259	103 Lr 262
------------------------	-----------------	-----------------	-----------------	----------------	-----------------	-----------------	-----------------	-----------------	-----------------	-----------------	-----------------	------------------	------------------	------------------	------------------

Special notes

- The **atomic number** denotes the number of protons and by implication also the number of electrons of a complete type of atom.
- The **relative atomic mass** is an approximation of 'the total mass of the nucleus of a specific type of atom as compared to the mass of the nucleus of a common hydrogen atom [consisting of but one proton]'. As such, when bearing in mind that the operational mass of a normal proton (938 MeV/c²) is nearly identical to the operational mass of a normal neutron (940 MeV/c²), then the relative atomic mass is indicative of the total number of nucleons (protons and neutrons) of a specific type of atom.
- The groups I to VIII are a categorization of the types of atoms that are known to have similar chemical properties. That is, the elements in every such group have as many valence electrons as indicated by the Roman numeral of that group. While the elements in the unmarked columns (collectively referred to as the transition metals) have either 1 or 2 valence electrons and will thusly be exhibiting similar properties as the elements in, respectively, group I and group II.
- The periods 1 to 7 on the left serve to indicate the number of so-called electron shells wherein the electrons are orbiting their nucleus (as will soon be explained in subsection 3.1.1).
- The legend is merely an indication of how the different kinds of elements are mundanely perceived to manifest themselves at the standardized temperature and pressure (i.e. at 0°C and 1 atmosphere of pressure). Hence that, although all of them are actually consisting of the same kinds of subatomic particles (i.e. of protons and neutrons and electrons), a few of them are mundanely deemed to have a non-metallic nature while most of them are mundanely deemed to have one or other kind of metallic nature.

Figure 2

Back

Some Typical Examples of the Electronic Configuration of Atoms

The following numerical notations serve to indicate the number of electrons that certain types of complete atoms are ordinarily holding in their shells, from their innermost shell to their outermost shell.

hydrogen (1)
helium (2)
nitrogen (2,5)
oxygen (2,6)
sodium (2,8,1)
aluminium (2,8,3)
sulphur (2,8,6)
chlorine (2,8,7)
argon (2,8,8)
calcium (2,8,8,2)
iron (2,8,14,2)
platinum (2,8,18,32,17,1)
lead (2,8,18,32,18,4)
radon (2,8,18,32,18,8)
uranium (2,8,18,32,21,9,2)

Special note

As previously mentioned, each electron shell is not necessarily holding the maximum number of electrons because:

- i) the total number of electrons of a complete atom will always equal the total number of its protons
- ii) the electrons will always be trying to optimally configure themselves across the electron shells (i.e. so as to try to maintain the energetic equilibrium of the entire atom)

For example:

- in the case of a complete argon atom, while the third shell can theoretically hold up to 18 electrons, it is known to hold but 8 electrons in that third shell
- in the case of a complete platinum atom, while the fifth shell can theoretically hold up to 32 electrons and the sixth shell up to 18, it is known to hold but 17 electrons and 1 electron in those respective shells

Figure 3

Back

The Most Common Distribution of the Electrons within the Various Sub-shells

The major shells	The maximum number of electrons in the sub-shells			
	s	p	d	f
1	2			
2	2	6		
3	2	6	10	
4	2	6	10	14
5	2	6	10	14
6	2	6	10	
7	2	6		

Special notes

- Again, specifically note that the electrons will always try to naturally arrange themselves in these electron sub-shells in such a way as to try to maintain the energetic equilibrium of the entire atom.
- Under extraordinary circumstances – i.e. when the electrons of an atom have been extraordinarily energized – then the number of the sub-shells can extend up to the so-called g and h and i sub-shells.

Some Typical Examples

The element		The distribution of the electrons across the electron shells (1 to 7) and sub-shells (s-f)																		
Name	Total number of electrons	1	2		3			4				5				6			7	
		s	s	p	s	p	d	s	p	d	f	s	p	d	f	s	p	d	s	p
Hydrogen (H)	1	1																		
Oxygen (O)	8	2	2	4																
Sulphur (S)	16	2	2	6	2	4														
Iron (Fe)	26	2	2	6	2	6	6	2												
Silver (Ag)	47	2	2	6	2	6	10	2	6	10	0	1								
Platinum (Pt)	78	2	2	6	2	6	10	2	6	10	14	2	6	9	0	1				
Uranium (U)	92	2	2	6	2	6	10	2	6	10	14	2	6	10	3	2	6	1	2	

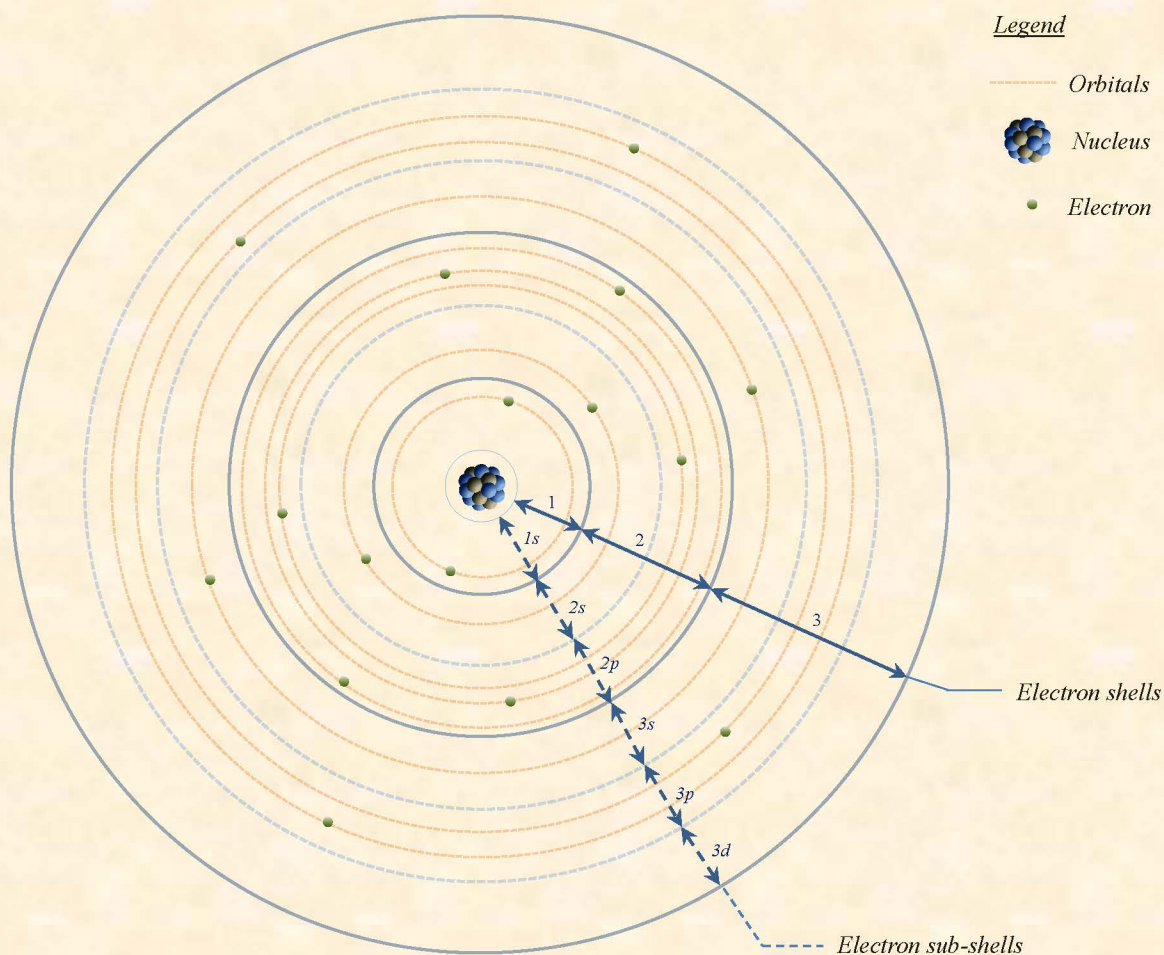
Special note

As can be surmised from Figure 3 and from this table, the configuration of the electrons of every complete atom can be notated either in terms of the electron shells or in terms of the electron sub-shells. For example, in the case of a sulphur atom, either more generically as S (2,8,6) or more extensively as S ($1s^2 2s^2 2p^6 3s^2 3p^4$).

Figure 4

Back

A Two-Dimensional Representation of the Electron Shells and the Sub-shells and the Orbitals of a Sulphur Atom



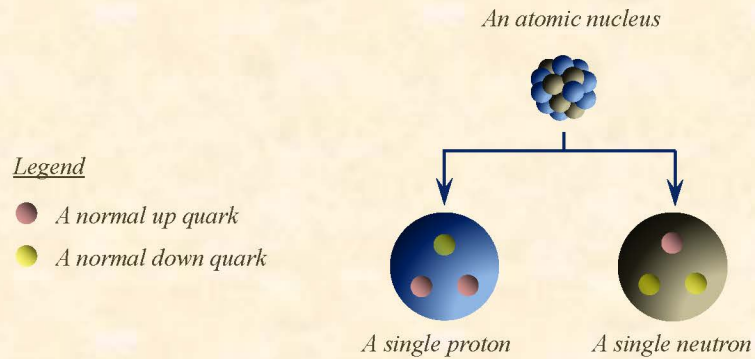
Special notes

- For academic purposes, the above illustration is not drawn to scale and has been greatly simplified.
- The overall shape of the electron shells and electron sub-shells and electron orbitals can be mathematically defined. They can be either spherically shaped or dumbbell shaped or quatro-pear shaped, and so on. But, by reason that such different shapes are actually irrelevant to the inner nature of the electrons, they are here for ease of understanding being depicted as if they were spherically shaped.

Figure 5

Back

The Basic Configuration of the Major Quarks within a Proton / Neutron



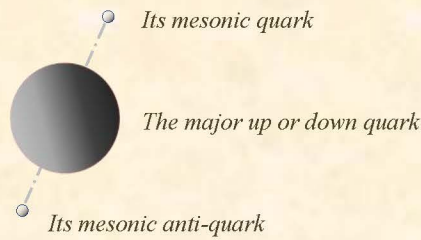
Special note

For the sake of simplicity, this illustration does not show the other subatomic particles that every proton / neutron is also consisting of.

Figure 6

Back

The Mesonic Quark and Mesonic Anti-Quark of a Major Quark



Special notes

- The concept of an anti-particle will be at length explained in Part IX. Let it suffice to know for now that, apart from the fact that the intrinsic energies of a normal particle and of its equally strong anti-particle are frequently opposed to one another, there is no fundamental difference between them from a purely energetic perspective.
- The mesonic quark and the mesonic anti-quark always remain on opposite sides of that major quark (i.e. because of their relative positionings always being magnetically linked to the spin of that major quark).

