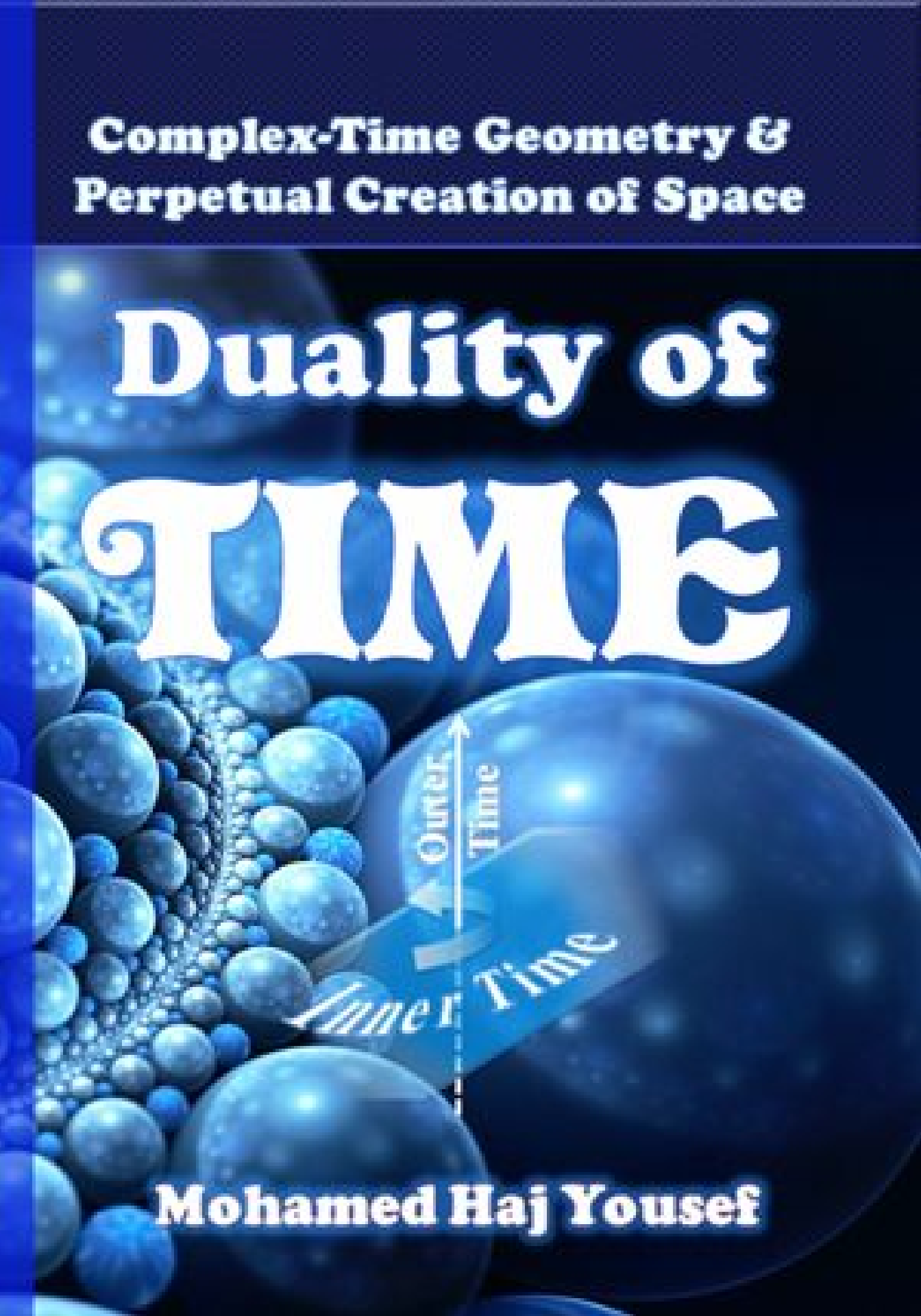
Complex-Time Geometry &
Perpetual Creation of Space

Duality of TIME



Mohamed Haj Yousef

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Perpetual Creation of Space

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Dedication:

I dedicate this work:-
- to the spirit of the Greatest Sheikh Muhyiddin Ibn al-Arabi and all his students,
- to my Sheikh, the Source of Wisdom, and my living Ibn al-Arabi: Prof. Ramadhan Subhi Deeb of Damascus,
- to the spirits of my parents, may Allah have mercy upon them,
- to my dearest wife, my daughter, and my two sons, and to all my brothers and sisters, in Islam, and in mankind.

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Preface

About this Book

This is the second book on the subject of time. In "The Single Monad Model of the Cosmos" we introduced Ibn al-Arabi's eccentric view of time and explored the general aspects of his cosmology and cosmogony, with a brief discussion of the implications this could have on modern physics. This unique view of time has never been discussed elsewhere in science or philosophy, before or even after Ibn al-Arabi, although it is indeed central to understanding the controversial theory of the "oneness of being". This is probably because of the difficult symbolic language he usually used, in addition to the fact that his overall cosmological understanding of time is intentionally dispersed and widely scattered over his many works and in different contexts within the various chapters of the Meccan Revelations.

This book is intended for the wider scientific community, so I tried my best to keep the discussion formal, although the nature of the subject is actually interdisciplinary, especially that it has been developed from the particular Sufi mystical thinking within the wider frame of Islamic philosophy. Nevertheless, there will be some important groundbreaking conceptions and conclusions, deeply related to the core of natural philosophy and even mathematics, or geometry and number theory, in addition to physics and cosmology. However, unlike the previous book, which was more descriptive in its exploring the mystical cosmological views, at least the main chapters of this book, that deal directly with the complex geometry of time, are going to be more rigorous and precise in introducing the new conceptions and analyzing the subsequent claims.

Additionally, because of the complexity of this subject and its interdisciplinary nature that has been drawn from various divergent sources, including physics, cosmology, philosophy and theology; some introductory chapters were necessary to put the various conceptions in their wider intellectual sense and historical context. By doing that, I also hope that this short but comprehensive review will help the readers realizing the huge gap and discrepancies between modern science and ancient philosophy and theology; this time the latter is the most superior. In the recent centuries, science mostly won all the battles against religion, by distancing its theories away from any alleged theological interpretations or ancient implicit philosophies, thus inventing its own rigorous theoretical and experimental methods to fight against the helpless ancient putative mythologies that could not face all the overwhelming cherished applications and evident inventions made available only through this rigorous modern sciences.

Nonetheless, theology is now coming back to rescue modern science out of its cosmological catastrophe, because it is the only authority that has the elixir Newton was looking for, namely: Oneness. For this reason, also, there will be some concluding chapters about metaphysics and Alchemy, which is indeed the original science of Quantum Mechanics, not only because its name is directly derived from the word "quantum", but because it is the ultimate science that manipulates the fundamental interactions between the metaphysical space-time quanta that constitute all corporeal and incorporeal structures.

I believe this research made a breakthrough in mathematics, physics, and cosmology, as well as natural philosophy, because it exposes a deeper level of time and original theory of creation that could explain many persisting problems in these various fields. The main result

of the Duality of Time is that *vacuum* is the real time, while our time is genuinely imaginary or latent to it, which makes it described as *void*. This vacuum-void duality is basically the same ancient atomistic philosophy, reinterpreted out of the most original theological and philosophical conceptions, combined together with the conclusions of modern physics and cosmology.

Henceforth, the resulting hypothesis will lead at the same time to all the philosophical and mathematical principles of modern quantum and relativity theories, joining them together in a unique way that is capable of solving the current discrepancies, while also joining together the various scientific arenas and offering many possibilities for extraordinary future applications. However, this book does not claim to solve all the problems of science, so there will be also many speculations, plainly stated as such.

Although this book contains advanced and innovative conceptions and claims to solve many persisting fundamental problems in the latest theories, it is still easily accessible for the average reader familiar with the general advances in modern physics and cosmology, at the level of any science graduate or even enthusiastic high school students. Physics is a difficult subject only in the technological applications and some narrow technical fields, but the fundamental concepts are really easy. Most of the mathematical analysis in this book is based on simple Euclidean geometry. This could not have been possible without introducing the genuinely complex nature of time, which will eliminate all the complications needed for treating singularities and infinities encountered in Riemannian manifolds.

The Structure of this Book

This book is divided into seven chapters:

The first chapter introduces the subject with a quick historical summary of the development of the Single Monad Model and the resulting Duality of Time Theory, in addition to brief descriptions of the main problems that could be explained by this new theory of time, as they started to develop, first very slowly from the early readings of Ibn al-Arabi in 1990s, and up to this current year of 2017 when things are rapidly unveiling at exponential rate.

The second chapter offers a brief historical summary of ancient cosmology and natural philosophy, from the onset of written history in Mesopotamia to the Western medieval thinking and up to the modern era. Starting from the Sumerian and Babylonian cosmology and philosophy, and how their knowledge was transfered to the Greek and Hellenistic philosophers and astronomers; focusing mainly on Parmenides and his Oneness doctrine which was formulated by his student Zeno into thought experiments known as Zeno's Paradoxes. We then investigate the main philosophical arguments against these paradoxes, that could be expressed in various mathematical forms, which led eventually to the development of the mathematical basis of infinitesimal calculus, by both Newton and Leibniz, in the 17^{th} century. In this chapter we shall also discuss the contributions of various Islamic scholars and their effect on Western medieval and modern philosophy and cosmology. This chapter closes by a brief description of the historical developments that led Newton to his theory of universal gravitation and the laws of motion, that formed the basis of Classical Mechanics, which quickly prevailed over the Corpuscular Mechanical Philosophy and Monadology, advocated by Descartes and Leibniz.

Similarly, the third chapter gives a quick historical review to summarize the development of the main modern theories of physics and models of cosmology, describing the major outstanding problems, and focusing on the conceptual contradictions between the quantum and relativity theories. We shall see in this chapter that, unlike Newton's Mechanics which quickly found many industrial and practical applications, and was eventually developed into Einstein's Theory of Relativity, the theory of monads and corpuscular mechanics could have been developed more quickly into Quantum Mechanics, had it received the adequate attention

as the more practical competitor of Classical Mechanics. It is only because of this historical break that Quantum Mechanics came out a bit late and with new terminology, and even after that, physicists had to wait many decades until the Standard Model of the Quantum Field Theory established the fact that elementary particles are the quanta of field excitations, which are nothing but the monads.

Henceforth, chapter IV comes in the line to speak again about Ibn al-Arabi's eccentric view of time and the Single Monad Model of the Cosmos, that have been already explained in the previous book, but we want to summarize and extend that here in various ways to make them more accessible to the wider scientific community, while also focusing more on the details that led to the Duality of Time postulate which will be discussed in the following chapter.

Chapter V will then be devoted for the Duality of Time Theory, explaining its main conceptions and how it could lead at the same time to the three principles of Special and General Relativity together, in addition to Quantum Field Theory, including the first and second quantizations, of energy and fields, and hence this third quantization of space-time itself, which will eliminate the need for re-normalization, and get rid of all singularities that are associated with Riemannian manifolds, because of the ill-defined geometry at certain points of extremely high densities. In this chapter we will explain the reasons behind the constancy and invariance of the speed of light, and how non-local quantum interactions and physical motion, and not only transfer of information, could occur in nature without breaking this cosmological speed limit. In addition to making gravity a full quantum field theory, we will show how the duality of time explains all the other interactions in terms of its complex-time geometry, but on lower dimensions.

Since the Duality of Time Theory explains everything in terms of space-time geometry, including the spiritual realms of angels, jinn, and the psychological world of mind, heart, soul, and spirit, chapter VI is dedicated for introducing these metaphysical conceptions and investigating how they could be studied under the same physics laws. This field, however, requires further investigation, together with the subject of the final chapter VII, in which we will talk about Alchemy and the hidden symmetry that replaces SUSY, the missing super-symmetry of the Standard Model of Elementary Particles, with the normal particles-antiparticles symmetry but on a conjugate arrow of time.

How to Read this Book

Passionate physicists who are mainly interested in the new theory may like to jump directly to chapter V where they will find all the relevant analysis of the new conceptions with the mathematical formulation of the Duality of Time Theory, or they could possibly start with chapter IV to get acquainted with the general philosophical conceptions of Ibn al-Arabi's cosmology that led to this revolutionary genuinely-complex time-time hyperbolic geometry.

Chapters II and III are only necessary for the general readers who would like to learn more about the important historical developments of the main ideas and theories in natural philosophy, cosmology and modern physics. These two chapters should provide a comprehensive summary for those unspecialized readers who may need to review how the various theories of physics and related cosmological models have developed into their current modern framework. The idea also behind these two chapters is to show how all the major theories are essentially based on one of the two competing views of the continuum or discretuum structures of space and matter.