Figure 7

[Back](#)

The Suggested Re-Classification of All Simple Subatomic Particles

All steadily appearing subatomic particles

- ✓ all *infrared photons*¹
- ✓ all *'visible' light photons*¹
- ✓ all *ultraviolet light photons*¹
- ✓ all *X-ray photons*²
- ✓ all *gamma ray photons*²
- ✓ all *electrons*¹
- ✓ all *neutrinos*¹
- ✓ all *major quarks*²
- ✓ all *mesonic quarks*²

All fleetingly appearing-and-disappearing subatomic particles

- ✓ all *gluons*²
- ✓ all *W-bosons*² and all *Z-bosons*²

¹ Currently assumed by all scientists to exert their forces in an exclusively electromagnetic fashion

² Currently assumed by all scientists to exert their forces in an exclusively nuclear fashion

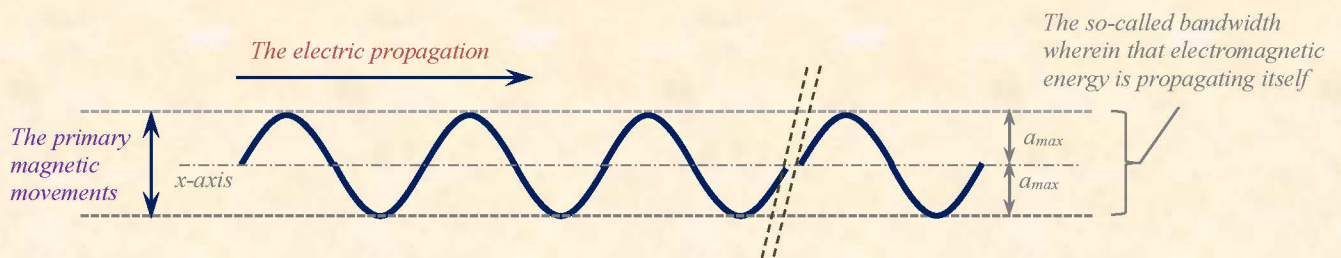
Special notes

- Whilst appraising this re-classification, let it be re-iterated that any kind of simple subatomic particle can in fact be referred to as a simple photon if it is in the process of being exchanged between two other subatomic particles.
- The gravitons are excluded from this re-classification because they will soon be shown to not actually exist.
- The *Higgs bosons* are later shown to not be subatomic particles but to altogether constitute the undivided spiritual substance of God, i.e. to altogether constitute His infinite spirit.
- As all subatomic particles are inherently invisible, the terms 'steadily appearing' and 'fleetingly appearing-and-disappearing' do not refer to any measure of visibility but to whether their invisible energies are either steadily or fleetingly assuming a spherical [seemingly particulate] form.
- Although the term 'gauge bosons' can be misleading, this chapter will continue to use that term so as to ensure that all of the forthcoming explanations do not deviate too much from the contemporary views of quantum physicists (i.e. most of whom are still considering every subatomic particle to either be a fermion or a gauge boson).

Figure 8

[Back](#)

A Two-Dimensional View of the Propagation of an Electromagnetic Energy



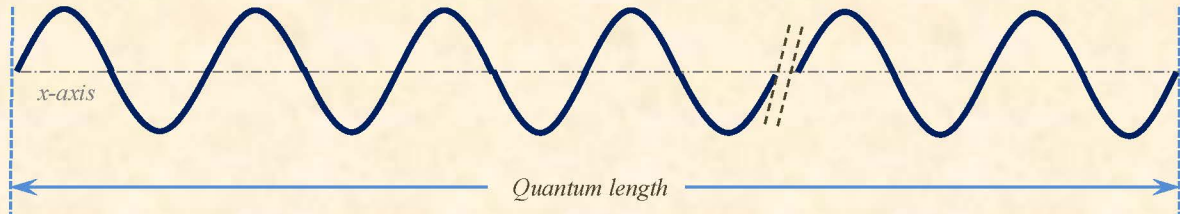
Special notes

- The $\therefore$ symbol serves to indicate that that electromagnetic energy is consisting of many more oscillations than graphically displayed.
- The **maximum amplitude** (denoted as a_{max}) of an electromagnetic energy is defined as 'the maximum extent of its magnetic movement on either side of the imaginary x-axis'.
- In reality, unlike the above greatly simplified two-dimensional view, an electromagnetic energy is propagating itself three-dimensionally. The graphical representation whereof can however only be rendered in section 24. That is, only after all of the affiliated electric and magnetic aspects of that three-dimensional propagation have been appropriately explained.
- The student may have noticed that the above two-dimensional representation of an electromagnetic energy, i.e. in terms of how its propagation and its movements are being portrayed, is quite different to the one of the quantum physicists. Yet will find it to in due time greatly facilitate the factual understandings of:
 - i) the manner wherein an electromagnetic energy is three-dimensionally propagating itself, as will be extensively explained in section 24
 - ii) the true origin of all conventionally known gravitational forces, as will be extensively explained in section 23
 - iii) the so-called electric charge of a subatomic particle, which section 29 will show to actually not be an electric charge but a magnetic charge

Figure 9

[Back](#)

The Quantum Length of a Singular Electromagnetic Energy



Special notes

- By way of comparison, the quantum length of a subtle radiowave energy can extend over many kilometers while the quantum length of a much more powerful gamma ray energy is but a tiny fraction of a millimeter.

However, irrespective of their quantum length, all electromagnetic energies have exactly the same number of oscillations (enumerated by way of dividing the characteristic quantum length of any electromagnetic energy by its characteristic wavelength), thusly allowing any one type of electromagnetic energy to be energetically converted into any other type of electromagnetic energy.

- By reason that the term 'quantum length' applies only to a singular electromagnetic energy, scientists use another term – *the Planck length* – when referring to 'the diameter of a simple subatomic particle'.

Figure 10

[Back](#)

The Wavelength of a Singular Electromagnetic Energy

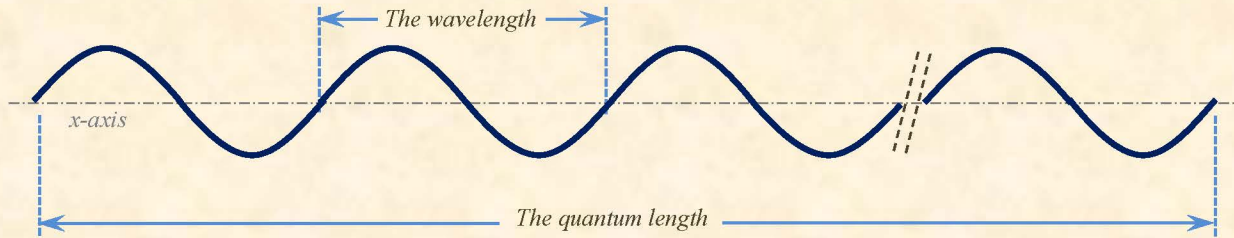


Figure 11

Back

The Scientific Notations of the Orders of Magnitude

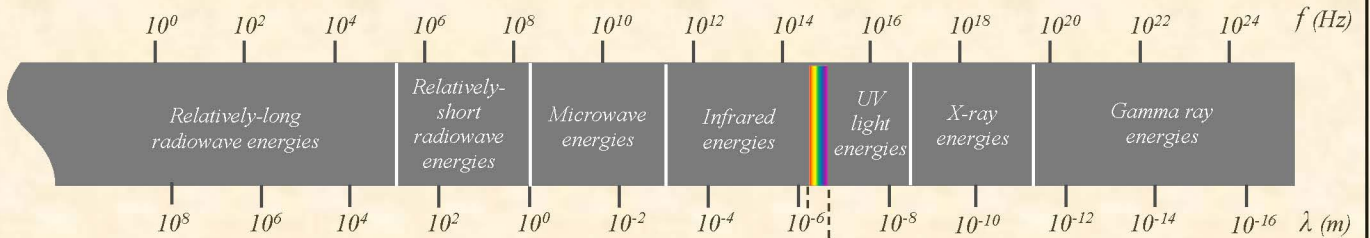
<i>In words</i>	<i>Prefix</i>	<i>Symbol</i>	<i>Decimal notation</i>	<i>Power of ten</i>
Septillion	yotta-	Y	1,000,000,000,000,000,000,000,000	10^{24}
Sextillion	zetta-	Z	1,000,000,000,000,000,000,000,000	10^{21}
Quintillion	exa-	E	1,000,000,000,000,000,000,000	10^{18}
Quadrillion	peta-	P	1,000,000,000,000,000,000	10^{15}
Trillion	tera-	T	1,000,000,000,000,000	10^{12}
Billion	giga-	G	1,000,000,000	10^9
Million	mega-	M	1,000,000	10^6
Thousand	kilo-	k	1,000	10^3
Hundred	hecto-	h	100	10^2
Ten	deca-	da	10	10^1
One	—	—	1	10^0
Tenth	deci-	d	0.1	10^{-1}
Hundredth	centi-	c	0.01	10^{-2}
Thousandth	milli-	m	0.001	10^{-3}
Millionth	micro-	μ	0.000001	10^{-6}
Billionth	nano-	n	0.000000001	10^{-9}
Trillionth	pico-	p	0.000000000001	10^{-12}
Quadrillionth	femto-	f	0.000000000000001	10^{-15}
Quintillionth	atto-	a	0.000000000000000001	10^{-18}
Sextillionth	zepto-	z	0.000000000000000000001	10^{-21}
Septillionth	yocto-	y	0.000000000000000000000001	10^{-24}

Figure 12

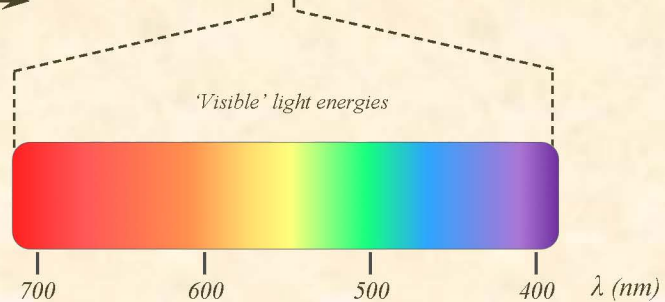
[Back](#)

A Graphical Representation of the Electromagnetic Spectrum

Increasing frequency (f) of the electromagnetic energies $\rightarrow$



Decreasing wavelength (λ) of the electromagnetic energies $\rightarrow$



Special note

In this regard, let it be duly acknowledged that all 'visible' light energies are in and by themselves actually invisible (i.e. even as all other kinds of electromagnetic energies). Yet, when such 'visible' light energies are being electrically relayed through one's optical nerves to one's brain, then they cannot but then invoke in one's spiritual awareness any whichever of the above portrayed colours (i.e. depending on their frequencies).

Figure 13a

[Back](#)

A Tabular Representation of the Electromagnetic Spectrum

Class			Frequency (f)	Wavelength (λ)	Approximate Energy Content (E)
Gamma ray energies (γ rays)	Gamma ray frequencies	Y	300 EHz	1 pm	1.24 MeV
X-ray energies	Hard X-ray frequencies	HX	30 EHz	10 pm	124 keV
			3 EHz	100 pm	12.4 keV
	Soft X-ray frequencies	SX	300 PHz	1 nm	1.24 keV
Ultraviolet light energies	Extreme ultraviolet frequencies	EUV	30 PHz	10 nm	124 eV
	Near ultraviolet frequencies	NUV	3 PHz	100 nm	12.4 eV
'Visible' light energies					
Infrared energies	Near infrared frequencies	NIR	300 THz	1 μm	1.24 eV
	Mild infrared frequencies	MIR	30 THz	10 μm	124 meV
	Far infrared frequencies	FIR	3 THz	100 μm	12.4 meV
Microwave energies & Radiowave energies	Extremely high frequencies	EHF	300 GHz	1 mm	1.24 meV
	Super high frequencies	SHF	30 GHz	1 cm	124 μeV
	Ultra high frequencies	UHF	3 GHz	1 dm	12.4 μeV
	Very high frequencies	VHF	300 MHz	1 m	1.24 μeV
	High frequencies	HF	30 MHz	10 m	124 neV
	Medium frequencies	MF	3 MHz	100 m	12.4 neV
	Low frequencies	LF	300 kHz	1 km	1.24 neV
	Very low frequencies	VLF	30 kHz	10 km	124 peV
	Ultra low frequencies	ULF	3 kHz	100 km	12.4 peV
	Super low frequencies	SLF	300 Hz	1 Mm	1.24 peV
	Extremely low frequencies	ELF	30 Hz	10 Mm	124 feV
			3 Hz	100 Mm	12.4 feV

Increasing frequencies ↑

Special note

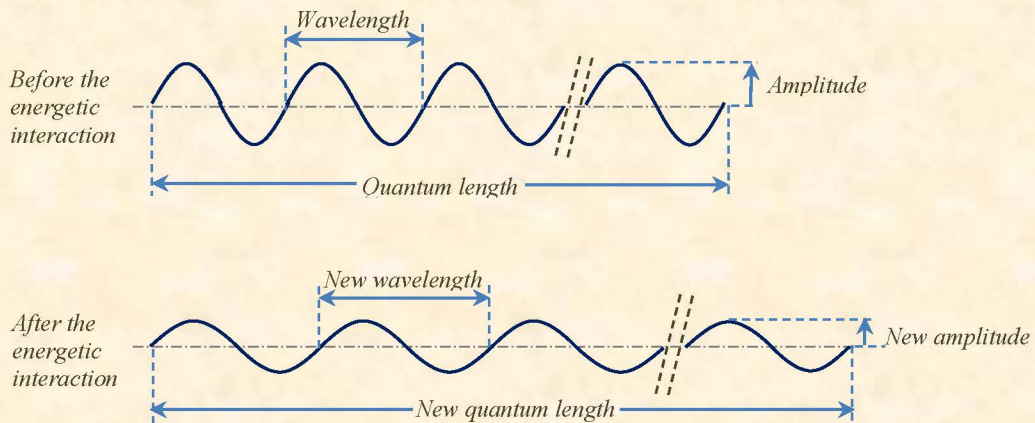
In addition to the relevant frequencies and wavelengths, this table is also portraying the approximate energy content of each kind of electromagnetic energy. The significance of the scientific unit 'eV', which is the abbreviation for 'electronvolt', will be conveyed in subsection 25.4.

Figure 13b

Back

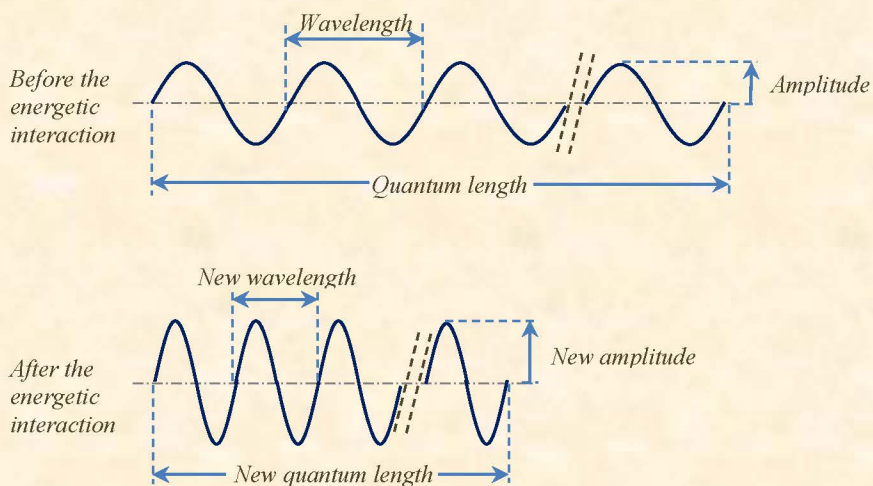
The Electric Elongation / Contraction of an Electromagnetic Energy

When its electric energy content is decreased, then the electromagnetic energy will naturally elongate itself:



If the electromagnetic energy was for instance an X-ray energy before the above modification, then it may have become – due to its decreased frequency – for instance an ultraviolet light energy after that modification.

Conversely, when its electric energy content is increased, then the electromagnetic energy will naturally contract itself:



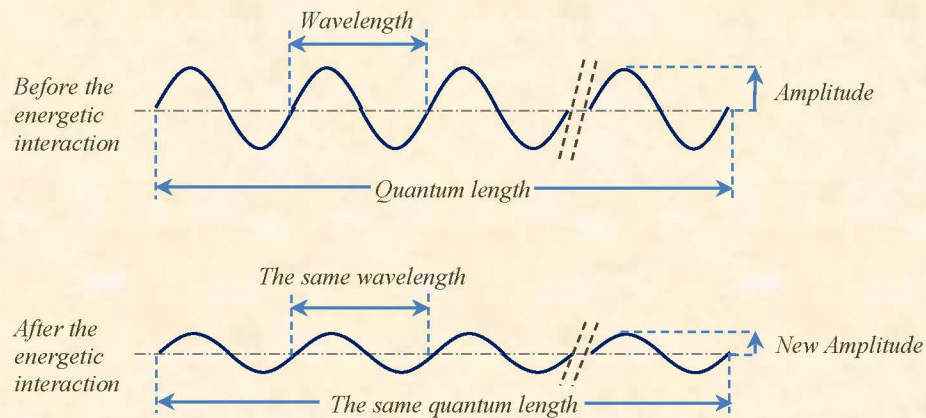
If the electromagnetic energy was for instance an X-ray energy before the above modification, then it may well have become – because of its increased frequency – a gamma ray energy after that modification.

Figure 14

Back

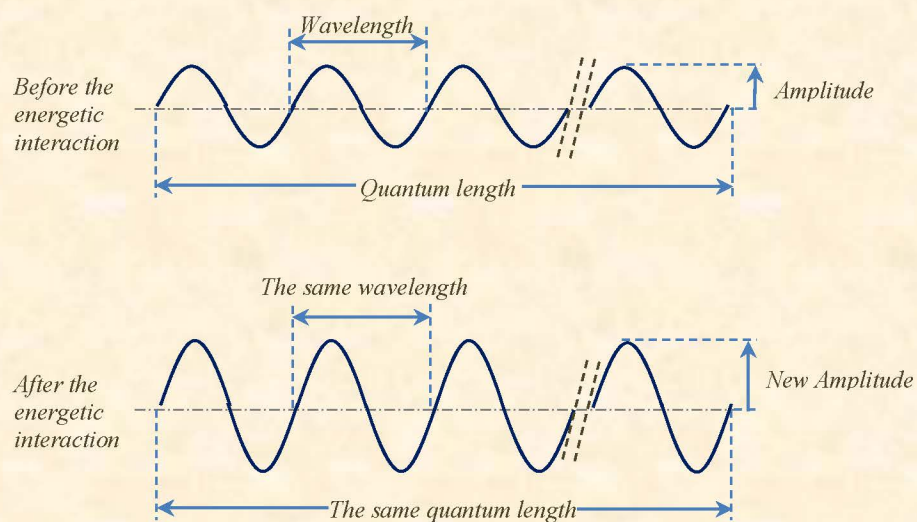
The Magnetic Weakening / Strengthening of an Electromagnetic Energy

When its magnetic energy content is decreased, then the electromagnetic energy will only assume a smaller amplitude:



If the electromagnetic energy was for instance an X-ray energy before the above modification, then it will still be an X-ray energy after that modification [with a smaller amplitude].

Conversely, when its magnetic energy content is increased, then the electromagnetic energy will only assume a larger amplitude:



Again, if the electromagnetic energy was for instance an X-ray energy before the above modification, then it will still be an X-ray energy after that modification [with a larger amplitude].

Figure 15

Back

An Analogy Illustrating the Conceptual Difference between the Actual Speed and the Apparent Speed of an Entity

Visualize a car that is travelling at a constant speed of 40 km/h and that it enters a suburb and travels to and fro within that suburb until finally exiting that suburb. The first illustration depicts the observation of a witness who can see the car travelling in all kinds of directions within the suburb and the second illustration depicts the observation of a witness who cannot see the car travelling within the suburb.

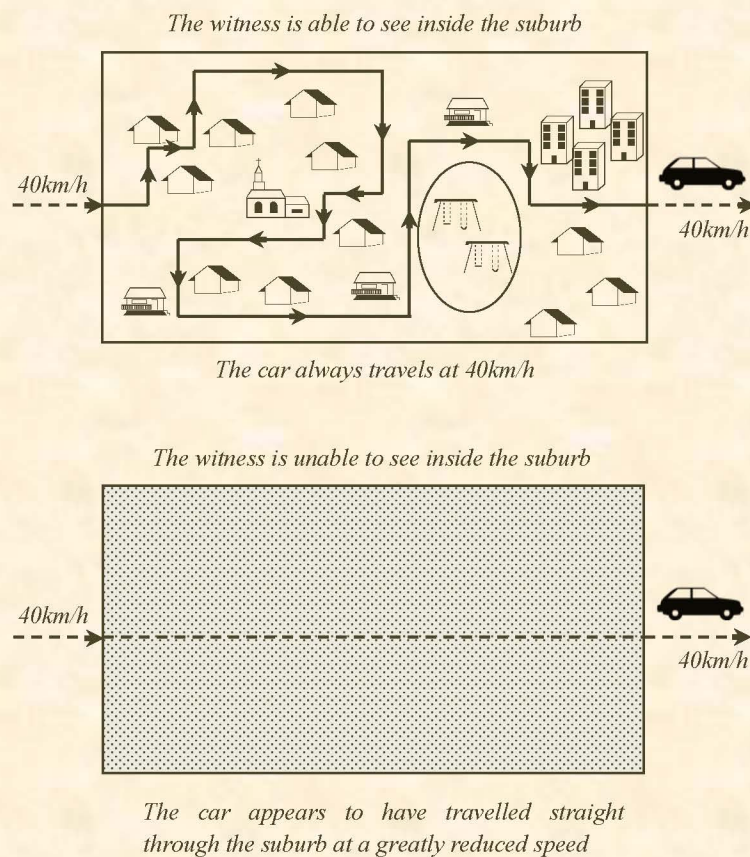


Figure 16

[Back](#)

The Different Kinds of Polarized Trajectories of an Electromagnetic Energy

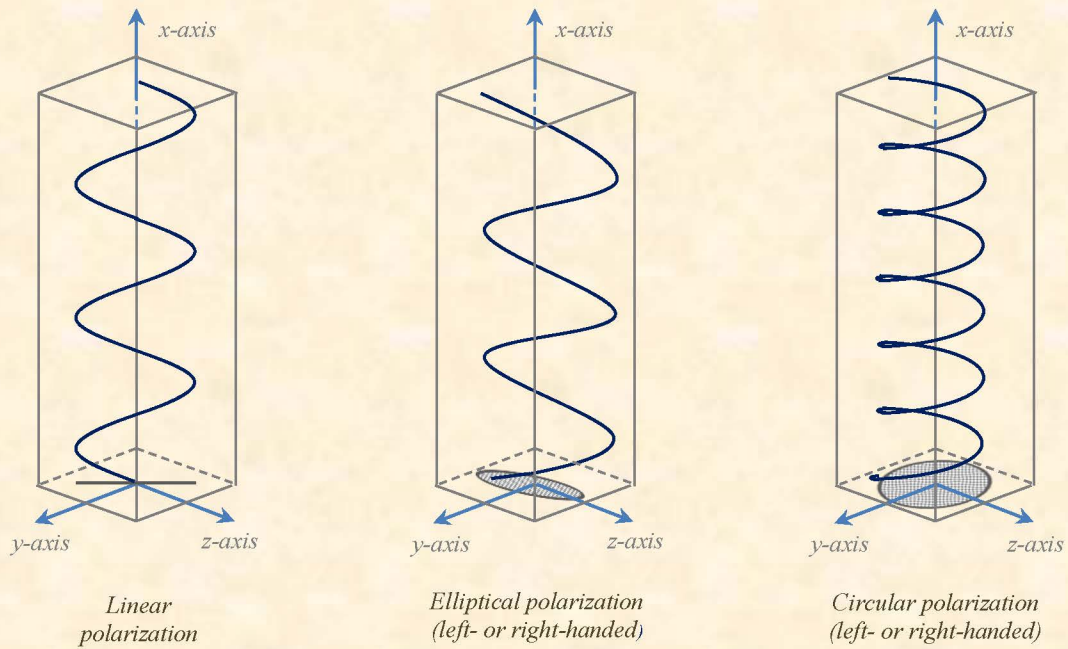


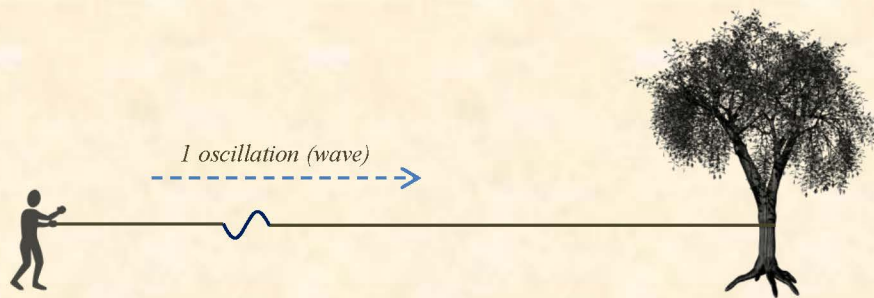
Figure 17

[Back](#)

A Typical Example of How to Mundanely Initiate a Series of Oscillations

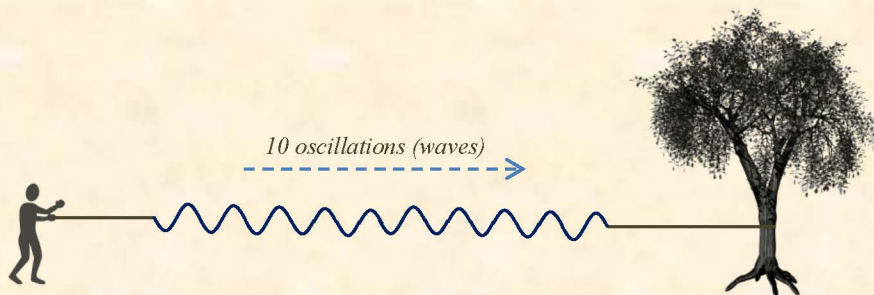
Imagine holding one end of a rope whose other end is attached to a far-off tree. And that, for the purpose of this metaphor, the rope would not be affected by the gravitational forces of the Earth, rendering it a perfectly straight rope between oneself and the tree.