These two opposing views are mutually conclusive, while neither one of them is capable of explaining all natural phenomena. Although some other philosophers have studied the metaphysical oneness of nature, but they could not make any application of it, because their theories were all abstract and incomplete. Therefore, the Duality of Time came at this critical

historical era in modern physics after physicists and cosmologists have tried all possible ways to combine these two opposing views that are now manifesting through the modern theories of Relativity and Quantum Mechanics. For this reason, the detailed chapter IV is necessary to establish the philosophical and ontological foundations of the Duality of Time that is based on Ibn al-Arabi's theory of the Oneness of Being, which is basically a much more sophisticated and comprehensive version of Parmenides oneness and his two views of nature. As we introduced above, chapter I then gives a brief description of the historical development of the main new concepts and the major fundamental problems that could be explained according to the new genuinely-complex time-time geometry, all to be analyzed further in chapter IV and the subsequent chapters.

The final two chapters VI and VII are also necessary to introduce the new extensions of space-time geometry into the incorporeal worlds, with some future perspectives of how the theory could be developed in this direction.

Patient readers can of course read all these seven chapters in the normal sequence.

The Opening Epigraphs

In accordance with the same tradition by Muhyieddin Ibn al-Arabi in his Meccan Revelations and many other books, where he usually starts each chapter with a short poem that touches the essences of the subjects to be discussed, we also started every chapter in this book by some related epigraphs from Ibn al-Arabi and other famous thinkers. It is always good to come back to these opening epigraphs as you progress through the chapters, because they provide the essence of the matter under discussion, in a short but profound nested layers of meanings which will be certainly revealed more and more upon each subsequent reading.

Note on References and Bibliography

In addition to the usual bibliographical references that will be included at the end of this book, and referenced properly in the text, most of the other quotes are based on Ibn al-Arabi's major comprehensive work of the "Meccan Revelations" ("Al-Futuhat Al-Makkiyya"). Therefore, because we are going to refer to this book very often, we shall use a short reference style directly in the text, without using footnotes, enclosed by medium brackets with the form: [X.000.00], which means: [volume.page.line]. When the line number is omitted, the reference is in the entire page, or a range of pages like this [II.229-231]. For all this, we have used the standard edition re-published by many houses based on (photocopy of) the old edition of Bulaq, published in 1911, in four volumes each about 600-700 pages of 35 lines, as it will be also listed in the Bibliography. You should notice, however, that newer type-scripted editions maybe different although some of them are also four volumes.

In addition to the Futuhat, we also used short form of references to many other books by Ibn al-Arabi, like: Ayyam al-Shaaan, al-Tanazzulat al-Mawsiliyya and al-Durrat ul-Bayda, which will be also listed in the bibliography, together with a list of other useful books on or by Ibn al-Arabi.

All references to the Holy Quran shall be indicated also in the text; after each verse quoted or meaning indicated in the text we shall add a reference like that [xx:yy] where xx refers to the number of Sura (chapter) and yy is the number of Aya (verse).

To simplify the reading, especially for the general unspecialized readers, I have omitted references to most prophetic narrations, using instead Ibn al-Arabi's interpretations of them, which are referenced as explained above. Readers who are interested to learn more about these specific cosmological prophetic narrations, are kindly directed to the previous book on the Single Monad Model where these narrations are referenced and discussed in different contexts as they appear in the text.

The general reviews, especially in chapters II and III, of the main relevant conceptions and theories in natural philosophy, modern physics and cosmology, are summarized from texts and information widely available on free Internet websites, such as Wikipedia, so we shall not need to reference and cite other than the otherwise serious issues and crucial claims.

The SMONAD.COM Website

The websites: http://www.smonad.com, or http://www.singlemonad.com, is dedicated for the Single Monad Model of the Cosmos, including this second book and the previous one, and it will contain related articles and extracts in addition to readers contributions and a forum for comments and other discussions on the subject of time.

Acknowledgment

I would like to express my truthful gratitude to my master Prof. Ramadan Subhi Deeb, of Sheikh Ahmad Kuftaro Foundation in Damascus, for his continuous support and inspirational insights that he always offered to me throughout the course of this long research over the past two decades. My sincere appreciation and thanks are also due to Prof. James W. Morris, of Boston College, who supervised me in the University of Exeter during the Ph.D. project that lead to the Single Monad Model which produced the Duality of Time Theory.

I would like also to express my gratitude to Said Foundation for the scholarship that allowed me to start my study at Cambridge University, where I originally started this long research in my free time.

Finally, this work would not have been possible without the peaceful and positive environment that I enjoyed during my work at the United Arab Emirates University, which allowed me to use my extra time in writing and researching.

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Sunday, December 31, 2017
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Al-Ain, United Arab Emirates

Introduction: The Secret of Time

> "In reality, Time is real, yet it is only known by imagination. Like (the four elements of) Nature, whose essence is extinct in time. ... Through it all things are determined, while itself has no essence to be defined. Like vacuum, an infinite extension beyond composition, but our imagination makes everything embodied."
>
> Ibn al-Arabi, *paraphrased from the introductory poem of chapter 59 of the Meccan Revelations: I.291.1-7*

> "The cosmos is imaginary, yet it is in reality real. That who appreciates this fact, has truly accomplished all the secrets of the Path."
>
> Ibn al-Arabi, *The Bezels of Wisdom*

It is *time* to reveal the secret of **time**: Time is real at the present instance of its being, but because it does not halt; we can only reflect upon its perpetually flowing images, and that's why it is actually imaginary. Therefore, time *itself* is both "real" and "imaginary"; it is real in its own being, and imaginary in the actual outward manifestations that we usually observe in each current individual instance of its continuous flow. This "duality of time" means that it has a **genuine** "complex geometry", with a real part and an imaginary part. In the real flow of time, space and matter are internally created, and they are observed in the imaginary time as they kinetically evolve. However, because observation is one single instance of time, the observed things become instantly extinct, into the past, right after their being in the indivisible present instance of time, to be perpetually re-created again in the following future instances, in ever new images that could resemble the previous with some outwardly minor changes that cause the illusion of motion and dimensions.

Therefore, although time is the essence of everything in existence, yet its own essence cannot be defined independently because it is the temporal individual instances of all discrete things that come into being only one at a time, and because the observer is one of those individual things, it is only possible to observe the instantaneous temporal images of the other things that have already vanished and are being perpetually re-created. This means that all individual entities in the Universe are continuously created anew every single instance of time, one entity at a time, so that at every real instance there is only one indivisible real entity that is the Single Monad, and all other imaginary entities are its temporal and instantaneous images.

In other words: Time is always revealing its essence when we are not watching, but when we watch; it instantly hides in our own essence, because it is all one indivisible existence that is taking the three roles of the observed thing and the observer, as well as observation itself; continuously alternating between this cosmological trinity of the subject, object and action; but not all at the same real instance of time, as it is usually conceived by normal human imagination which conveys the

illusory sensation that physical objects are real because it is averaging their extremely fast and instantaneous fluctuation into the present existence, in the same manner as we are normally deceived by the seemingly continuous existence and apparent motion of characters displayed on a computer screen, when they are in fact being re-created at an extremely fast refresh rate.

Hence, for its own existence, time is real, because it is always in the state of being. For us, however, time is imaginary, because it is always becoming into the past. There is only one indivisible present moment that is continuously dividing the real flow of time into remembered past and expected future, both of them are unreal with regard to the observer, because the first has already vanished and the latter has not come yet. Therefore, our time is imaginary because its discrete instances come to us only one by one, but we **imagine** it in the form of continuous extension or duration, because we always expect the future and remember the past.

The "Duality of Time Theory" is the dynamic combination between this inward real and outward imaginary dimensions of time. This is expressed mathematically in the form of complex numbers, whose real and imaginary parts are dynamically connected with hyperbolic relation that produces a granular and self-contained Euclidean space-time, without invoking Riemannian geometry.

This complex time-time geometry according to the Duality of Time Theory is genuine, and not a simple mathematical trick as it is normally treated in modern physics theories. In the dynamic process of perpetual creation, the physical dimensions of space are sequentially being re-created in the inner levels of time, which is what makes the outward time genuinely imaginary with respect to the inner time, and thus easily expressed in terms of Euclidean geometry by using hyperbolic split-complex numbers.

Without postulating the Duality of Time and the resulting continuous creation of space, this concept of imaginary time does not have any genuine reality or justification outside the mathematical formulation, because both the Galilean space and Minkowski space-time consider space and time to be coexisting together, i.e. they both are real. The fact that each frame of the inner time, which constitutes space, appears as one instance on the outward time is what justifies treating time as imaginary with relation to space, thus latent or orthogonal to it.

This is the first time in the history of mathematics that imaginary numbers have any intrinsic genuine reality. In fact, the real numbers' line is now a special abstract or extreme "unrealistic" approximation of those genuine complex numbers which describe the real flow of existence. This extreme approximation is realized only when the normal level of time is zero or infinite, and in this latter case it is also equivalent to zero but on a higher level of the inner time that is creating the dimensions of space.

Therefore, this will also have deep implications on the various fields of mathematics, such as geometry and number theory, because complex numbers are now genuinely natural while the reals are one of their special approximation. In the physical sense, space-time has become naturally quantized although it may look continuous, depending on the relative dimension in which the observer is situated. For example: the $2D$ plane is itself continuous with relation to its inner dimensions but it forms one discrete instance with relation to the flow of time in the encompassing $3D$, which then appears internally continuous but discrete with regard to the encompassing outward time T.

One of the striking conclusions of this process of sequential re-creation in the inner levels of time is the fact that it conceives of only two primordial states: **vacuum** and **void**, whose spatial and temporal superposition is producing the multiplicity of all intermediary states that appear in the cosmos as **matter particles**. Vacuum, or empty space, is the continuous existence in the inner level of time, and void is the discrete existence in the outer level.

For normal observers who are habitually living, as discrete instances in the outer time, the continuous existence of vacuum appears moving at the terminal cosmological speed (of light) since it does not suffer the inertia that

is experienced by massive particles and objects as they advance in the outer time. This inertia is the resistance that results from interrupting the continuous creation in the inner time in order to appear as discrete instances in the outer time. That is why the outer time is genuinely imaginary with relation to the inner time that is the real flow of creation.

Therefore, this dynamic and complex nature of time is the fundamental fact that underlines the emergence of dimensions. In other words: *vacuum* is the continuous and infinite existence which forms the inner real part of time, and whenever this existence is interrupted it makes a new dimension that appears as a discrete instance on the outer imaginary level which is then described as *void* because it does not last for more than one discrete instance, before it is re-created again in a new state that may resemble the previous perished states.

All the geometrical points of space and matter are sequentially fluctuating between these two existence and nonexistence states, or vacuum and void, which means that the actual instantaneous speed of each point in space can only change from $v_i = 0$ to $v_i = c$, and vice versa.

This instantaneous abrupt change of speed does not contradict the laws of physics, because it is occurring sequentially in the inner levels of time before the physical objects are formed, while "space" and "mass", and all other physical properties, are actually generated from the temporal coupling and decoupling, or entanglement, of these geometrical points, which is exhibited only on the outward time level. The normal limited velocities of massive physical particles and objects are a result of the spatial and temporal superposition of the various dual-states velocities of their individual points.

This single postulate explains the three principles of Relativity all at once, since the speed of light is the only real speed in nature, and all frames are effectively at rest in the normal (imaginary) level of time, so there is no difference between inertial and non-inertial frames, thus there is even no need to introduce the second principle of Special Relativity, which says that the laws of physics are invariant between inertial frames, neither the equivalence principle that leads to General Relativity. These two principles, which are necessary to derive Lorentz factor and Einstein's field equations, will follow directly from the complex-time geometry as it will be explained and derived in the book.

Furthermore, it will be shown that this essential fact that results from the genuinely complex nature of time is the only way that allows exact mathematical derivation of the mass-energy equivalence relation ($E = mc^2$) directly from the fundamental classical principles. Einstein gave various heuristic arguments for this relation without ever being able to prove it in any theoretical way, as he repeatedly acknowledged.

Accordingly, the Duality of Time will lead to full quantum field theory of gravity because it is now based on discrete instances of dynamic space, without any background. Additionally, the other fundamental forces can now be interpreted in terms of this new complex-time geometry, but in lower dimensions: $2D+1$, $1D+1$, and $0D+1$, while gravity is in $3D+1$.

As a result of this unification, most, if not all, of the major fundamental problems of physics and cosmology are easily solved in this model. The homogeneity problem, for example, will instantly cease, since the universe, no matter how large it could be, is re-created sequentially in the inner time, so all the states are updated and synchronized before they appear in the outer level of time.

Actually, the Duality of Time postulate is capable of taking the fundamental philosophical observations to profound new levels, because the most basic principle of causality becomes a consequence of the sequential re-creation. Therefore, without breaking the speed of light limit, this sequential re-creation can explain non-locality, the uncertainty principle, and various other critical quantum mechanical issues.