When moving the rope up and down only once, then that movement will be propagated along the rope as a single oscillatory wave. In this regard, note that apart from the up and down movement, the rope itself does not move. That is, only the forces that are being imparted unto that rope are being propagated along the length of that rope towards the tree in the form of an oscillatory wave.



The stimulus that is occasioning the oscillation to emerge and to propagate itself along the length of the rope can be referred to as *a coordinated impetus*.

Now, instead of moving the rope up and down only once, rhythmically move the rope up and down ten times. This rhythmic movement will then result in ten consecutive sinusoidal waves being propagated along the length of the rope. As such, it is the number of times that the rope is rhythmically moved up and down that will then be determining the total number of the oscillatory movements.



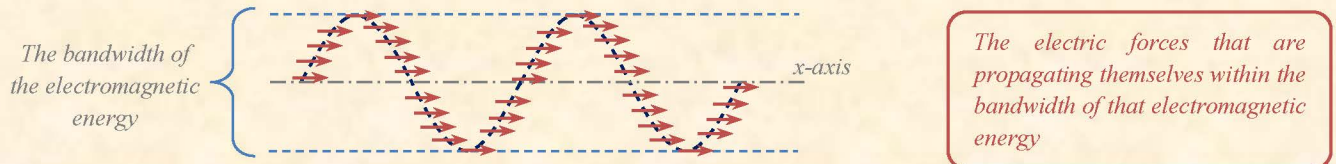
The stimuli that are occasioning the ten oscillations to emerge and to propagate themselves along the length of the rope can now be referred to as *a series of ten coordinated impetuses*.

Figure 18

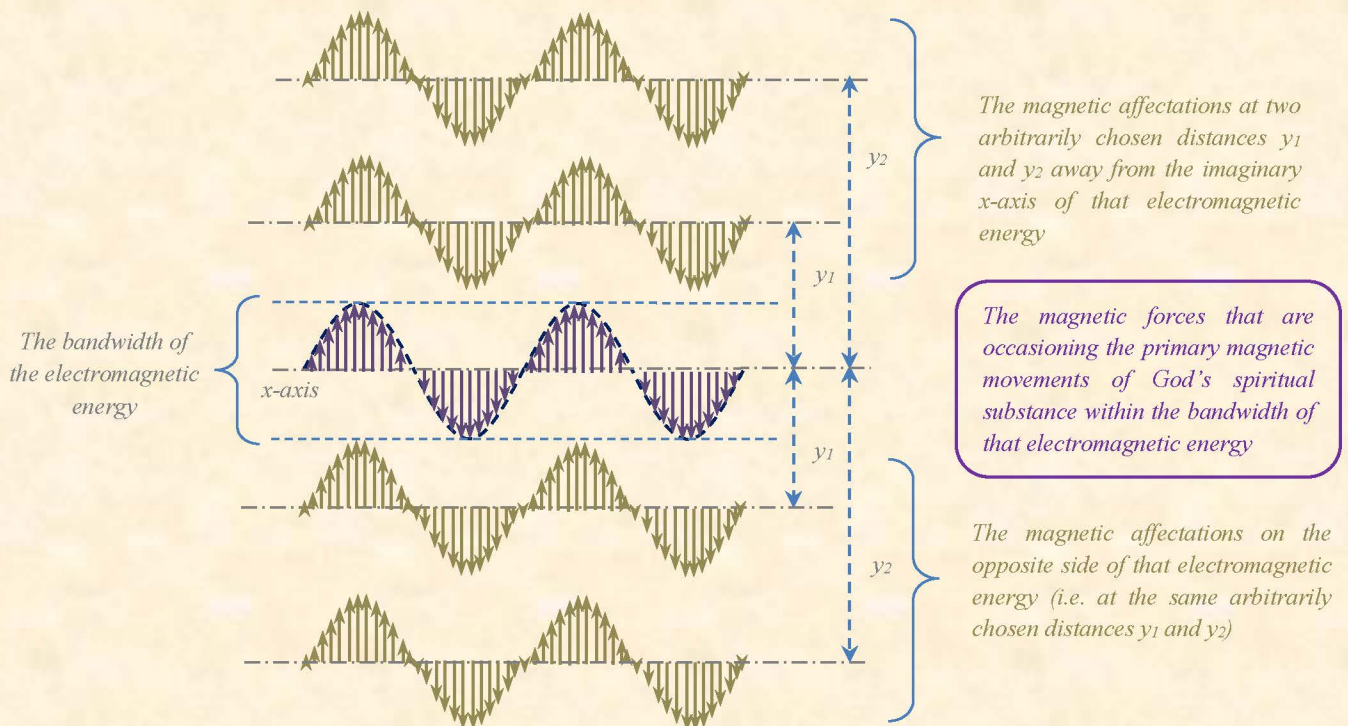
[Back](#)

A Two-Dimensional Representation of the Electric Forces and the Magnetic Forces and the Magnetic Affections of an Electromagnetic Energy

An Academic Representation of the Electric Aspects



An Academic Representation of the Magnetic Aspects



Special note

From the above illustrations can be surmised that the magnetic affections of an electromagnetic energy are even so magnetic forces. But they will henceforth be referred to as the *magnetic affections* of that electromagnetic energy so as to distinguish them from the magnetic forces that are occasioning the microscopic movements of God's spiritual substance.

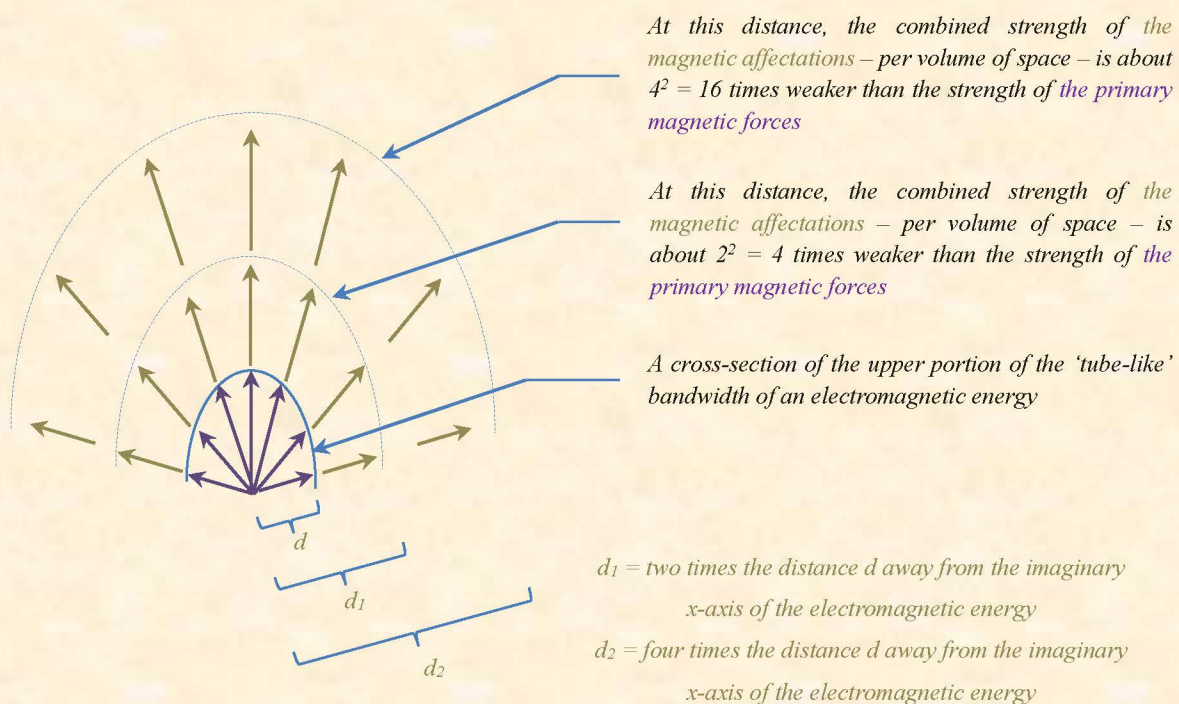
As such, it is important for the student to always maintain a clear distinction between:

- i) the *magnetic forces* that are occasioning the microscopic movements of God's spiritual substance within the bandwidth of an electromagnetic energy
- ii) the *magnetic affections* that are being effectuated by such microscopic movements and which will, after breaching the bandwidth of that electromagnetic energy, merely propagate themselves across His spiritual substance

Figure 19

Back

A Greatly Simplified Representation of the Radially Dispersed Magnetic Affections

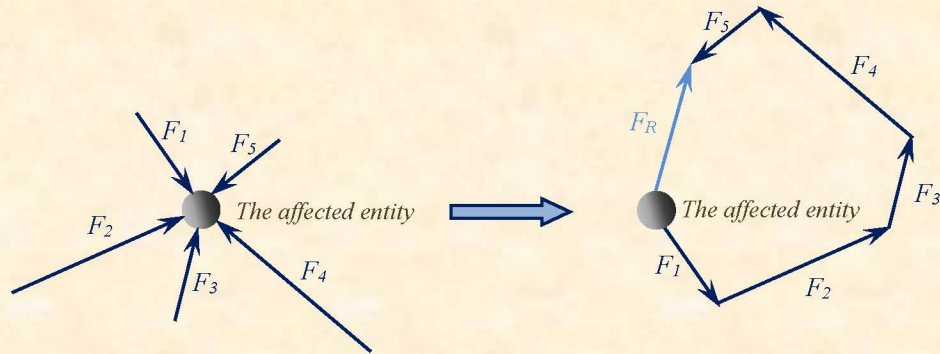


This illustration is clearly showing that, even as the rays of the sun are becoming more and more dispersed throughout space the further and further away from the sun itself, the combined strength – per volume of space – of the radially exerted magnetic affections of an electromagnetic energy is also steadfastly diminishing the further and further away from that electromagnetic energy itself. This practically means that **not** the individual strength of every magnetic affection **but** their so-called combined strength per volume of space is exponentially decreasing the further and further away from the imaginary x-axis of that electromagnetic energy.

Figure 20

[Back](#)

How to Graphically Combine a Number of Forces (F_1 to F_5) into a Resultant Force (F_R)



Special notes

- As can be surmised from the above illustration, the vector components F_1 to F_5 [each represented by an arrow having a specific magnitude and a specific direction] are simply drawn end to end so as to determine the magnitude and the direction of the resultant vector F_R .
- The same result can of course also be mathematically obtained. Yet, the above graphical method should not be ignored because it gives one a visual impression of the relative magnitude and direction of the resultant vector F_R , which should help one to identify any occurring mathematical errors.
- From a graphical perspective and consequently also from a mathematical perspective, every one of the above forces [such as F_2] can be deemed to consist of a number of component forces. If the applied framework is for instance an x - and y -axis configuration, then the component forces (F_x and F_y) of the force F_2 can be graphically portrayed as follows:

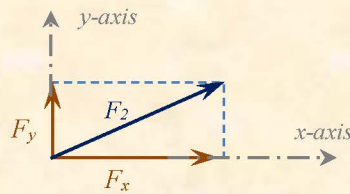
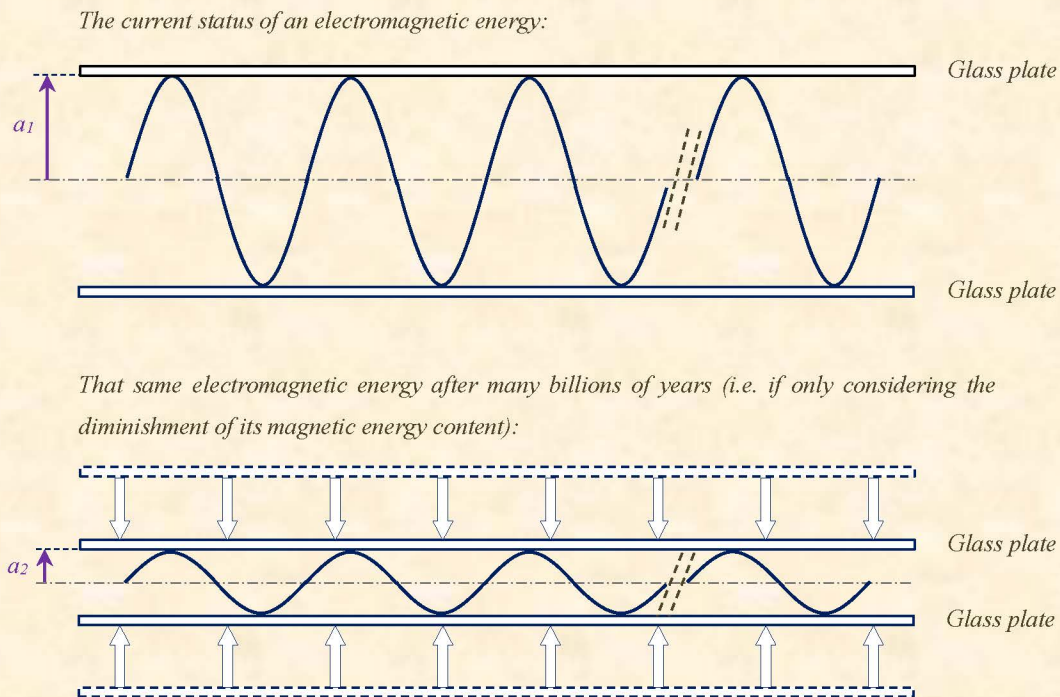


Figure 21

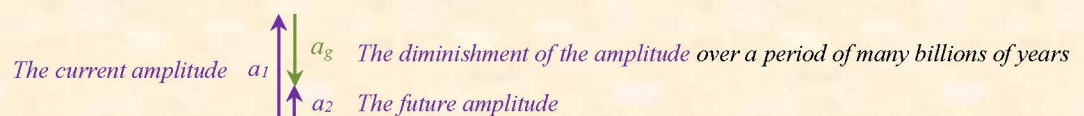
Back

The Emergence of the Conventional Gravitational Forces due to the Diminishment of the Magnetic Energy Content of an Electromagnetic Energy

(as can be understood in terms of the aforementioned thought experiment)



The basic principle of that long-term process can be vectorially displayed as follows:



Special notes

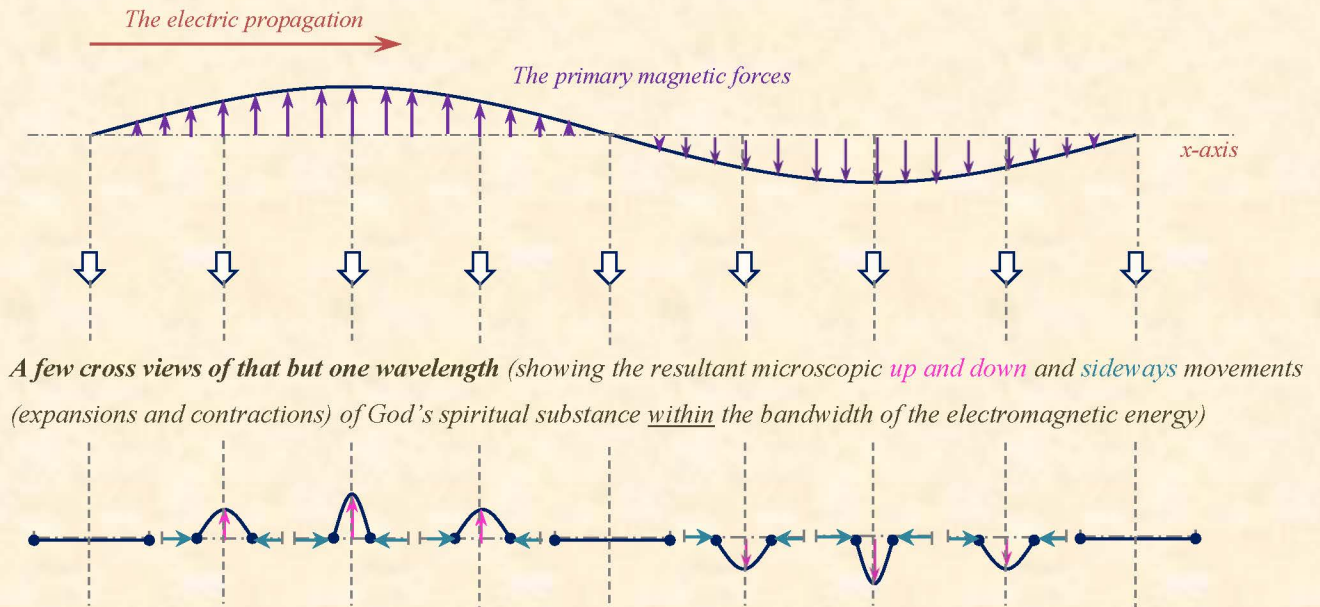
- As such, the arrow a_g serves to collectively represent the many gravitational forces being exerted by that deteriorating electromagnetic energy over a period of many billions of years.
- The gravitational forces exerted by a singular electromagnetic energy are of course incredibly small. Yet, when numerous such singular electromagnetic energies are altogether comprising a huge celestial body [such as planet Earth], then the overall effect of all such tiny gravitational forces becomes clearly discernible. This explains why, unlike the other three so-called fundamental forces of Nature, the strength of such gravitational forces cannot be microscopically but only macroscopically measured.
- Specifically note that the diminishment of only the magnetic energy content of an electromagnetic energy cannot result in the elongation of that electromagnetic energy. That elongation [as illustrated in Figure 14 and as hereafter explained] is due to the diminishment of the electric energy content.

Figure 22

Back

The Three-Dimensional Aspects of the Propagation of an Electromagnetic Energy

The side view of one oscillation (i.e. of but one wavelength)

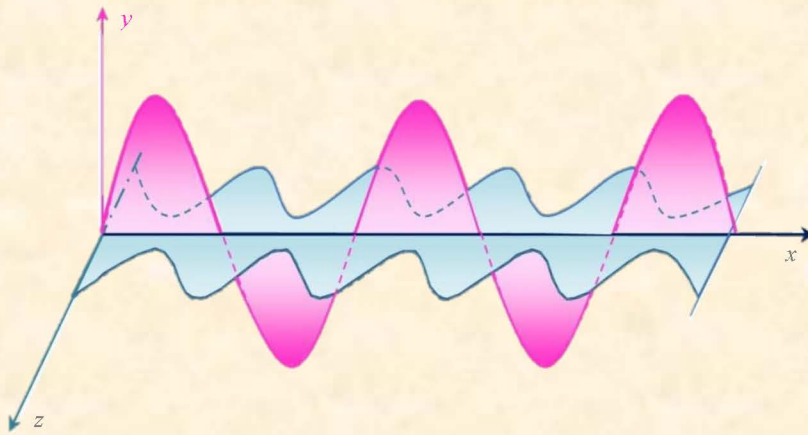


Specifically note that for ease of understanding, the above illustration is not portraying all of the magnetic affectations that are being effectuated by all of such microscopic movements (expansions and contractions) of God's spiritual substance.

Figure 23a

[Back](#)

A 3-D View of the Relevant Expansions and Contractions of God's Spiritual Substance over the Span of Several Wavelengths



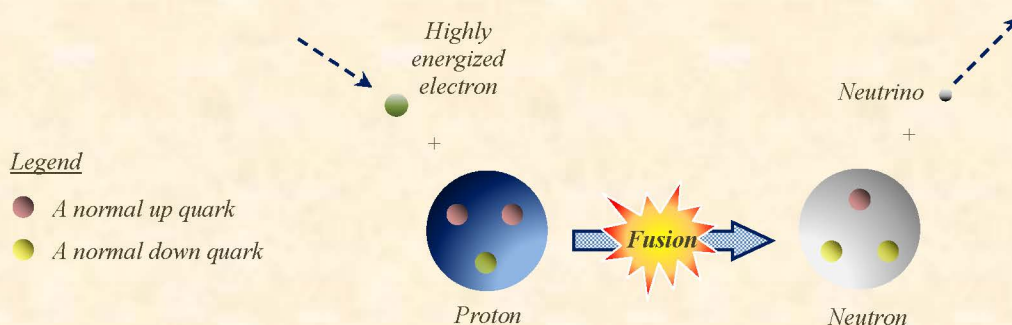
*This illustration also shows, again in a simplified way, how the primary **magnetic forces** of an electromagnetic energy are occasioning as well the microscopic **movements** of God's spiritual substance along the y-axis as the microscopic **movements** of God's spiritual substance along the z-axis.*

Note however that in reality, unlike the above greatly simplified illustration, such microscopic movements of God's spiritual substance are actually occurring in every other xyz-direction (i.e. in exact accordance with the three-dimensional propagation of an electromagnetic energy).

Figure 23b

[Back](#)

The Thermonuclear Fusion of a Proton and a Highly Energized Electron into a Neutron



Special notes

- For the sake of simplicity, this illustration does not show the other quarkonic particles that every proton / neutron is consisting of.
- The depicted colours merely serve to emphasize the distinction between the up quarks and the down quarks and are therefore not an indication of the so-called colour confinement of the quarks.
- Scientists used to call the above portrayed highly energized electron a nuclear electron but gradually abandoned that term after they had to acknowledge that its constituent energies were capable of converting an up quark into a down quark. Nevertheless, for ease of writing, this chapter will continue to use that outdated term.

In this regard, note that the energy content of such a nuclear electron [consisting of very powerful gamma ray energies] is far greater than the energy content of a normal orbital electron [consisting of less powerful X-ray energies]. That is, the energy content of such a nuclear electron is about 80,000 MeV while the energy content of a normal orbital electron is only about 0.5 MeV.

- The manner wherein that nuclear electron is capable of converting an up quark into a down quark ought to be understood as follows:

That nuclear electron [having a $-1 = -\frac{3}{3}$ charge] will be effectively changing an up quark [having a $+\frac{2}{3}$ charge] into a down quark [having a $-\frac{1}{3}$ charge]. That is, as per the mathematical equation:

$$-\frac{3}{3} + \frac{2}{3} = -\frac{1}{3}$$

Thusly changing the positively-charged proton having a total charge of $+\frac{2}{3} + \frac{2}{3} - \frac{1}{3} = +1$ (i.e. of its two up quarks and its one down quark) into a nearly-neutrally charged neutron having a total charge of $+\frac{2}{3} - \frac{1}{3} - \frac{1}{3} = 0$ (i.e. of its then one up quark and two down quarks).

- It is perfectly possible to reverse that process, i.e. to convert a neutron back into a proton, which will then result in the emission of a nuclear anti-electron (positron) and an anti-neutrino.

Yet, when compared to the energy content of the original electron (before its fusion with a proton into a neutron), then the energy content of the new electron (after the fission of that neutron back into a proton and an electron) will be smaller to the extent of the energy content of the two aforementioned neutrinos (i.e. of the normal neutrino and of the anti-neutrino).

- In this regard, again note that – as will soon be explained in subsection 25.5 – the only real difference between whichever kind of particle and its so-called anti-particle (such as between a neutrino and an anti-neutrino that has exactly the same scalar energy content) is that their constituent energies are frequentlyly opposed to one another.