Furthermore, in addition to solving the major problems of physics and cosmology, the Duality of Time does not only unify all the fundamental interactions in terms of its genuinely-complex time-time geometry, but it unifies this whole physical world with the

two other even more fundamental domains of the psychical and spiritual worlds. All these three conclusive and complementary realms are constructed on the same concept of complex time-time geometry that together form one single absolute and perfectly symmetrical spherical space.

Among many other astonishing consequences, this astounding conclusion means that the psychical world is composed of atoms and molecules that are exactly identical with the physical world, except that they are evolving in a conjugate time direction, which is why we feel them but describe them as incorporeal. It may initially appear impossible to believe how spiritual worlds may have the same atomic structure as the physical world, but it is more appropriate to say that physical structures are eventually incorporeal, because they become pure wave phenomena and energy interactions as soon as we dive into their microscopic levels, as it is now confirmed by Quantum Field Theories. In the Duality of Time Theory, since rigid space is created sequentially in the inner time, energy may become negative, imaginary and even multidimensional, which simply means that all things in creation are various kinds of energy moments that are spreading on different intersecting dimensions of time, and contributing in physical and non-physical interactions depending on their plane of existence, although they all have the same fundamental space-time structure. Therefore, not only mass and energy are equivalent and convertible according to $E = mc^2$, but also charge and all other physical and metaphysical entities are geometrical space-time structures with interconvertible types of energy, including consciousness and abstract information.

Therefore, speaking, writing, painting, and all kinds of interfering colors, shapes and inscriptions; all these otherwise abstract meanings are essentially made of particles covered by the same symmetry of the Standard Model, and this is indeed the missing super-symmetry which solves many fundamental problems, such as the hierarchy problem and baryonic asymmetry.

Finally, what is even more amazing is that this extraordinary unification between the various apparently incompatible physical and spiritual sciences is based on the same classical conceptions found in most ancient philosophies and contemporary religions, that describe different layers of creation beyond the physical world, such as the incorporeal creations of angels and jinn, in addition to describing the various unseen fundamental structures beyond stars and galaxies, such as the seven heavens and the four classical elements of earth, water, air and fire; all these creations and realms are now equally described in terms of the same complex-time geometry. This will open many doorways to whole new kinds of sciences and give the possibility of extending existing technologies onto the other spiritual domains, and vice versa. Many overwhelming historical records and manuscripts show that sciences and applications such as Alchemy and other occult practices have been widely used in ancient traditions, although most have been actually interpreted in various wrong manners and were eventually greatly misused by swindlers and magicians. This, however, does not falsify other sciences, such as energy meditation, dowsing, and many other mysterious applications.

The Duality of Time Theory is the result of more than two decades of ceaseless investigation and searching through the forgotten remarkable heritage that includes many ancient manuscripts of discounted philosophies and mystical Sufi traditions, and comparing all that with the conclusive results of modern physics theories, until I was able to put together all the contradicting puzzles into this brilliant portrait. Without the strong indications and overwhelming proofs that gradually accumulated over time, it would have been impossible to pursue this long research path, as it is extremely challenging to appreciate this unfathomable secret of time and ongoing perpetual creation. Ultimately, this theory does not only explain how the Universe appears *ex-nihilo*, but that it is always in this ontological state of potential existence, only perpetually and discreetly coming into being for some series of consecutive discrete instances of time, the duration of each is absolutely zero, but as a result of our manipulative past memory and future expectation we imagine time exten-

sions in which we are no more than passing shadows making some monotonous noise for this short period of *imaginary* time, before we leave this world to a relatively higher level of existence. Often when I retire, for a few days, and then come back again to think about this mysterious nature of time and perpetual creation, I need to study everything thoroughly from the beginning again, in order to retain the logical image of this impermeable reality beyond ordinary human imagination.

CHAPTER: I.

From Physics to Metaphysics

"If the material world rests upon a similar ideal world, this ideal world must rest upon some other; and so on, without end. It were better, therefore, never to look beyond the present material world."

David Hume, *Dialogues Concerning Natural Religion*

"Moonlight floods the whole sky from horizon to horizon. How much it can fill your room depends on the windows."

Jalaluddin Rumi, *The Essential Rumi*

"The best and most beautiful things in the world cannot be seen or even touched. They must be felt with the heart."

Helen Keller, *The Story of My Life*

I grew up on fantastic stories of demons crossing the walls, powerful giant genies bursting out of Aladdin's magic lamp, and the wind carpet that can transport humans to remote destinations, in addition to other supernatural tales like those found in the One Thousand and One Night stories. Later, with more reliable and authenticated sources, I heard and read numerous accounts that some modest Sufi saints could habitually travel to Mecca for Hajj and return in hours, not to mention the confirmed miracle of the Night Journey of Prophet Muhammad, peace be upon him, who traveled on the steed Buraq to "the farthest mosque" from where he also ascended to heaven, to encounter events that would normally take many years of our local time that we count.

This unconventional sense of space and time created a natural disposition to believe that physical boundaries must be ultimately artificial. Although this was suppressed later after learning science and logic at school, it was greatly reinforced again after studying the modern theories of Relativity and Quantum Mechanics, where various weird phenomena, such as time travel and quantum tunneling, are theoretically predicted and sometimes confirmed experimentally on the microscopic scales.

One of the big questions, that reserved a considerable space at the back of my mind, was about "the world of dreams" and how exactly they could be related to the physical world. Many dreams seem to have undeniable relevance to the physical reality, and some-

times they clearly describe future events with overwhelming details. Conversely, therefore, could the physical world itself be a longer dream that will also end in the same manner, when we wake up into "the real world"! If this is true, then is it possible to access this real world voluntarily, just as we do have some relative control of sleeping and waking?

From time to time, this big question surged to the frontages, often when I read the various books on psychology and philosophy, especially in most religious accounts which talk about the Hereafter and describe our world as "the Lower World". For example, one narration affirms that "people are asleep, and when they die they actually wake up!". In this regard also, the Sufis often describe various "types of dying", or, in fact, "wakening", some of which are voluntary, and easily reversible. it is also overwhelmingly evident that all their numerous and detailed descriptions of the hypothetical "Higher World" cannot be sheer fantasy. In their numerous books, many Sufis give detailed accounts of their voyages to other Earths and meeting other creatures or people who had already ceased many centuries ago, and even those who are not born yet. There is no chance that all these astounding stories are merely the product of human fantasy that physicists, philosophers and cosmologists, who are trying to understand the world, keep ignoring them.

Of course, physics theories usually deal with more practical and applicable ideas, away from these "non-realistic" conceptions. However, as the modern theories of physics have already developed to the cutting edges, they are being confronted by many contradictions and sharp phenomena that have no place in the material aspects of nature. As a result, physicists are now open to more considerations beyond the classical boundaries of physics.

Actually, at some earlier stages in the history of modern science, the distinction between metaphysics and physics was shallow, and many other diverting subjects, including mathematics, cosmology, and ontology, were all studied under the umbrella of natural philosophy. The reason why these fields are not anymore connected in modern science as they used to be in philosophy is simply because of the industrial revolution which produced many applied fields and subfields even within physics itself, but the main theoretical physics cannot be detached from metaphysics and philosophy.

By the merit of its own fundamental nature, the subject of time permeates all the diverging fields of science and philosophy, and it is the only notion that is going to unit them together again; as it turned out to be the most fundamental and primordial structure of EVERYTHING, including the physical and metaphysical worlds, with all their narrower fields and conceptions, such as: space, atoms, and particles, in addition to the psychological realms of souls, minds and spirits; all are linear chronological instances of time. This means that, just like the physical world, the psychical world is also made of atoms and molecules, so the dreams are as true as the normal material experiences, except that they evolve in a time direction that is orthogonal to our time, and both are genuinely imaginary, while the real world is only momentarily accessible through discrete perceptions that may become realized in certain situations such as terminal death or the voluntary Sufi realization.

In this way, the Duality of Time will not only unite Relativity with Quantum Mechanics, leading to full Quantum Field Theory of gravity, and explaining the other fundamental interactions in terms of its complex-time geometry, but also uniting all that with the ontic or psychological realms, and thus replacing the theory of super-symmetry with the hidden symmetry that is already present through the same anti-particles in the Standard Model, thus also explaining the apparent baryonic asymmetry, the hierarchy problem, and many other fundamental issues.

1 The Beginning

After I graduated from Aleppo University in 1990, I really wanted to study theoretical physics and cosmology, but I could only get admission and scholarship in experimental fields. So I did the master in Semiconductor Physics and Microelectronics Engineering at Cavendish Laboratory in Cambridge University in 1992. Nevertheless, I spent most

of my free time thinking about the cosmos, especially after I read Hawking's books and attended some of his lectures and seminars that were regularly held at the Department of Applied Mathematics and Theoretical Physics (DAMTP). Fortunately, I must say, after several failing attempts to transfer the scholarship or find another funding to study the postgraduate diploma in mathematics, required by DAMTP in order to enroll for the PhD in theoretical physics, I was left with only one choice: to study cosmology on my own!

Henceforth, it was not very long before I discovered that the sort of cosmology I really wanted to study is not taught at any regular university, because it is found exclusively in the Sufi literature; widely dispersed and mostly encrypted in their own personal mystical experiences, usually without any rational elucidation.

However, I now strongly believe that this challenging path, that I had to follow, was surely predestined in a mysterious manner that I am nearly starting to grasp now, after about three decades of long and persisting reflection, with strong faith that far preceded the final unveiling comprehension. This would not have been possible at all if I was ever able to pursue any formal research on cosmology or theoretical physics at any university, because the incredible results and eccentric conclusions that are gradually emerging from studying mystical Sufi cosmology could not have been revealed via any ordinary logic or rational thinking.

1.1 The Unseen Worlds

This introduction is not meant to be any autobiography, but I want to give a vibrant example to show that weird quantum and relativistic phenomena are prominently operational on the macroscopic and biological scales, and not only on the atomic levels. While also giving a brief historical account of the development of the Duality of Time Theory, and a short summary of the major problems and mysteries that could be solved or explained by this innovative idea, the observation that I will try to illuminate in this introductory chapter is that the future can sometimes create the present or lead it in certain ways that will make the future the way it is. In other words: the present is not always the result of what happened in the past, but the opposite might sometimes be more evident.

In reality, although they may be relatively rare and impossible to predict or repeat, teleologic effects are deeply natural but we see them weird only because we do not understand how time is actually progressing. After unlocking the secret of time, however, it will become clear that, for example, quantum spatial and temporal entanglements and tunneling, or space-time wormholes, are all natural phenomena that may occur very often, and they may also be studied and controlled. These and other paranormal or para-psychological phenomena are no longer outside the laws of physics. They even do not need any extreme conditions, such as relativistic velocities, and they do not lead to any logical paradoxes, as normally predicted from the mathematical formulation of the current theories of physics, such as the twin paradox, though they are still probabilistic and sometimes unpredictable, just as the microscopic quantum occurrences.

The underlying fact is that, according to the Duality of Time Theory, everything is primarily simple massless metaphysical monads whose physical properties become manifest only on the outward normal level of time, where they become localized and inertial. Therefore, there are many parallel temporal interconnections between the present and the future, and they are continuously being synchronized in normal physical dimensions; only after observation everything become materialized, by which time it would have already perished and become part of the past. And this is repeated perpetually in one linear chronological sequence every single instance of our normal time!

1.2 Enters Ibn al-Arabi

In Cambridge, I used to sit with my friends, who share similar interests on philosophy and mysticism, and we used to discuss the various emerging views and modern theories concerning physics and cosmology. We were partic-

ularly fascinated by those weired predictions that emerged from the principles of relativity and quantum theories. Hence, one of the turning points in my life was certainly when one of my friends, Ahmad Achtar, now a lecturer at the University of London, pointed out to me that Muhyiddin Ibn al-Arabi had already presented, in his various books, many of those weird ideas and innovative cosmological conceptions. I could not believe, at that time, how someone could possibly have any good model of the cosmos, many centuries before the recent revolution in science and technology! He did not even have any telescopes or computers to analyze his observations and test his conceptions.

Nonetheless, shortly after I started reading Ibn al-Arabi's works, I realized that despite the amazing achievements of modern science and technology, physicists, astronomers and cosmologists are simply looking in the wrong direction, and using erroneous and extremely limited intellectual and technical tools, that at most may provide some partial and distorted images of the immense and complex macroscopic and microscopic Universe. Conversely, instead of relying on the intellect alone to analyze the apparent motion of celestial objects, mystics chose to contemplate, meditate and reflect upon their inner dimensions; via the **heart** rather than the **mind**.

1.3 A Decade of Withdrawal

Driven by the strong motivation towards theoretical physics and cosmology, I took one year off from Cambridge to study mathematics in Germany, hoping that I will be ready after that to enter this challenging field. Fortunately, again, I must say, I found that this specific course which was also specifically supported by a scholarship, is purely technical and would not help me in my endeavor. Actually, deep in my heart, I was not convinced at all why do I have to study complicated mathematical tools to understand the cosmos! After all, Ibn al-Arabi did not know anything about Lie algebra, differential geometry or Riemannian manifolds!