Figure 24

Back

A Typical Example of a Nuclear Fission Chain Reaction

In view of this example, the chain reaction is being triggered by way of bombarding U_{235}^{92} atoms with neutrons, occasioning some of such U_{235}^{92} atoms to then be converted into extremely unstable U_{236}^{92} atoms. Each of which U_{236}^{92} will then almost instantaneously fission into a Kr_{92}^{36} atom and a Ba_{141}^{56} atom. Thusly resulting in the forceful ejection of 3 neutrons, two of which will then [on average] be colliding with other U_{235}^{92} atoms. Thusly altogether resulting in a nuclear fission chain reaction.

The energies exploded into the surrounding environment during such a nuclear fission reaction are the ones comprising the difference between the gluonic energies of the U_{236}^{92} atoms and the gluonic energies of the resultant lighter atoms (the Kr_{92}^{36} and Ba_{141}^{56} atoms). Although that so-called mass defect constitutes but a tiny portion of the nuclear fission materials, it nevertheless releases millions of times more energies than can be obtained from the combustion of a comparable volume of fossil fuel.

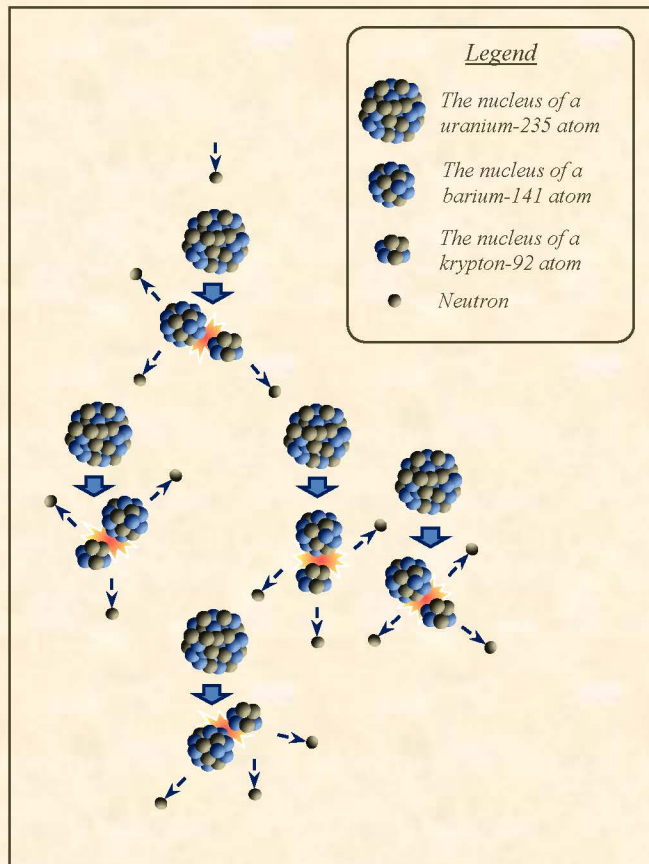
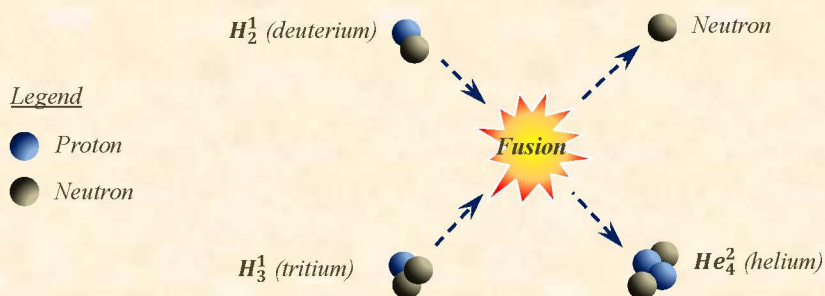


Figure 25

[Back](#)

A Typical Example of a Thermonuclear Fusion Reaction



Special notes

- Again, for ease of understanding, the above illustration is only showing the nucleons (protons and neutrons), to the exclusion of all the electrons. In this regard, let the student be reminded of the fact that a deuterium atom and a tritium atom are both hydrogen atoms, i.e. which are respectively containing 1 and 2 neutrons.
- During such a very powerful thermonuclear fusion reaction, about 0.7% of the gluonic energies of the hydrogen nuclei (the so-called mass defect) are being explosively dispersed towards the surrounding environment. As opposed to about 0.1% of the gluonic energies in the case of a nuclear fission chain reaction.

Figure 26

[Back](#)

The Conventionally Reported Energy Contents and Operational Masses of the Nuclear Particles

<i>The Relevant Particles</i>	<i>Order of Magnitude of their Energy Content (notated in MeV units)</i>	<i>Order of Magnitude of their Operational Mass (notated in MeV/c² units)</i>
<i>The constituent particles of a proton or neutron:</i>		
<i>Up quark</i>	<i>2.4 MeV</i>	<i>2.4 MeV/c²</i>
<i>Down quark</i>	<i>4.8 MeV</i>	<i>4.8 MeV/c²</i>
<i>Gluon</i>	<i>< 20 MeV</i>	<i>< 20 MeV/c²</i>
<i>W-Boson</i>	<i>80,400 MeV</i>	<i>80,400 MeV/c²</i>
<i>Z-boson</i>	<i>91,200 MeV</i>	<i>91,200 MeV/c²</i>
<i>The entire proton or neutron:</i>		
<i>Proton</i>	<i>938 MeV</i>	<i>938 MeV/c²</i>
<i>Neutron</i>	<i>940 MeV</i>	<i>940 MeV/c²</i>

At first glance, this table appears to contain at least two major inconsistencies:

- *The energy content of a gluon (intermediating the strong nuclear forces) is far smaller than the energy content of as well a W-boson as a Z-boson (both intermediating the weak nuclear forces), which appears to be utterly illogical. And likewise so what their operational masses are concerned.*
- *The energy content of an entire proton and of an entire neutron is far smaller than the sum of the energy contents of their constituent subatomic particles, which appears to again be utterly illogical. And likewise so what their operational masses are concerned.*

Note, however, that these kinds of seeming inconsistencies will later be resolved during the explanations of the energetic interactions between the quarkonic particles in section 31.

Figure 27

Back

The Relative Energy Contents and Operational Masses of the Quarks and the Electrons and the Neutrinos

<i>The Relevant Particles</i>	<i>Order of Magnitude of their Energy Content (notated in MeV units)</i>	<i>Order of Magnitude of their Operational Mass (notated in MeV/c² units)</i>
Quarks:		
Normal up quark / charm quark / top quark	2.4 / 1,270 / 171,200	2.4 / 1,270 / 171,200
Normal down quark / strange quark / bottom quark	4.8 / 104 / 4,200	4.8 / 104 / 4,200
Electrons:		
Normal electron / muon / tauon	0.5 / 105 / 1,777	0.5 / 105 / 1,777
Neutrinos:		
Normal neutrino / muon neutrino / tauon neutrino	< 0.000002 / 0.17 / 15.5	< 0.000002 / 0.17 / 15.5

Special note

Many experiments have shown there to be a direct relationship between the overall energy content and the overall frequency of a subatomic particle. That relationship is expressed by the formula:

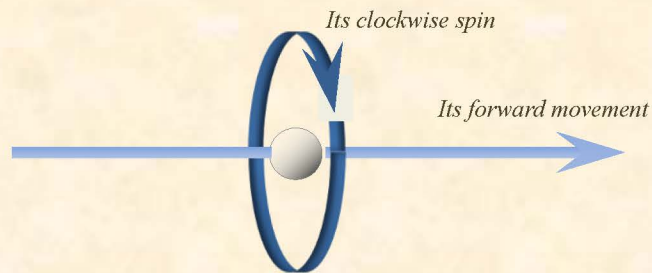
$$E = h \times f$$

Wherein *E* is the overall energy content of that subatomic particle and *h* is the so-called Planck's constant and *f* is the overall frequency of that subatomic particle. Wherefrom can be surmised that, if one increases (decreases) the overall energy content of a subatomic particle, then it will proportionately increase (decrease) its overall frequency. But let it be specifically emphasized that scientists apply this Planck's constant only with respect to simple subatomic particles and as such not to any singular electromagnetic energy.

Figure 28

[Back](#)

The Direction of the Spin of a Normal Subatomic Particle



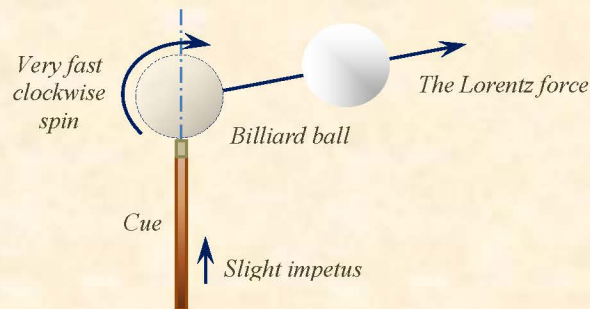
Special notes

- The effectual outcome of this phenomenon can be somewhat compared to how the enforced spin-like movement of a speeding bullet is known to ensure its straight trajectory.
- In this regard, let the student be reminded that:
 - all fleetingly appearing-and-disappearing particles are said to have a spin of 1
 - all steadily appearing particles are said to have a spin of $\frac{1}{2}$ (i.e. their spin is half as fast as the spin of the fleetingly appearing-and-disappearing particles)

Figure 29

[Back](#)

A Simple Metaphor to Illustrate the Reason for the Emergence of the Lorentz Force

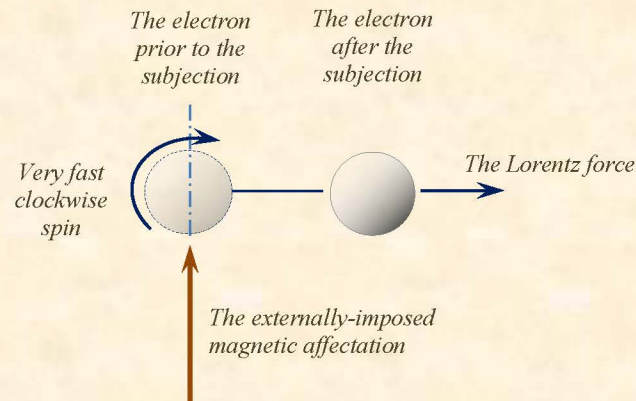


The rougher the surface area of the billiard ball, the more perpendicular the exertion of the 'Lorentz force' will be to the direction of the exertion of the slight impetus.

Figure 30

Back

***The Direction of the Lorentz Force that an Electron is Bound to Experience
when subjected to a Sufficiently Strong Magnetic Affection***



Special note

By reason that the outer layer of a subatomic particle is actually consisting of many 'rugged' subatomic energies, the resultant Lorentz force will be exerting itself almost perpendicularly to the direction of the exertion of the externally-imposed magnetic affections (the magnetic impetus).

Note that this principle is applicable not only to all electrons but also to all other kinds of simple subatomic particles.