In the next ten years, thereafter, I took several teaching positions at various universities, to support my living and use my free time to study the Meccan Revelations, Ibn al-Arabi's main book and encyclopedia of Islamic wisdom. Henceforth, I published my first book, in Arabic, about the Path of the Heart, in seeking liberation out of the natural binding ties of the mind and soul. Only after demolishing these complicated connections, the heart could become capable of witnessing the simple metaphysical reality.

As it will be explained further below, the cosmos can be expressed easily in terms of simple Euclidean geometry, but only after understanding the complex nature of time. That is simply because the heart, being the actual observer of reality, is watching the world from a higher dimension, while the mind, together with its corporeal senses, are part of this physical world, so they can only see some partial reflections of this reality, like the mirror images which can reflect only one side of the actual objects. The mind is therefore puzzled at explaining the physical observations in terms of the real dimensions which the heart is experiencing, thus we invented Riemannian geometry to perform such conversion, and this is indeed the best approximation of reality.

The "Path of the Heart" was not directly related to cosmology, but the Sufis hold a firm view and fundamental theory that the cosmos is a mirror image of the human, to the extent that they often describe the human as a "microcosm" and they call the cosmos as the "great human". Therefore, alongside the journey towards understanding the various spiritual relations and interconnections between the heart, the mind and the soul, we could learn many key insights and reflections about the cosmos itself, sometimes down to the most fine microscopic and physiological or spiritual details. Henceforth, just like every human, the cosmos also have a heart, though we certainly need to know the differences and connections between the fleshly heart that is pumping blood into the physical body, and the spiritual heart that is spreading life and knowledge, and what is the role of the intellect, or the mind, in all that, for both the cosmos and the human beings.

1.4 The Heart versus the Mind

The main difference between the heart and the mind, in this respect, is that the latter is inevitably directed and distracted by the diverse external sensations, while it is also bound by its own constrained intellectual and analytical abilities, which may seem to be potentially unlimited but practically become quickly exhausted, and quite often produce premature conclusions and rely on them to obtain wrong conceptions, which may become the principles for fundamental theories. In contrast to that, the heart is characterized by its intrinsic creative imagination and intangible inter-dimensional flexibility. Thus, one of the characteristic features of the Sufi comprehensive knowledge is that it is never achieved through reasoning, that's why they normally describe it by "vision" and "tasting", while comprehension may come later or may not come at all, but they don't care, because: *seeing is believing*. Only they need to cleanse this subtle tool carefully before using it, otherwise they will also not be able to see beyond the usual dense physical boundaries. They usually spend decades in this cleansing, via the continuous concentrated contemplation, sometimes in strict seclusion and other severe spiritual meditation techniques.

Eventually, after witnessing or tasting some aspects of the reality in their hearts, only few Sufis, such as Ibn al-Arabi, have enough courage to describe their mystical experiences in the formal language that may be comprehended by other minds, lest they are commonly accused of heretics, even after applying their complicated multiple levels of symbols and ciphering and encrypting their statements in the forms of poetry and other indirect narrations.

As an example, in order to get a sense of the depth of the Sufi symbolic language, let us uncover some of the sciences encoded in the poem Ibn al-Arabi chanted at the beginning of chapter 295 of the Meccan Revelations [II.674.5], which includes some introductions on the origins and relations between the four elements of Nature. We shall come back to this key chapter often in chapters VI and VII, after we explain the splitting of heavens into the two parallel physical and psychical worlds. As in most other poems, Ibn al-Arabi's expressions here have many layers of inter-connected meanings which are very difficult to convey or translate, so we shall provide here a general rough interpretation:

> - Rivers burst out from the essence of (my) stones, and dived deep inside the earth of my secret treasuries. - One tenth of divine knowledge I have disclosed, but what remained concealed are the other nine. - My soul is (trying to contemplate alone by) seeking (to unite and realize) in her partner (that is the mind), while my mind is urging me (to explain what I have disclosed) to other confronting minds. - I took refuge in the city of the Lord (the Spirit), (which is the body) that he built out of compound water and fire. - The heights of its fences are beyond comparing, and I am shielded inside the castle behind the seven walls.

As we can see, from the first reading of this poem we may understand that Ibn al-Arabi is describing some delicate spiritual state of imagination, which is correct. However, when we understand the meanings of "earth", "water", "fire" and "heavens", and the corresponding meanings of the "body", "mind", "soul" and "spirit", all as the various possible space-time structures; this poem becomes a whole theory of creation and super-symmetry that can be applied equally on the complimentary physical and psychical worlds.

It is extremely difficult, and maybe impossible, to describe extraordinary experiences to someone who has never had similar experiences before. Therefore, the Sufis mostly give various hints to encourage the seekers to try by themselves. Why do we need to waste the time and efforts in explaining the taste of honey to our children or students? Give them a spoonful instead and they will know. Thereafter, if you ask them how it tastes, the only accurate answer is going to be: it is honey!

1.5 The Need for Metaphysics

Similarly, the Universe, by definition, may not be explained in terms of anything else, and yet nothing may be fully explained in terms of its parts. Observations, that rely mainly on seeing, hearing and other sensations, or any more accurate technological tools, since they are all

eventually channeled through intellectual reasoning, are significantly limited in terms of the information that they may convey, and the observations can only be explained in terms of previous similarly incomprehensive observations. Therefore, we can only hope to understand the Universe through inner insight and the higher spiritual powers, which are at least outside its apparent physical composition.

When we look at the Universe, we are actually looking at our own image in a mirror that extends boundlessly in all directions; not realizing that it is a mirror, and not realizing also that we are actually outside, as metaphysical consciences or spiritual essences. The perceived dimensions of the image are therefore always fewer than the actual dimensions of the object. The differences between real objects and their reflected images are immensely huge.

For example, the difference between an apple and its picture, no matter how close and accurate we may try to get, by using higher resolutions and sensitivity when taking and displaying the image, even with modern holographic techniques that may preserve some aspects of the physical dimensions, still in the end it is impossible to understand the important properties of the apple, such as its taste and nutritional benefits, by merely studying its picture, without having full hold of a real one. What is even more frustrating is that, in the case of the Universe, and in all the possible physical observations that may be performed, we are merely looking at some partial dimensions of a tiny part of the vastly capacious and dynamic image, without knowing at all what are the original dimensions that are producing it!

It is rather astoundingly strange how physicists speak about what might have happened at 10^{-37} seconds after the Big Bang singularity, and they use their abstract reasoning to explain how the Universe developed to its current state after 13.8 billion years! Despite the advanced technology, they can't even see more than a tiny small image of the deep capacious sky. Yet all observations are only a few temporal frames of the continuously changing physical and cosmological phenomena. In fact, as we will see in this book, the actual reality reveals itself only between the moments, so it can never be captured at all by any physical means.

1.6 The Cosmic Computer

If we can compare the cosmos to a movie that is displayed on a computer monitor, the Sufis always seek to dive inside the complicated vertical hierarchy of the computer structure down to the disc, memory and processor, trying to understand the logic behind all that, while astronomers are engaged in studying the motion of some tiny pixels on the screen, where they themselves are living inside some minuscule shady region, obscured by the limits of their own corporeal bodies and surrounding physical boundaries.

It is not surprising, therefore, that characters who are habitually living on the screen, absorbed by their natural diverse and deceptive phenomena, denote computer science as "mystical" and even "superstitious", as it was nicely demonstrated in the Allegory of the Cave in the Republic of Plato. Inversely, however, although computer engineers innately realize that the shapes being displayed on the screen are pure simulations, they still want to look at every pixel and study its color, position, and motion, because they consider them equally real in their own level of existence, and surely reflect what is happening inside each level of the complex vertical hierarchy and internal formation of the computer.

1.7 The Heart Observatory

The laws of causality and locality are a result of our own intellectual reasoning, which confines the mind into the physical world, while the heart is always breathing in the capacious realm of spiritual reality, that we then describe their phenomena as nonlocal weirdness. Like the wave-particle duality, these two contrasting realms are complementary, and although the external world must be in the end subjected to the rules of rationality, it is the heart that ultimately generates the internal experiences or individual instances that are only some partial temporal images of the underlying reality.

The human heart is a unique cosmic observatory in whose mirrors the eternal reality is continuously being reflected in the various beautiful and most glorious forms, which had always been the actual source of inspiration for all poets, artists and even philosophers. When cleansed properly, the mirrors of this observatory may become capable of seeing deeply far and beyond the physical boundaries. It may be not so easy in the end to put these spiritual observations in any proper scientific manner that could create, for example, new inventions or commercial technologies, as artists could usually relatively easily create their immortal masterpieces out of momentary inspirations. Nonetheless, truthful heart observations could be invaluable banners that can be used in conjunction with the usual intellectual activities.

1.8 Sight, Insight and Beyond

Therefore, the serious step that should be taken in order to put cosmology on the right track is to engage the heart in observation, and take advantage of its intrinsic non-locality, rather than relying solely on the confined mind. In other words: we must use insight rather than sight and other rational sensations. With insight, the heart is capable of crossing through the vertical hierarchy of the cosmos, rather than only observing its outward manifestations.

The difference between insight and sight is like the difference between seeing and hearing. Hearing can manipulate one-dimensional sequence of data, while seeing is two-dimensional. When we open our eyes we instantly see an image which would require long time to communicate to someone who is blind or not looking at the scene, and it is impossible to be comprehensive. Likewise, insight, which is more like three-dimensional images, is capable of instantly conducting the meanings of things and their internal relations, rather than only their outer shapes and colors. It is worth mentioning here that some Sufis can activate four further spiritual levels of perception beyond insight, which they call the levels of certainty, that is the ultimate true level of knowledge, while everything below that is channeled through some distorted reflections.

This may initially seem to be artistic fantasy, but the laws of quantum mechanics can now provide the initial theoretical foundations in this regard, because the relation between the heart and the mind is parallel to the wave-particle duality, as it will be clarified further in this book. Moreover, it is overwhelmingly evident that all ancient civilizations, such as the Sumerians, the Babylonians, the Chinese and the Egyptians, had practiced such spiritual cosmology, but unfortunately it became quickly corrupted and driven away from its proper scientific procedures which had been lost with the passage of long time and reduced to astrology and various other occult practices. Nevertheless, if practicing such genuine creative heart cosmology seems to be remote at the moment, at least we must start taking more seriously the great authentic traditions of known past scholars in the field, such as Ibn al-Arabi and similar figures in Islam and other ancient civilizations.

1.9 Bridging the Gap

Modern science is normally motivated by experimental data, so whenever new data are reported, scientists try to put forward their theories that could explain the observations, and possibly predict further evidences. The reason why personal experiences or observations, as reported for example by mystics, are not taken seriously in science is because they are normally not reproducible, while the mystics always affirm that one must follow their path in order to see, or taste, the truth that they are claiming. The problem is that, unlike scientific experiments which may be repeated in other labs relatively easily, it takes the whole lifetime to enter the mystics path and one is never certain where it is going to lead, and when or whether it is going to open at all, unless he or she has strong and durable faith.

The purpose of this book is, therefore, to connect these two contrasting approaches of studying the Universe, by matching their major achievements and hence trying to explain the discrepancies of the various leading theories of modern physics and cosmology. This

is achieved by understanding the real flow of time which was originally presented in "Ibn Arabi - Time and Cosmology" and "The Single Monad Model of the Cosmos", and will now be pursued further in this book by focusing on the physical applications rather than the metaphysical or ontological relations.

It was a remarkable breakthrough for me when I could understand and explain the connection between time and the dimensions of matter and space, which turned out to be the long-missing link between relativity and quantum theories. However, it was not possible at that time to express the theory in terms of the conventional language of physicists and mathematicians. For this reason, except among a small circle of some people who are originally interested in mysticism and metaphysics, the previous books could not achieve the desired impact on scientists and physicists.

1.10 The Fruits of Patience

One of the distinguishing features that can be clearly noticed amongst all serious readers of Ibn al-Arabi, and perhaps other Sufis, is that they feel the meanings slowly growing in their own hearts much earlier before they actually understand what they are reading. Only after dwelling on the subject for some long time, and with more frequent readings from various sources, the meanings start to accumulate and make the whole picture clearer to the extent that they feel now they understand everything, but it is still difficult for them to explain it to others. As Zeynep Inan wrote in her review of "Ibnu'l-Arabi Zaman ve Kozmoloji", the Turkish translation of "Ibn Arabi - Time and Cosmology": "This book shows that not understanding what one is reading does not prevent him from deeply admiring the subject. Usually when people do not understand what they are reading, they get bored quickly, but this book is one exception." [1].

As I mentioned above, my work on this subject started in 1990, and after several years of intermittent reading in Ibn al-Arabi's literature, I realized that, along his unique cryptic portrayal of his extensive mystical experience, the fantastic description of his cosmic vision included some accurate details far beyond the reach of the sophisticated tools of physicists and astronomers, and their subsequent advanced computer analysis.

In some occasions, these two contrasting views coincided, which made me wonder how could Ibn al-Arabi speak of such detailed scientific issues several centuries before they have been actually discovered by telescopes. However, although this gave me good reasons to maintain my faith, it was extremely difficult to reconcile most other particular details with established scientific facts, and even simple common human logic. Nevertheless, I continued the research with the least objective that I might understand this archaic view of the cosmos, with the hope that it may open new windows towards understanding the reality, especially that cosmology is only one minor subject in Ibn al-Arabi's comprehensive knowledge that he recognizably managed to beautifully layer down horizontally and vertically in the Meccan Revelations and his other shorter books and treatises.

1.11 After the Path of the Heart

At the end of the first book, in Arabic: "The Sufi Interpretation of Joseph Story", or: "The Path of the Heart", that was published in 1999, I promised that I will write another book to explain the cosmological principle behind Einstein's theory of relativity, and why the speed of light is constant in all frames! At that time, in fact, I had not the slightest idea how am I really going to do that, but it became utterly evident to me that Ibn al-Arabi's comprehensive view of the cosmos is far deeper and much more accurate than all other scientific theories, to the extent that they can only be correct if they agree with him.

Although the subject of that book was not directly related to cosmology altogether, I put an illustration on the front cover to demonstrate the Sufi concept of abolishment in divine Presence, but it turned out that this same depiction can beautifully summarize the concept of re-creation or the perpetual forma-

[1] Translation from the source published in: <http://www.dunyabizim.com/kitap/14453/limler-zaman-meselesine-nasil-egilmisler>, published on 10 September 2013, and last retrieved on 31 October 2017

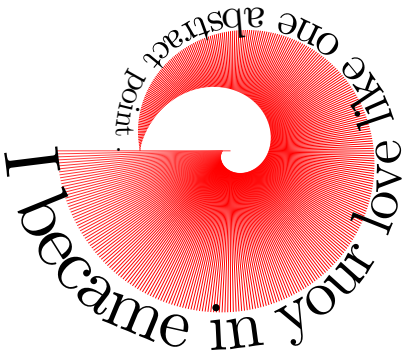


Figure I.1: An illustration of the Sufi concept of abolishment, originally depicted in "The Sufi Interpretation of Joseph Story", but this can at the same time beautifully demonstrates the concept of metaphysical creation of space and matter in the inner levels of time. The abstract point denotes the Single Monad which is continuously inflating into matter and space and deflating again into the metaphysical reality of oneness.

tion of space and matter, which is the main concept in the Single Monad Model that lead to the Duality of Time Theory. This illustration is reproduced in Figure I.1.

At the time when I was reading these concepts in Ibn al-Arabi's books, I had no clear idea how they are actually related to cosmology, because he normally never care too much to explain the reasons, mostly only describing his views, or visions, in remotely cryptic and dispersed poetic manners that require extensive study and analysis to put them together in reasonably comprehensible logic.

2 The First Serious Study

For this reason, after about ten years of retreating away from traditional physics and cosmology, I decided to take it a step further; so I started to communicate with recognized scholars in the subject, until I decided to do the Ph.D. with Prof. James W. Morris at Exeter University.

My general theme was to study Ibn al-Arabi's cosmology, and I remember that in the early correspondence with Prof. Morris he told me that this subject had not been seriously tackled since the time of Henrik S. Nyberg (1889-1974), in his famous critical commentary and translation of three related short books by Ibn al-Arabi: "Kleinere Schriften des Ibn al-Arabi" which was published in 1919. He also acknowledged that this really requires someone who is knowledgeable and interested in both physics and Sufism at the same time. However, cosmology, or cosmogony, is a broad field; so after some discussion we settled on the subject of "time", which turned out to be the key.

However, after performing all the initial stages and summarizing the interdisciplinary literature survey and other diverse investigations, and after collecting the relevant materials from Ibn al-Arabi's extensive literature that he deliberately spread over his many enigmatic books, I found that it is absolutely impossible to put it together in any scientific manner, according to the current logic. For example, on the one hand he frequently confirmed that there is a minimum indivisible time, and yet on the other hand he also confirmed that this time is the normal twenty-four hours day itself. He also says that Saturday is the day of eternity and all the days of the week, including Saturday itself, are occurring in Saturday!

These, and other complex issues, were later explained in the previous books, but I wanted to mention it in this introduction to show again how much our common sense and complicated rational thinking is really creating the big obstacle that is preventing us from

understanding the simple reality. It was very hard for me, even after more than two decades of preparation and spiritual guidance, to overcome this obstacle.

At various stages I decided to stop the project, and even towards the end I simply decided to put these problems as they are without being able to provide any logical explanation, until the door was slightly opened and it was put all together in the initial Single Monad Model. Few days before this happened, I saw in a dream that I was circumambulating the Kaaba and its door was suddenly opened to me and I entered inside, looked at the sky through its roof, and a gust of heavy rain started falling.

However, the duality nature of time was not very clear in the first version of the Single Monad Model, although a special chapter was devoted to the concept of the intertwining between week days, which is in fact the intertwining between the inner and outer levels of time.

2.1 Meeting the Greatest Master

Ibn al-Arabi had already reported several times that he had extraordinary non-local and non-temporal experiences with people who have passed away many centuries before, but apart from the various visions in which he helped me to understand some critical issues in the subject of this life-long research, the following extraordinary story happened with me in real physical dimensions, although some might still prefer the classical interpretation, that it may all be just a matter of simple coincidence.

When I submitted the thesis and the University of Exeter specified the date for the final viva examination, it happened at the same time that Muhyiddin Ibn al-Arabi Society in Oxford invited me for their annual symposium, which was held in May 14-15, 2005, at Worcester College, and the theme was also chosen specifically on the subject of time. So I went to the British Embassy in Abu Dhabi to get the visa for UK, and I entered the hall waiting for my turn to be interviewed. There were only few people waiting for their names to be called, then the speaker called upon the name: "Sheikh Muhyiddin"!

At first I was going to answer because I thought that I might have filled the application by mistake and put his name as the applicant, but then recalled that I did not even mention his name anywhere in the application. In fact, I remembered quickly that I deliberately intended not to mention any religious indications because the tension of 9-11-2001 was still maximum, so I made sure not to include in the application the invitation from Muhyiddin Ibn al-Arabi Society, and I put instead the letter from Exeter University which did not specify the subject of my research.

For few seconds I was completely perplexed, then I saw a young chap stood up from the back of the room, and as he went into the interview window, he looked at me with a tender smile. He was younger than twenty years, Arabian looking, with short beard and soft mustache that have never been cut, exactly as Sheikh Muhyiddin Ibn al-Arabi described himself in his early youth in the only one occasion in the Meccan Revelations [I.153.33].

At that time, I did not have time to think about it and I thought it was just a mere coincidence, although "Sheikh" is normally not used as a first name, and "Muhyiddin" is also not commonly used as surname, and statistically speaking, it is a chance in billions I meet someone with this specific name in such particular occasion.

However, it was only during the lunch after the viva, when the examiner Prof. Ian Netton asked me if I had any mysterious encounters with Ibn al-Arabi, as some other researchers have frequently reported. Then I told him the story, and only at that time, as I was recalling the events, I realized that it was not any coincidence at all, especially after I recalled all the circumstances in the conference and during the viva; it was then very clear to me that he was really present with me all the time, to the extent that, given the extreme complexity of the new ideas presented in the thesis, that sometimes it seemed as if it was not myself who is answering the questions!

The reason why such extraordinary encounters are not normally appreciated in science is because they do not seem to be reproducible, and the current laws of physics

prohibit them because they must incorporate some kind of super-luminous motion, which is not possible at least on the macroscopic scales. With the new concept of complex-time, however, it will be clearly shown that instantaneous motion of macroscopic objects is possible and can be described mathematically by the same laws of quantum mechanics. It will be also shown in chapter VI that the world of "dreams" is as real as our own physical world, and all other psychological entities, such as angels, jinn, the soul and the spirit, are covered by the same laws of physics because they have carnal space-time geometry just as all other physical objects. In fact, all these creations and realms have material structure exactly like our own, with the same kind of atoms and elementary particles, except that they exist in different dimensions within our encompassing space-time, as it will become clear by the end of this book.

However, my meetings and encounters with the Greatest Master, soon moved to the normal ordinary physical life, as it happened that during these same years I established a connection with Sheikh Ramadan Subhi Deeb, and soon enough my relationship with him started very quickly to become strong and interactive. I then realized that many prominent scholars of Ibn al-Arabi are his students, including for example Michel Chodkiewicz, to the extent that many often call him as the living Ibn al-Arabi, not by chance that he was actually living and working in Damascus only few hundred meters close to the historical Ibn al-Arabi's mosque which includes his shrine.

Consequently, all the aspects of my relation with Sheikh Ramadan were deeply mysterious that it is impossible to state in any ordinary language. What is important with relation to the subject of this book is that his teachings to me were not in the form of any direct intellectual communication, though he mostly answers my questions before I ask. In addition to his clear fierce ability of reading my mind, as if I am an open book before him, and despite that we are living in different countries, he is also able to create active thoughts in my own heart in different ways and mostly without any direct communication.

2.2 The Single Monad Model

The Ph.D. was a remarkable turning point in my life, only because I believe the thesis was not ordinary, and I was not expecting it to pass, because it included two key chapters that I myself do not seem to fully understand even until the present moment: Chapter III (The Significance of the Week and Its Seven Days), and Chapter IV (The Actual Flow of Time). The examiners asked me all the possible questions from every page of the thesis, passing very quickly over these two key chapters. In the end, I exclaimed why they did not discuss these two chapters like the others, because I was worried that they may request significant modifications. Their answer was that they only needed to clarify ambiguous issues! The thesis passed without any modification, but in my own opinion, this was possible only due to the fact that it is similar to Ibn al-Arabi's books, where it is quite often the case when the reader do not understand a word, yet he feels the truth slowly flowing into his heart in a way that he can not deny.

Nevertheless, after publishing the Single Monad Model in 2007, I was expecting that physicists and mathematicians are going to grasp the innovative concept of time and quickly develop it into a complete physics theory. Although some critical examples were already given in the final chapter to show, for example, how Zeno's paradoxes of motion and plurality and the EPR (Einstein-Podolsky-Rosen) paradox could be easily explained based on the new model, it remained all possible philosophical analysis, that fell way short from any direct physical applications.

In 2010, Prof. Shigeru Kamada, of the University of Tokyo, noted in his review of "Ibn Arabi - Time and Cosmology": "The similarity between the world-view of modern physics and that of Ibn Arabi is interesting ... I wonder if Ibn Arabi's theory could be successfully expressed in mathematical formulas. A work which succeeded in doing that would bridge humanities and science, and contribute to mutual understanding between the two fields of human knowledge." Kamada (2010).

This sharp gap between science and hu-

manities is narrowing, especially in subjects related to physical sciences, such as physics and philosophy. Physicists have developed sophisticated technical tools that make them unable to appreciate any analysis not expressed or supported by their rigorous mathematical formulas, while philosophers, who are usually interested in more diverse and wider subjects, find it extremely difficult to use these sophisticated tools. The new complex-time Euclidean geometry will enormously simplify the laws of physics, and make them cover other natural phenomena previously considered not physical.

2.3 Single Electron Transport

My outstanding story with what is "single" goes back to Cambridge in 1990, as I was studying Electron Transport in Free-Standing GaAs Nano-Wires. Using what was then the state-of-the-art electron beam lithography techniques that could make micro structures on semiconductor crystals, I was trying to find the optimal conditions to fabricate these wires by etching GaAs chips in Nitric Acid solutions for a certain amount of time. As I was changing the width of wires to find the suitable dimensions that make them free-standing without breaking down, I noticed that the conducting nano-wire could be made so narrow that only few atoms are physically connecting between the sides of the bulk material. It was not very difficult then to predict that under such circumstances it is possible to make electrons pass through the wire, one single electron at a time, which allows quantum tunneling at room temperature, because of the guaranteed coherence. I quickly submitted this observation, with some demonstration figures, to the supervisor, who showed great interest in this discovery and promised to discuss it with other leading theoretical physicists from Imperial College in London.

However, it happened afterwards that I went to Germany for few months, and then to Syria where one of my friends showed interest in studying at Cavendish Laboratory so he brought to me the new graduate prospectus to help him choose from the trending research topics in microelectronics. To my surprise and astonishment, a new group of researchers was formed by the ex-supervisor to work on the subject of "Single-Electron Transport" on which they published many pioneering articles without ever mentioning my name!