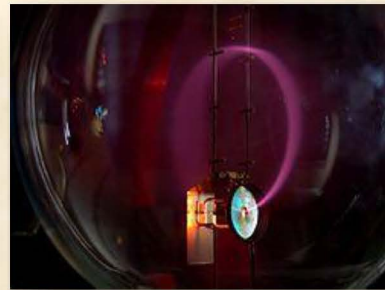
Figure 31

Back

*The Cyclotronic Trajectories of Subatomic Particles that are being
subjected to a Series of Very Strong Magnetic Affections*



*The cyclotronic trajectories of a
number of subatomic particles as
recorded during an atom-smashing
experiment*



*The cyclotronic trajectory of a
concerted stream of freed electrons.*

Figure 32

Back

A Two-Dimensional Representation of the External Magnetic Field of a Subatomic Particle

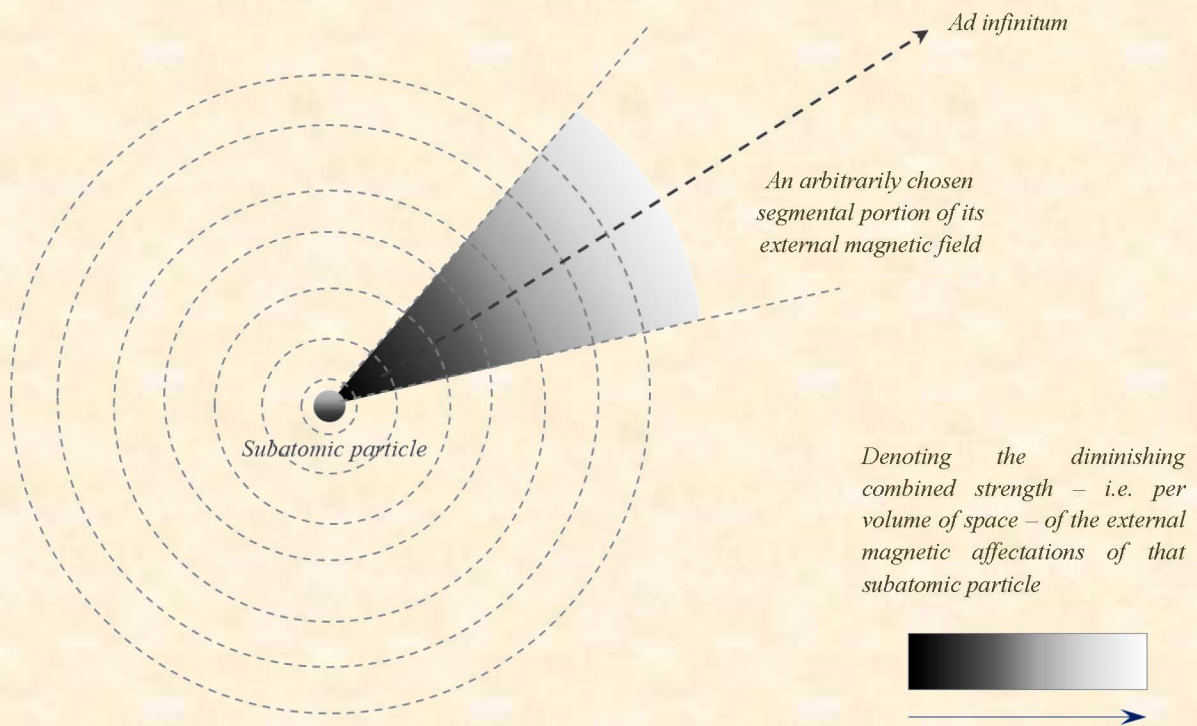


Figure 33

Back

How Scientists Tend to Portray the Comparative Magnetic Charges of the Subatomic Particles

<i>The Relevant Particles</i>	<i>Their Relative Magnetic Charge</i>
Quarkonic particles:	
Normal up quark / charm quark / top quark	$+\frac{2}{3}$
Normal down quark / strange quark / bottom quark	$-\frac{1}{3}$
Gluon	0
W-Boson	+1 or -1
Z-Boson	0
Electrons:	
Normal electron / muon / tauon	-1
Neutrinos:	
Normal neutrino / muon neutrino / tauon neutrino	0
Nucleons:	
Proton	+1
Neutron	0

Special notes

- The anti-particle of every such particle has an equally strong but opposite magnetic charge. Hence that a positron for instance, which is an anti-electron, is known to have a magnetic charge of +1.
- The 0 values in the above table should be understood to mean that the magnetic charge of such subatomic particles is either 'relatively very small' or 'as yet immeasurable'. In reality, every subatomic particle is always consisting of electromagnetic energies and will therefore always have at least some magnetic charge.
- As the overall magnetic charge of every normal proton will always be approximating +1, it cannot but be any otherwise than that the combined magnetic charges of all its W-bosons [each of which can have a +1 or a -1 magnetic charge] is always totalling 0. That same principle is applicable to every normal neutron whose overall magnetic charge will always be approximating 0. As such, all of the W-bosons with a magnetic charge of +1 in a proton (neutron) can in fact be deemed to be the anti-particles of all the W-bosons with a magnetic charge of -1 in that same proton (neutron).
- In the domain of classical physics, scientists are still maintaining a distinction between the magnetic field of a 'moving' entity (which they are calling an electromagnetic field) and the magnetic field of a 'non-moving' entity (which they are calling an electrostatic field). That distinction, while no doubt useful from a mundane perspective, is irrelevant from a spiritual perspective by reason that there is in reality not a single static (i.e. non-lively) force in the whole of creation.

Figure 34

[Back](#)

The Changing of a Down Quark into an Up Quark and Vice Versa

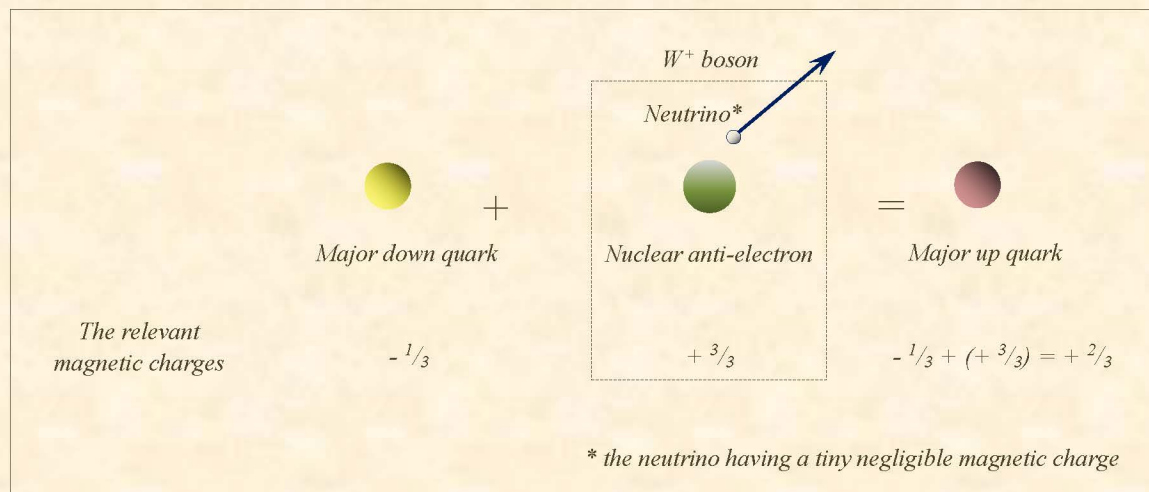
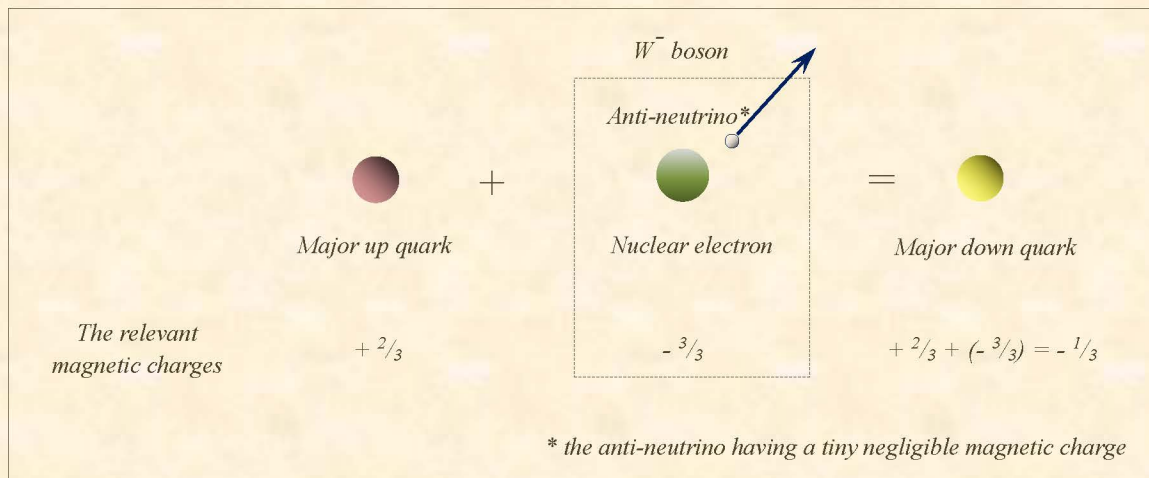
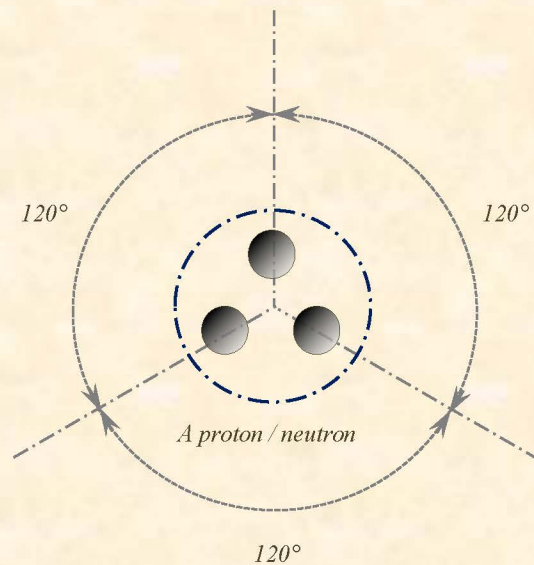


Figure 35

Back

The Triangular Configuration of the Three Major Quarks of Every Proton / Neutron

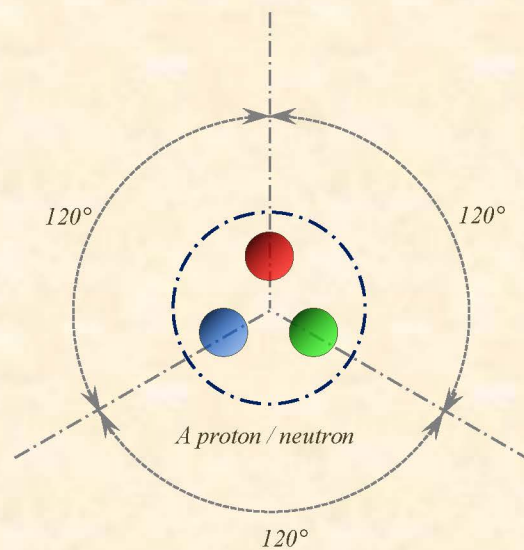


Whilst considering that configuration, let it be re-emphasized that the three major quarks are not stationary entities but that they are always propagating themselves in a synchronized fashion at nearly the speed of light on one or other quark orbital within that proton / neutron.