Therefore, I think it is not by chance at all that, after ten years of this great disappointment, my new research at the University of Exeter lead to the "Single Monad Model" on which this theory of the Duality of Time is based. This was actually symbolically revealed to me in a dream straight after that story, and I am realizing now that the additional ten years after publishing the first book on this subject were to my advantage, to allow some time the Single Monad Model to spread. The same older idea of quantum tunneling between the two sides of the nano-wire is also operating here in the Duality of Time and perpetual creation of space, but this time it came from the most fundamental fields of physics, because they are both related to the intrinsic quantum structure of space that is perpetually being re-created at the speed of light, which makes every geometrical point like a quantum dot, or quantum bit that is oscillating between zero and the speed of light. This will lead to the theory of quantum information and quantum gravity as we shall see in chapters V and VI.

2.4 Another Decade of Withdrawal

For these and other circumstances, I stopped working on the subject for a few years, and maybe I started questioning myself again about its creditability. After all, it is not easy to imagine how the whole cosmos is being re-created anew every single instance of time! Sometimes I myself can't imagine it to be true. Even with the recent developments that should leave no doubts, because the theory is now mathematically verified and it can be applied in solving many major persisting problems in physics and cosmology, nevertheless; if I do not keep my thoughts active on it for few days, I find myself in doubt again.

During the previous ten years that followed the Single Monad Model, I decided to work on other projects that could also help deepens my understanding of Ibn al-Arabi's intricate

conception of time and creation. The original research on Ibn al-Arabi's time and cosmology was mainly based on a tiny portion of the Meccan Revelations, both in terms of passages size and the vast extent of subjects tackled in this *magnum opus*. Therefore, I decided to work on translating this essential book into English, since most of the serious scholarship nowadays is performed by students or scholars who may not have full access to the Arabic text, not to mention the fact that this extensive Arabic text itself needs to be properly edited, indexed and characterized to allow easier access, benefiting from existing computer accessibilities.

This job, however, was not easy at all. I remember when I decided to work on this book, I conversed about the idea with some prominent scholars in the field and I was utterly discouraged, claiming that translating this book is something absolutely impossible; due to its magnitude, complexity and mystical nature. Although I was definitely aware of that, I decided to try, but after I completed the first draft of the first volume, out of thirty seven, I had to stop because I realized much more difficulties than that I had been initially warned. This book, which is considered relatively easy compared to Ibn al-Arabi's other several hundreds books, include many bolted sentences in almost every chapter that remain opaque and unclear to the most specialized scholars who have studied them for years.

2.5 Back to Time

I learned, however, that working on Ibn al-Arabi's books is never a waste of time. One of the reasons for the lack of any serious studies of Ibn al-Arabi's unique view of time and creation is the difficult symbolic language he usually used, in addition to the fact that he didn't discuss this subject at length in any single place in his extant works, so we must piece together his overall cosmological understanding of time from his scattered treatments. Even after serious study, it is never possible to anticipate in advance when or whether the puzzles will ever be solved. There is always a great deal of probability when working with subjects related to mysticism, as if it is covered by the same laws of quantum mechanics. No wonder, because it is resolved in or by the heart!

It then came to path that, as I was working on these various issues related to the Meccan Revelations and other books, I came across a quote attributed to Ibn al-Arabi: "Time is liquid space, and space is rigid time." Although I had already noticed the two levels of time and how they are intertwined and connected in various complex ways, as explained in chapter IV of the Single Monad Model, but it never occurred to me how to convert this fundamental key insight into a mathematical model, which turned out to be extremely simple, with the help of complex hyperbolic geometry that can avoid Riemannian manifolds, which lead to all the complicated curved four dimensional space-time, full of singularities at ill-defined geometrical points.

2.6 Ultimate Simultaneity

Classical mechanics considered time and space as absolute quantities, in accordance with the common classical concept of simultaneity, where events which occur simultaneously in one frame of reference were considered to have occurred simultaneously also in all other frames. Special Relativity, based on the principle that light travels at the same finite speed in all directions and in all frames of reference, corrected this erroneous idea. Because space and time are dynamically connected, simultaneous events in one frame of reference are not necessarily considered simultaneous with regard to another frame of reference moving at a relatively high speed with regard to the first, as we will explain this further in chapter III when we review Special Relativity in section 2.

With Ibn al-Arabi's re-creation principle, the concept of simultaneity will have even a deeper relative aspect. With regard to us, as physical entities living in the normal level of time, we could habitually observe many simultaneous events, whereas in reality there can be no two cosmic events happening at the same instance of the real flow of time at all. This means that at every instance of the outward normal level of time, space and matter are

being re-created in one linear chronological sequence but in various layered levels of time. These are the inner levels of time that later lead to the genuinely complex-time Euclidean space that can magnificently replace the non-Eclidean Minkowski space and eliminate the need for Riemannian geometry, at least as far as theoretical cosmology is concerned, otherwise this differential geometry is essential tool in various other practical fields.

2.7 Paradoxes of Zeno and EPR

During the long decade after the Single Monad Model, in several occasions of international conferences and seminars, I tried to explain the importance of the new concept, which I regard as a real breakthrough in physics and cosmology, since it could clearly explain the various persisting paradoxes. Due to the interdisciplinary nature of the subject, the audience were either far from being any professional physicists, or those who are specialized in narrow subjects that were either purely experimental or, at best, too technical. My main theme was discussing the historical Zeno's paradoxes of motion and plurality, which physicists wrongly believe they have solved many centuries ago, and sometimes I have discussed the EPR which I myself could only present it in some philosophical arguments, because I did not have any rigorous mathematical proof of my new theory of time.

Nevertheless, I was recently writing a chapter in an edited book on the "Islamic and Byzantine Philosophies of Time" (Haj Yousef, Haj Yousef, ch.7), and the title of my chapter "Zeno's Paradoxes and the Reality of Motion under Ibn al-Arabi's Re-creation Principle", which was already introduced in the Single Monad Model. One of the related issues I briefly considered in chapter VII (The Single-Monad Model and its Implications for Modern Physics) of that book was the case of transforming the throne of queen Bilqis, from her palace in Sheba into king Solomon's palace in Palestine, on which Ibn al-Arabi declared that this is in reality not ordinary motion, but, rather, the throne was instantly re-created in front of Solomon, in "no time".

Accordingly, Zeno's paradoxes, the EPR, and all nonlocal quantum phenomena could be easily explained if we consider that motion is always re-creation in the new places rather than infinitesimal transmutation. In normal macroscopic situations, because the change of place is extremely small during the short time of motion, we perceive objects moving continuously in time, when in fact they are being re-created every single instance.

However, at that time in 2007, since I was only briefly discussing all these various concepts in the final chapter of the book, I did not think about how exactly this alleged process of re-creation is taking place. This turned out to be the key for the next stage that lead to the current Duality of Time Theory. Therefore, as I was writing the above chapter about Zeno's paradoxes, many exciting concepts started to unveil and very quickly fit together to complete the jigsaw puzzle.

3 Complex-Time Geometry

The principal technical applications of Ibn al-Arabi's conception of time and creation led to the Single Monad Model of the Cosmos, but the resulting Duality of Time Theory turned this model into innovative theory of cosmology, physics and mathematics. This remarkable breakthrough was realized expressing the duality nature of time in terms of complex hyperbolic geometry, which turned out to be extremely easy and straightforward, since it relies completely on the Euclidean frame, i.e. without invoking Riemannian geometry.

The perpetual re-creation in the inner level(s) of time implies that normal time is actually imaginary or latent with relation to the real flow of time that is creating space and matter. Therefore, this **genuinely complex-time** will define a new discrete symmetry that allows expressing the (deceitfully continuous) non-Euclidean space-time in terms of its granular Euclidean complex-time space, whose granularity is expressed through the intrinsic properties of hyperbolic numbers.

3.1 Formation of Dimensions

In this manner, the dimensions of space are dynamically formed by the linear flow of the

inner levels of time, which has to be interrupted in order to make a new dimension. This interruption is achieved by multiplying with the imaginary unit, which produces an abrupt rotation, creating a new dimension that is perpendicular on the previous level, or hyperbolically orthogonal on it, to be more precise.

It is this subtle property, that is a consequence of the duality nature of time, that makes space-time geometry genuinely discrete and complex, otherwise if we consider all the dimensions to be coexisting together it will be continuous and real. This will therefore have deep implications on the various fields of mathematics, such as geometry and number theory, because complex numbers are now genuinely natural while the reals are one of their special approximations, that corresponds to the extreme theoretical case of infinite flat space without any motion in time.

3.2 Theory of Everything

Actually, the Duality of Time Theory is capable of taking the fundamental philosophical observations to a new profound level, beyond the physical boundaries, because the most basic principle of causality becomes a consequence of this sequential metaphysical creation in the inner levels of time, and hence all the conservation laws of momentum and energy, because the whole Universe becomes like a standing wave, or a closed system of quantized space-time excitations, where any perturbation at a particular location will cause subsequent coherent synchronization in other locations. Moreover, because of re-creation, the conservation laws can now be applied in any isolated system, whose parts could well be separated in space or time, as far as they are entangled into one closed system. This will therefore explain non-locality without breaking the speed of light limit.

The Duality of Time leads at the same time to all the three principles of Special and General Relativity together, as well as Quantum Field Theory, including the first and second quantizations, of energy and fields, and hence this "third quantization" of space-time itself will eliminate all kinds of infinities that are normally encountered in the current background continuum models, due to singularities in the ill-defined Riemannian geometry.

No wonder, therefore, that one of the various names that the Sufis usually give to the Single Monad is: "Everything", not the least because it is literally continuously appearing in the form of every single thing, but it can, at least potentially, explains everything.

3.3 The Speed of Light

The famous Michelson-Morley experiment in 1887 proved that light travels with the same speed regardless whether it was moving in the direction of the movement of the Earth or perpendicular to it. This unexpected null result led to the first principle of Special Relativity, that the speed of light in vacuum is the maximum speed which anything in the Universe can attain, regardless of the motion of the source or the inertial reference frame of the observer.

However, even though it was confirmed by many experiments, there is yet no theoretical or philosophical account that could explain this constancy and invariance of the speed of light, but it is considered an axiom that has been experimentally verified, but not yet proven in any fundamental academic sense.

According to the Duality of Time, the speed of light is a property of the dynamic space-time geometry whose individual discrete points are perpetually fluctuating between the two metaphysical states of void and vacuum, corresponding to zero and the speed of light, respectively. All other states, that produce the apparent physical properties of matter result from the spatial and temporal superposition of these two primordial states. So the speed of light is the speed of creation that is the only real speed in nature from which all the other physical properties, such as velocity, acceleration, energy and even the dimensions of space, are only observable on the outward imaginary level of time, and based on this genuinely complex nature of time they can be easily calculated form the basic principles of Classical Mechanics.

The second principle of Special Relativity, which says that the laws of physics are invari-

ant between inertial frames, and the equivalence principle that lead to General Relativity, are not needed anymore. These two principles, which are necessary to derive Lorentz factor and Einstein's field equations, will follow directly from the complex-time geometry, in addition exact mathematical derivation of the mass-energy equivalence relation ($E = mc^2$), which has no exact derivation under the current theory of relativity, whereas all current derivations of this critical relation suffer from unjustified assumptions or approximations as was repeatedly acknowledged by Einstein himself.

3.4 Cosmic Inflation

The horizon problem, or the homogeneity and isotropy of the Universe, can also be easily explained according to the Duality of Time, which in fact provides a creation scenario that is equivalent to but more realistic than (eternal) inflation, because the continuous and perpetual creation in the inner levels of time does not require any infinite hypothetical Universes. No matter how large and complex the Universe might be, and thus how long it might take to be created in the inner levels of time, the creation is still instantaneous on the outward level that we encounter.

Currently, the accepted solution to the horizon problem is the inflationary model that was originally introduced by Alan Guth and developed in the early 1980s, but soon proved that this may lead to eternal inflation, or what is known as the chaotic inflation theory, because it must continue in most parts of the Universe, producing hot bubbles that are the seeds of new universes, thus generating a hypothetical infinite multiverse.

The Duality of Time does not lead to any of these problems because it replaces inflation in the outer (physical) level of time with perpetual creation from one single geometrical point in the inner metaphysical level, so the physical Universe will still be finite.

In fact, the Duality of Time can also be considered alternative to the cyclic, or oscillating, models which were seriously considered by early theoretical physicists, including Einstein, but those models failed because they violate the second law of thermodynamics. The Duality of Time does not only comply with this law, but it can also explain why entropy can only increase, because of this intrinsic arrow of time on the inner levels. With this perpetual creation scenario, the Universe oscillates, by inflating and deflating, between the instances of the outward level of time, without reversing the entropy because this process of perpetual creation is performed in a natural one linear chronological sequence in the inner levels.