Figure 36

Back

The Arbitrarily-Assigned Colours of the Three Major Quarks



Special notes

- The primary colour of every major quark is not specifying whether it is an up quark or a down quark but only serves to facilitate the understanding of how the three major quarks are cyclically exchanging their colour charges. So, from this point onwards, the student is to maintain a clear distinction between the **magnetic charge** of a major quark [which determines whether it is an up quark or a down quark] and the **colour charge** of a major quark [which determines the direction wherein that major quark will be predominantly exerting its magnetic affectations].
- As a matter of convention, scientists are attributing the colours anti-red (cyan) and anti-green (magenta) and anti-blue (yellow) to the anti-quarks of an anti-proton and of an anti-neutron. Their relative positionings then being mirror-imaged to the relative positionings of the normal quarks:

The Arbitrarily-Assigned Colours of the Three Anti-Quarks

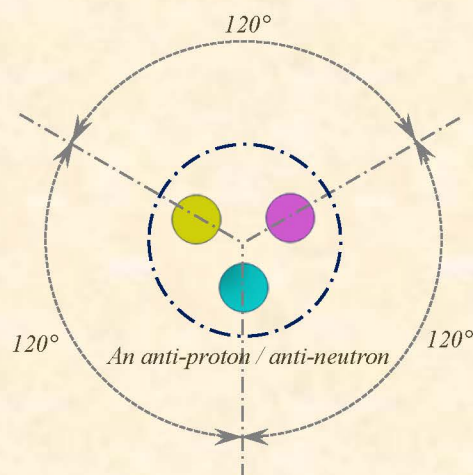


Figure 37

Back

The Periodic Table of Elements

	I	II											III	IV	V	VI	VII	VIII
1	1 H 1																	2 He 4
2	3 Li 7	4 Be 9											5 B 10	6 C 12	7 N 14	8 O 16	9 F 19	10 Ne 20
3	11 Na 23	12 Mg 24											13 Al 27	14 Si 28	15 P 31	16 S 32	17 Cl 35	18 Ar 40
4	19 K 39	20 Ca 40	21 Sc 45	22 Ti 48	23 V 51	24 Cr 52	25 Mn 55	26 Fe 56	27 Co 59	28 Ni 59	29 Cu 64	30 Zn 65	31 Ga 70	32 Ge 73	33 As 75	34 Se 79	35 Br 80	36 Kr 84
5	37 Rb 86	38 Sr 88	39 Y 89	40 Zr 91	41 Nb 93	42 Mo 96	43 Tc 98	44 Ru 101	45 Rh 103	46 Pd 106	47 Ag 108	48 Cd 112	49 In 115	50 Sn 119	51 Sb 122	52 Te 128	53 I 127	54 Xe 131
6	55 Cs 133	56 Ba 137	* 57-71	72 Hf 178	73 Ta 181	74 W 184	75 Re 186	76 Os 190	77 Ir 192	78 Pt 195	79 Au 197	80 Hg 201	81 Tl 204	82 Pb 207	83 Bi 209	84 Po 209	85 At 210	86 Rn 222
7	87 Fr 223	88 Ra 226	** 89-103	104 Rf 263	105 Db 262	106 Sg 266	107 Bh 264	108 Hs 269	109 Mt 268	110 Ds 272	111 Rg 272	112 Cn 277	113 Uut 284	114 Uuq 289	115 Uup 288	116 Uuh 292	117 Uus 294	118 Uuo 294

The atomic number
The element
The relative atomic mass

Legend

- Metals
- Metalloids (semi-conductors)
- Non-metals
- Inert gases
- The Lanthanides & Actinides

The transition metals

* The Lanthanide series

** The Actinide series

Special notes

- Of all the different types of atoms, only the inert gases (in group VIII) have the optimal number of electrons in their outermost shell, which is why they are naturally refraining from forming chemical bonds with one another and with the other types of atoms. All of the other types of atoms have a less-than-ideal outermost shell, which is why they are typically forming all kinds of chemical bonds with one another.
- There are however two notable exceptions as to how the elements have been classified in that period table:
 1. The element helium (He) has but 2 electrons (valence electrons) yet has been included in Group VIII because of it – even as the other inert gases – having a complete electron shell (its only electron shell).
 2. No grouping has been assigned to the **transition metals** (between Groups II and III) in that they can have either 1 or 2 valence electrons.

Figure 38

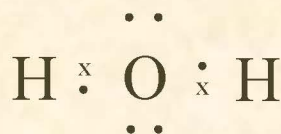
Back

The Chemical Structure of an H₂O (ordinary water) Molecule

*The overall structure of
an H₂O molecule*



*The chemical structure
of that H₂O molecule*



*A simplified representation of
that same chemical structure*



- x a hydrogen electron (now being shared with the oxygen atom)
- a valence electron of the oxygen atom (two of which are now being shared with the hydrogen atoms)

— serves to depict a mutual aspect of the chemical bond

Special notes

- The above portrayals are not showing how the electrons are spatially orbiting the nuclei
- Every such atom is now appearing to have a complete outermost electron shell in that:
 - each hydrogen atom is now appearing to have 2 electrons in its one and only shell
 - the oxygen atom is now appearing to have 8 electrons in its outermost shell

Figure 39

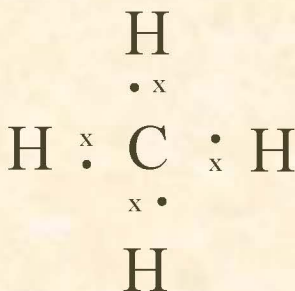
[Back](#)

The Chemical Structure of a CH₄ (methane) Molecule

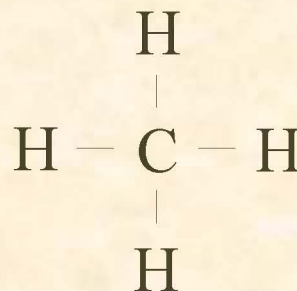
The overall structure of a CH₄ molecule



The chemical structure of that CH₄ molecule



A simplified representation of that same chemical structure



- × a hydrogen electron (all four of which are now being shared with the carbon atom)
- a valence electron of the carbon atom (four of which are now being shared with the hydrogen atoms)

— serves to depict a mutual aspect of the chemical bond

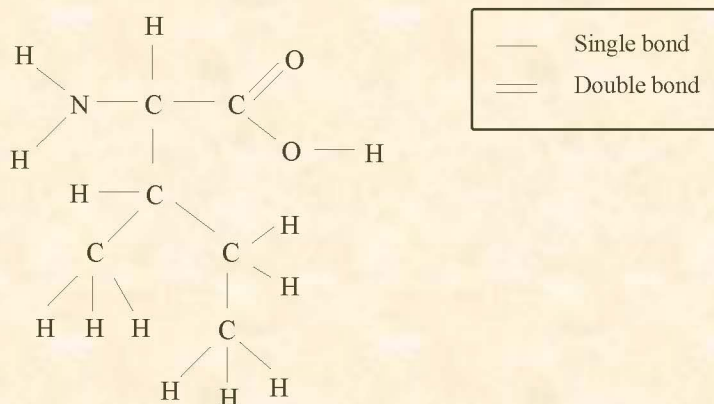
Special notes

- The above portrayals are not showing how the electrons are spatially orbiting the nuclei.
- Each atom is now appearing to have a complete outermost electron shell in that:
 - each hydrogen atom is now appearing to have 2 electrons in its one and only shell
 - the carbon atom is now appearing to have 8 electrons in its outermost shell

Figure 40

Back

The Chemical Structure of the Amino Acid Isoleucine ($C_6H_{13}NO_2$)



Each atom is once again appearing to have a complete outermost electron shell in that:

- every hydrogen atom (H), which normally has but 1 electron, is now appearing to have 2 electrons in its electron shell
- every carbon atom (C), which normally has 4 valence electrons in its second shell, is now appearing to have 8 electrons in that outermost electron shell
- the nitrogen atom (N), which normally has 5 valence electrons in its second shell, is now appearing to have 8 electrons in that outermost electron shell
- every oxygen atom (O), which normally has 6 valence electrons in its second shell, is now appearing to have 8 electrons in that outermost electron shell

Figure 41

[Back](#)

A Graphical Portrayal of the Propagation of the Pressure Waves (Sound Waves) through the Air

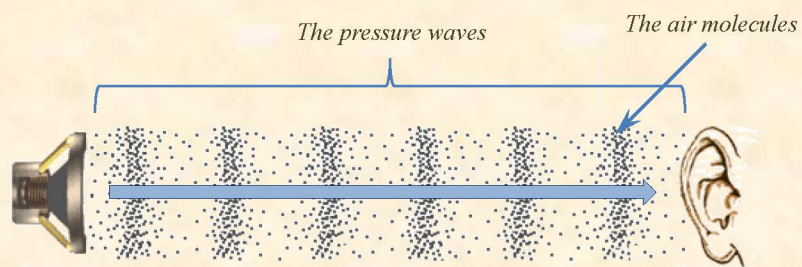


Figure 42

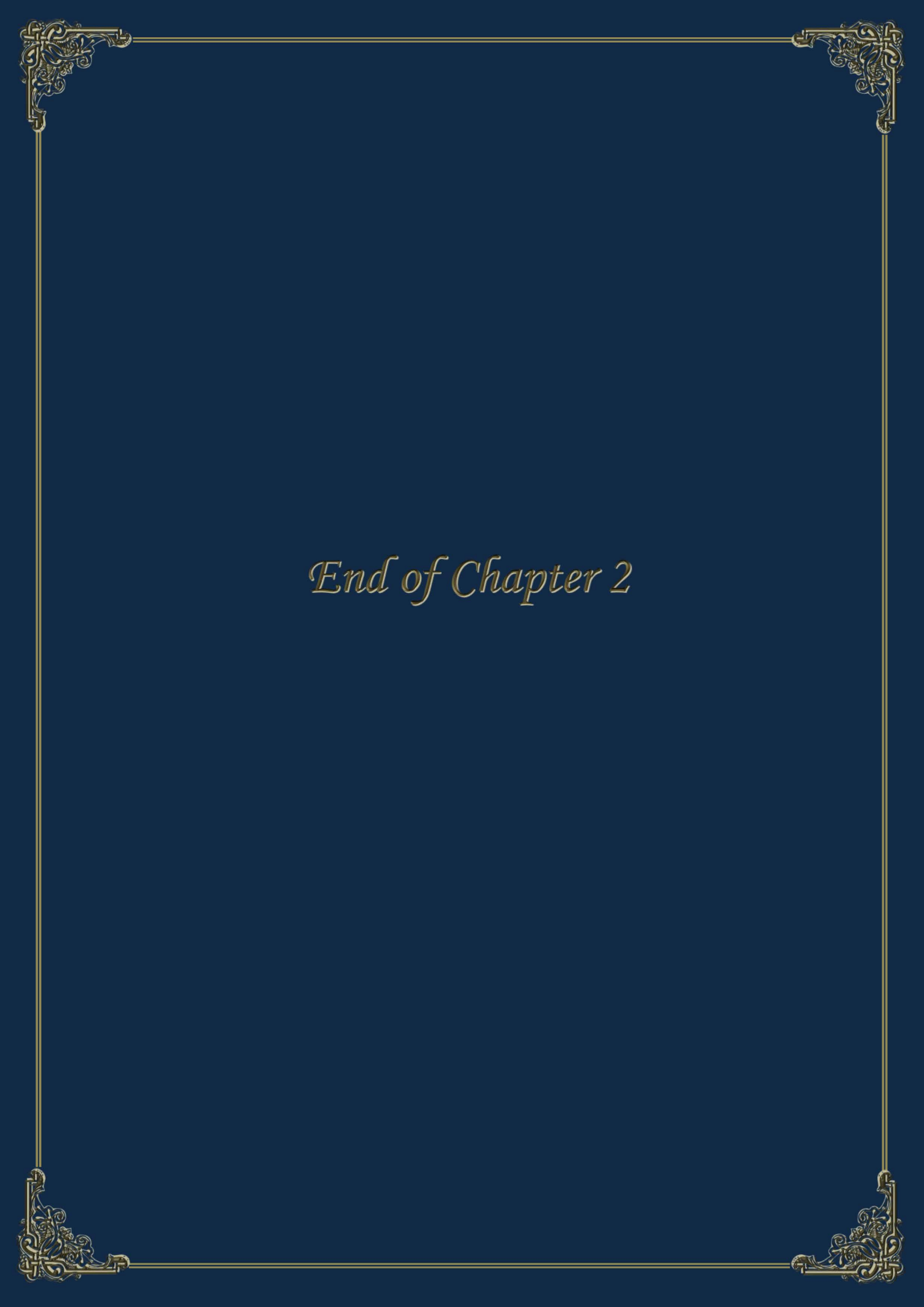
Back

The Perfect Unity of Creation

Dark matter / all so-called Higgs bosons / the ether				The all-pervasive spirit of God
All dark energies (inclusive of all their 'unconventional' gravitational forces)				The 'objectified' mental forces of God
All electromagnetic energies (inclusive of all their 'conventional' gravitational forces)	All relatively-long radiowave energies	All thought energies	All heavenly energies	
	All relatively-short radiowave energies	All intermediate energies		
	All microwave energies			
	All infrared energies*			
	All 'visible' light energies*			
	All ultraviolet light energies*			
	All X-ray energies*			
	All gamma ray energies*			
	All conventionally known photons	All subatomic particles	All earthly energies (which are in fact also heavenly energies)	
	All electrons			
	All neutrinos			
	All quarks			
	All gluons			
	All W-bosons			
	All Z-bosons			
Each of which is consisting of one particular kind of the above asterisked energies.				
The mental forces of all His lively creatures				The 'subjectified' mental forces of God

Figure 43

Back



End of Chapter 2