3.5 Aether and Quintessence

Aether was used in ancient and medieval science as a thin transparent material that fills the upper spheres where planets revolve. The concept was used again in the 18^{th} century to explain the propagation of light and gravitation. This continued until the late 19^{th} century in what is called: luminiferous aether, or light-bearing aether, which was needed to allow the apparently wave-based light to propagate through empty space. The concept was contradictory because this medium must be invisible, infinite and without any interaction with physical objects. Therefore, the concept was completely discarded after the null results of Michelson-Morley experiments in 1887. After the development of Special Relativity, aether theories became scientifically obsolete, although Einstein himself said that his model could itself be thought of as an aether, since empty space now has its own physical properties. In 1951, Dirac reintroduced the concept of aether in an attempt to address the perceived deficiencies in current models, thus in 1999 one proposed model of dark energy has been named: quintessence, or the fifth fundamental force. As a scalar field, the quintessence is considered as some form of dark energy which could provide an alternative postulate to explain the observed accelerating rate of the expansion of the Universe, rather than Einstein's original postulate of cosmological constant.

The classical concept of aether was rejected because it required ideal properties that could not be attributed to any hypothetical medium that was thought to be filling the otherwise empty space background. With the

new dynamic creation, however, those ideal properties of aether can now be explained, because it is no longer something filling the otherwise empty space, but it is the space itself, being dynamically created in the inner levels.

However, in the light of the Duality of Time, there is now a fine distinction between aether and quintessence. Quintessence, which literally means: the fifth essence, is the Single Monad itself, which is the real individual metaphysical point of geometry, while aether is the medium produced by its continuous recurrence in the inner levels of time. Therefore, in addition to the above homogeneity problem, the magnetic monopole can be thought of at this fifth essence, which exists effectively everywhere but it can never be isolated, since it is the individual metaphysical points of space-time geometry. For this reason, we do not witness the magnetic force alone, but it is always accompanied by the electric and other forces. This same issue can be also analyzed further to solve the hierarchy problem because all the forces are now associated with the dimensions of space, so gravity is very weak simply because it is exhausted in the volume and the other forces are the properties of lower dimensions.

3.6 Cosmological Constant Problem

In order to make the Universe static, Einstein first added the cosmological constant to his field equations so that the positive attraction of matter may balance the cosmological constant repulsion. This was later discarded after Hubble's discovery of the expansion of the Universe in 1929. However, in 1998, after the discovery of the accelerating Universe from distant Type Ia supernovae, in addition to the data from the cosmic microwave background and large galaxy redshift surveys, astronomers were able to measure the evolution of the expansion rate of the Universe, which lead to the current standard model of cosmology, the Lambda-Cold-Dark-Matter model, $(\Lambda - CDM)$.

On the other hand, as early as 1960s, Quantum Field Theory predicted that quantum fluctuations would make huge contributions to the vacuum energy, much larger than the energy due to the cosmological constant which was known to be either zero or very small. The problem became extremely critical after the development of inflationary models in the 1980s, since the cosmic inflation is driven by vacuum energy and even the smallest changes in its value will lead to different expansion scenarios.

As Weinberg showed, there are many problems associated with the cosmological constant. The observed acceleration of the expansion simply means that the cosmological constant is about 120 orders of magnitude smaller than the density of vacuum energy, the Planck density, that can be calculated from Quantum Field Theory. This is known as the problem of smallness. Moreover, being so small, why it just happens to have exactly the value that makes its density similar to the average matter density, which is called the coincidence problem.

Many solutions have been suggested in this regard, as it was reviewed by Weinberg and Sanhi, but because the discrepancy is so huge, none of the speculations came ever close to solving the puzzle. The huge discrepancy indicates that there is something substantially wrong in our understanding of quantum physical processes.

The number of atoms in the visible Universe is usually estimated at $N_{edd} = 10^{80}$, which is called Eddington number, so the discrepancy in the cosmological constant problem is still forty orders of magnitudes larger than the number of all atoms in the Universe. It would not be strange, therefore, if we postulate that this huge physical multiplicity could be deceiving! Yet since we clearly observe this multiplicity in our normal time level, the only way out is to consider that the whole Universe is being created from only one ultimate, or metaphysical, elementary particle, that we call the Single Monad, that is perpetually being multiplied in the inner levels of time to create the whole physical Universe.

Accordingly, the huge discrepancy in the cosmological constant is diminished and even eliminated because the vacuum energy should be calculated from the average of all states, and not their collective summation as it is cur-

rently treated in Quantum Field Theory. This means that we should divide the vacuum energy density by the number of modes included in the unit volume, which can be calculated by: $N = (\frac{2\pi}{\ell_P})^3 = 8\pi^3/(1.616229 \times 10^{-35})^3 \approx 10^{117}$, because the cutoff is usually applied at the Planck scale. This will reduce the discrepancy between the observed and the predicted vacuum energy density from 120 into only three orders of magnitudes. The remaining very small discrepancy could be explained according to quintessence models, but a more accurate calculation is needed first because all the current methods are approximate.

3.7 Quantum Mechanics

In addition to explaining non-locality without breaking the speed of light limit, the Duality of Time can ultimately offer complete interpretation of Quantum Mechanics by describing how actually the wave function collapses into single eigenstates and what is the role of the observer in determining these states.

The problem in current theories are rooted in the introduction of calculus in the 17^{th}, by both Newton and Leibniz. Only after that physicists and most philosophers were wrongly convinced that Zeno's paradoxes are solved once and for all. However, the main tool in calculus is calculating the limits, which presupposes space and time to be infinitely divisible. Although this is still working just fine in all classical situations, it gave rise to many problems that eventually lead to Quantum Mechanics, which stems on the first quantization of energy due to Planck in 1900, and Quantum Field Theory, which introduced the second quantization of fields, due to Dirac in 1927. New concepts, such as Strings and Spin Networks, have been later introduced in the search of Quantum Gravity, but these are not yet fully successful.

The main problem is that most of these concepts are trying to implement some kind of quantization in a continuous space-time background, which makes any prospective theory of gravity non-re-normalizable and impossible to test because it cannot make any meaningful predictions. This problem does not exist in the Duality of Time because the resulting space-time is self-contained, without any background. This would not have been possible without introducing the genuinely complex-time space, which at the same time simplified the approach by going back to the absolute Euclidean space.

Because space-time is ultimately granular, measuring velocity as distance per time is only a macroscopic approximation that works just fine in everyday life, but this approximation can produce huge error when applied on microscopic scales. In Quantum Mechanics we start with the wave function that describes the state of the system, and any perturbation will cause subsequent synchronization in the following instance of re-creation. Hence, non-local interactions can naturally happen when the system is very small, even when it is spread over different regions of space, because the change is limited by the laws of conservation rather than distance. The effect of distance prevails in large systems because energy dissipates quickly over the large number of geometrical points when they are spatially connected by direct proximity, giving the impression of a continuous region of space.

The EPR is one experiment that is able to demonstrate non-local interaction in the case of two entangled particles that are spread over large distance, that is the inner level of time. Another, kind of such quantum interaction is the single particle interference which can be explained according to the Duality of Time as a small isolated system that is spread over normal time. In both cases the effect can only be logically explained because the particles are connected, or entangled, through the Single Monad that is their sole mutual source; in the EPR case this connection is achieved through spatial entanglement, while in the second case it is temporal entanglement. Quantum tunneling can also be explained in the same manner, except that it usually happens at smaller scales.

3.7.1 Collapse of Wave Function

With re-creation and the two levels of time, the dilemma of wave-particle, or continuity versus discreteness, is solved by noting that the inner level is the real flow of time in which

space is created, at the speed of light, which gives the wave behavior, which then instantly appear as one point in the normal level of time, that we normally encounter as particles. On the highest existential level, there is either pure energy or pure mass, or: either massless waves or massive particles, not the two together, but in real life, at the normal outward level of time, objects and particles are a mixture, or superposition, of these two primordial states of wave-particle duality, so some particles will be heavier than others, and some will have more kinetic energy than others.

In any closed system, such as an isolated particle, atom, or even objects, the contributions to this superposition state come from all the geometrical points in the system that are always fluctuating between the two primordial states of vacuum and void, or: existence and nonexistence, or: space and time, or: subject and object, or: wave and particle, or: real time and imaginary time, so on average the total state is indeterminate, or determined only as a probability distribution, as far as it is not detected or measured. However, any kind of measurement or detection necessarily means that the Single Monad at this particular instance of measurement is manifesting as the observer that is now acting on the system, and since there is only one state of existence and one state of nonexistence, at the real flow of time, the system must necessarily collapse into nonexistence, or particle, because at this particular time the observer was taking on the existence state, so the whole observed multiplicity of individual points must be all in the nonexistence state, at this particular instance of the real time.

Of course, this collapsing is not fatal, otherwise particles and objects will disappear forever, but they are re-created or excited again right after this instantaneous collapse, at which time the observer now would have moved back into an indeterminate state, and become an object amongst the other objects.

3.7.2 The Cosmic Trinity

In other words, the collapse that always happens as a result of measurement or detection, means that the measured entity, which was in the superposition state, i.e. "subject", has now collapsed into the eigenstate, i.e. "object", by the "act" of measurement by the observer that has just took over this instance of existence and became the subject at this very real instance of measurement. The whole cosmos is then built on these three entities: "subject-action-object", or: "energy-force-matter", or: "wave-operator-particle", that are three different aspects of the same reality of the Single Monad, that is the only player who is unceasingly performing these three consecutive movements, whose outcome would create a geometrical point that is nothing but its "shadow" which would act as an object in the next scene. The perpetual recurrence of this three-fold operation results in the accumulation of these shadows or objects that are eventually spread spatially and temporally to make the whole dynamic matter and energy in the cosmos.

In total, therefore, the Single Monad performs seven primary revolutions, because each movement of the above three-fold operation consists of two states of existence-nonexistence, which in total makes the six directions or three dimensions of space, and the seventh revolution is what makes a one directional instance of the outward level of time, and this will be like resetting the instance of space to start anew. In terms of Quantum Field Theory, the first six revolutions create massive particles that becomes localized in space, which will be either the subject or the object depending on which one is the current excitation, and the seventh revolution creates a massless particle that is the action or energy; the first type are fermions and the second are bosons. For this reason, energy is directly related to time, while mass is more related to space.

For this reason, also, the speed of light must be theoretically multiples of three, without unit, because it is inner time over outer time; thus having no real dimensions, since space is reduced into time, and both are reduced into natural numbers. This of course will have enormous consequences on physics, philosophy and mathematics.

Also, for this same division of subject-action-object, we can notice how elementary particles are divided into three main types:

quarks, leptons and bosons, and while bosons are known as the force carries, i.e. actions, the other two types together are called fermions and they are what constitutes matter, i.e. subjects and objects that are exchanging roles.

Actually, the above three-fold operation is nicely demonstrated by Feynman diagrams which represent a perturbative contribution in a quantum transition from some initial quantum state to some final quantum state. Each diagram is basically composed of five components, a force carrier and four particles, two of them interact as a subject and object and two come out also as another subject and object that may now enter a new operation, so a unit operation contains only the three players: subject-action-object.

Additionally, the reason why there are three generations of fermions, such as electron, muon and tau, is directly related to the three spatial dimensions, so the electron is three-dimensional, the muon is two-dimensional and the tau is one-dimensional, but because we observe them all in our three-dimensional space the electron becomes lighter. Actually, the concept of mass itself is now directly related to the dimensions, and as a result, the mass-gap of Yang-Mills theory can be easily explained under the Duality of Time.

3.7.3 Uncertainty Principle

We can give a logical explanation of the uncertainty principle, which was first introduced in 1927, and it states that the more precisely the position of some particle is determined, the less precisely its momentum can be known, and vice versa. This is normally expressed as an inequality relating the standard deviations of position and momentum. This principle had been verified experimentally even on the macroscopic scale, and it can be mathematically explained according to wave mechanics and matrix mechanics, but we want here to explain the physical reasons that cause this uncertainty limitation, apart from the mathematical formulation.

As we explained above: a particle or any object with apparent velocity, or momentum, is in fact momentarily fluctuating between the two states of existence and nonexistence, so its velocity is the time average of its dual state velocity that can be either zero or the speed of light. If we suppose that the object is composed of N individual points, only one of these points will be existing, at the real instance of measurement, so it will be moving at the speed of light, while all the other points will be at zero, at this particular time. According to Special Relativity anything moving at the speed of light its position is undefined, due to length contraction, i.e. it virtually exists in all places as far as it is undetected, but after detection its position will be fixed because it instantly move into the particle state.

Therefore, in an object composed of N individual points, the position of one of them will be completely uncertain, while the rest are already determined, because they are now in the particle state. When the number of points N is very large, as it is the case with large objects and heavy particles, the uncertainty will be very small. But for small particles, such as the electron, the uncertainty could be considerably large, especially when the particle is moving at hight speeds, which means that on average most of its individual points are at the speed of light.

3.7.4 Schroedinger's Cat

The superposition state of a system with of N geometrical points comes from averaging the dual-states of these points, all of them had already made their contribution except one point that is the current image of the Single Monad, at the very time of measurement, which is going to be determined right in the following instance. Therefore, because the state of any individual point automatically collapses into zero after it makes its contribution to the system, once the moment pass all systems are determined automatically, although their state may remain unknown as far as it is not measured. The act of measurement only provides knowledge of the state. However, if the number of points in a system is very small, and the observer is necessarily part of the system, the measurement will have large impact on determining the eigenstate.

Accordingly, the state of Schroedinger's cat, after the box is closed, is either dead or

alive, so it is already determined, but we only know that after we open the box, provided that opening the box does not have any influence on the radioactive material that is inside the box.

3.7.5 Supernatural Phenomena

Moreover, since the whole world in space is a closed system, all changes in it are necessarily internal changes only. Therefore, any change in any part of the world will inevitably cause instantaneous synchronizing change(s) in other parts. In normal cases the effect of the ongoing process of cosmic re-creation is not noticeable because of the many possible changes that could happen in any part of the complex system and the corresponding distraction of our limited means of attention and perception.

Therefore, being part of this closed system, the observer can have a considerable role in determining its state. In normal circumstances, the effect of the observer on the surrounding world is limited only through physical forces, because his or her conscience constitutes only a very insignificant part of this whole world. On much smaller scales, and after isolating other stronger causes, the effect of consciousness will be more detectable. This distinctive mental capacity might be significantly different from one person to another, which may explain some people's inherent capability to perform certain telekinetic and telepathic actions. This conception also provides a hypothetical explanation for diverse para-psychological phenomena, that are yet beyond the scope of the current laws of physics.

3.8 Super-Symmetry

With the success of Quantum Field Theory, symmetries played important roles in finding new particles and interactions which were quickly found in experiments. According to the standard model, as it will be described chapter III, particles are arranged in different symmetrical groups which include leptons and quarks, both are fermions with spin-half, in addition to bosons which are spin-one particles. According to the symmetry breaking mechanism, the spin-zero Higgs boson was discovered in 2012, after 40 years of its prediction.

In the Standard Model, all fermion particles are associated with anti-particles which have the same mass but with opposite physical charges, such as the positron which is the anti-electron. Additionally, as we shall explain further in chapter III, the theory of super-symmetry supposes that for every particle, including the anti-particles, there is a super-partner, also with the same mass but different quantum statistics. This idea of super-symmetry was utilized in order to solve the Hierarchy Problem which is related to the huge differences between the strength of the fundamental interactions. Super-symmetry is also a key ingredient for the consistency of Strings Theory. However, all searches for the super-partners returned null results, so if super-symmetry existed it should have been broken severely.

According to the Duality of Time, space is dynamically generated by the combination of two opposite, or conjugate, arrows of time, which is why the Cosmic week is made of seven Days, six for the three dimensions of space and one for the outer level of time. Accordingly, further analysis, that will be described in chapters VI and VII, shows that our physical is (being) formed by the perpetual splitting of one spatial dimension into two parallel worlds that exist on two opposite time directions. The first one is the physical world and its anti-world is our own psychical world which has exactly the same **physical** structure but in the conjugate dimension of time, and they form together the $3D$ flat space of the constant entities, that is a fully spherically symmetrical Euclidean space, without time.

This means that there is no need to introduce any new super-symmetry, because the same present symmetry, between particles and their anti-particles, is enough to solve the hierarchy of the fundamental interactions, because they now act on different levels of time, and also the asymmetry between matter and antimatter is explained, since they originally exist on different axis of time, in addition to solving many major problems in physics, that will be listed in chapter III.

3.9 The Principle of Love

The Duality of Time Theory explains everything in terms of the inner and outer levels of time; starting from the individual dimensions space and their subsequent condensation that develops into all kinds of matter and energy phenomena. The real continuous flow of the inner time creates infinite flat space, which condense into matter when interrupted in the outer level. The creation of the cosmos is therefore like splitting the the infinite, two directional, flat space into two separate, and opposite, dimensions of time, which form a universe and and anti-universe. These two complementary universes are going in parallel and they are intermingled because they have a natural tendency to re-unite again into flat space, and this is the most fundamental cause of motion, that we call the "Principle of Love", from which the principle of steady action will follow. The parallel particles of the Universe are naturally seeking each other and continuously annihilating into their original flat space, and separating back again into opposite times, just like water droplets or waves when they are excited out of the surface of the sea.

All these and other innovative concepts will be discussed in more details in the following chapters, starting from chapter IV, after reviewing the most important concepts in ancient philosophy and modern physics and cosmology, in chapters II and III, respectively.

3.10 Publish or Perish

Although I realized the importance of publishing at early stages of my work on the subject of time, even before I started the Ph.D. at Exeter University, when I published my first book in 1999, but the nature of this interdisciplinary subject was really a big obstacle that prevented adequate publishing in scientific journals. Publishing public books should normally come after the accumulation of important scientific results which should have been published in specialized journals where they may be appreciated and evaluated by other interested scholars, and then may subsequently cause the desired discussion and interaction. The problem in my case was the complete absence of any serious specialized journals which may be interested in such unprecedented mixture between physics and Islamic philosophy.

In fact, right after I published "Ibn Arabi - Time and Cosmology", I prepared an article dedicated on Zeno's paradoxes of motion, but I could not find any journal to publish it. They mostly tend to send a quick rejection right after reading the title, claiming that they are looking for articles on contemporary philosophical problems rather than those historical issues of ancient philosophy that have been already superseded by modern physics! After receiving several such rejections, I started to doubt my findings, and I even stopped working on the subject for several years as I mentioned above.

However, after I obtained more significant and vibrant results with further rigorous mathematical formulation, I decided that I am now ready to publish in physics journals, at least those which are focused on the fundamental or theoretical aspects of gravity and quantum physics. Nevertheless, all specialized journals kept rejecting my articles even after I did several tough revisions and rectifications which removed all the supposedly heuristic arguments.

Unfortunately, it was very clear that some reviewers wrote their quick comments without even reading the article at all. Maybe because most important journals usually receive much more articles than they could publish or even review, but some of these comments were unjustifiably very harsh and even cruel in their criticism. The problem is that most journals take several weeks to reply without giving any useful critical comments, and they request that authors should not send the article to any other journals while they are reviewing it. For example, one of the famous journals, which is specialized in classical and quantum gravity, took two weeks to send the article out for review and then more than six weeks during which the statues was showing "awaiting referee reports", and then after that replied with the following comment:

> The paper is not based on a reliable mathematical foundation. The "split-imaginary", or "hyperbolic" numbers introduced by the author do not have any rigorous mathematical sense. From the physical point of view, the paper does not contain any new and

correct theoretical results and formulas, too.

How can such journals specialized in quantum gravity send their manuscripts to reviewers who have not heard of hyperbolic geometry and split-imaginary numbers! They also tend to appoint managing editors who may not be physicists at all, while the chief editor, usually one of the famous physicists in the field, never looks at most manuscripts, at least in the early stages of the peer review process.

Another journal which is specialized in relativity and gravitation replied:

> I find that the conceptual and technical level of the present submission is substantially below the papers that are accepted for publication in leading international journals in theoretical physics.

So it is very clear from these comments that the reviewers are not ready to look beyond the classical ideas tackled by the current trending research and its treatment of contemporary theories. For example, once they see the word: "monad", they reach a final decision without reading the article, although I gave the sufficient analysis of its physical and philosophical meaning and how it can be compared to black holes or space-time singularities which have absolutely zero volume. I went even further and removed some of the main key concepts because they could not be written in the language physicists can usually understand, but I always get the rejection, even by journals that specialize in the foundations of physics where I got replies such as:

> The author of this manuscript fails to make clear how his/her work relates to current discussions in the foundations of physics.

So if we refuse to seriously discuss any research outside the current discussions in the foundations of physics, how can we ever break out of the current closed loops!

Nevertheless, I decided to go back to the philosophy of physics/science journals, just in case my article is not suitable for any physics journals, but again the article was rejected for other reasons, with polite comments such as:

> While this paper has a number of significant virtues, I am sorry to report that it is not well suited for publication in philosophy of science. ... the project presented here falls outside the scope of what the journal typically publishes and would be better placed in a journal that publishes theoretical physics.

Along that, of course, there were many such polite apologies and useful comments which helped me cultivate the article, but I reached the conclusion that scientific journals are not prepared to review innovative ideas, because they have to go through the reviewers who are mostly specialized in some current narrow fields of modern theories, and they are necessarily not familiar with the alleged new conceptions and their profound philosophical background. At the same time, there are very few serious reviewers who are ready to spend enough time on revolutionary articles in order to realize their strong points, so they tend to search for the weak points and amplify them to justify their decisions, when they do, and of course the new revolutionary theories are not born mature. Yet if these new concepts were already part of modern theories, they would have been discovered long ago, and the same if they were pretty straightforward.

Although their decision was the same typical quick rejection, one of the best comments that I received from one of the first class journals in theoretical physics says:

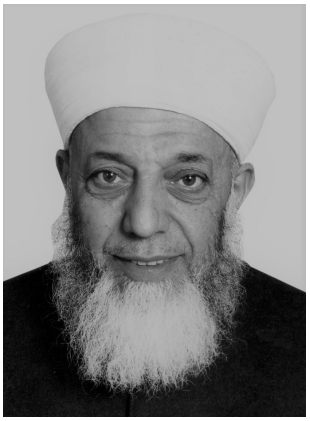
> The author has introduced a new concept: "duality of time", using a complex time number plane, and has made effort to resolve many physics problems including: derivation of Lorentz symmetry, the equivalence principle, and a solution of the cosmological constant problem. Though new principles and ideas have been introduced, the essential number of problems solved by doing that does not decrease at all. ... and this just transforms the question into another question without decreasing the number of questions to be resolved.

Well this seems to be encouraging, but is it not enough that there is a new concept, and that this concept does solve many persisting problems? The reviewer did not refute the new solutions, which requires more serious reviewing to tell if it is faulty or flawed, and even if it is correct that the essential number of problems does not decrease, it means that this new idea provides an alternative way of thinking that solves some old persisting problems, and now we have to think of others even if they are new problems caused by this same innovative idea.

Nevertheless, rather than discouraging me,

these negative and disappointing comments gave me more reasons to write this book, which was already planned, but now, in the process of this writing, even more important results started to develop very quickly, which may not have been possible if publishing was any smooth process.

Author Biography



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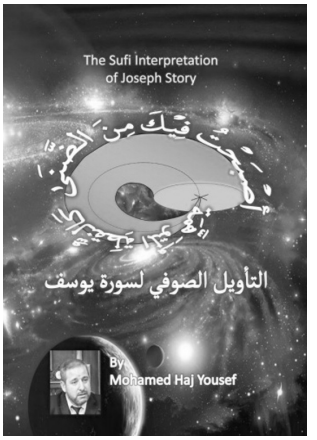
Mohamed Haj Yousef is a writer and researcher interested in physics, cosmology, philosophy and Islamic thought, especially with regard to mysticism and Ibn al-Arabi. He did his undergraduate studies in Syria where he earned the B.Sc. degree in Solid State Physics from the University of Aleppo in 1989 and a Postgraduate Diploma in Electronics from the same university in 1990. After that, he obtained the Master's degree in Microelectronic Engineering and Semiconductor Physics from the University of Cambridge in the UK in 1992. After a period of teaching, he resumed to get the PhD from the University of Exeter in UK in the year 2005, where he studied the concept of time in Ibn al-Arabi's cosmology and its implications on modern physics, which was published in several books and eventually lead to the Duality of Time Theory. This research was supervised by Prof. James W. Morris, as it is continuously inspired by the spiritual guidance of Sheikh Ramadhan Subhi Deeb, the Naqshbandi master at Sheikh Ahmad Kuftaro Foundation in Damascus.

The author has also published numerous articles in Arabic and English that combines science, philosophy and Islamic thought. Most of these articles are accessible online at: http://www.ibnalarabi.com. He also published several books on the subject of time, and

other related subjects in Islamic thought and Sufi mysticism, including:



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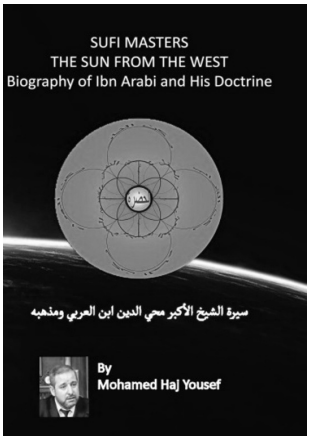

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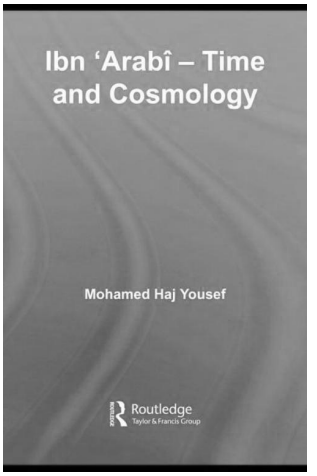

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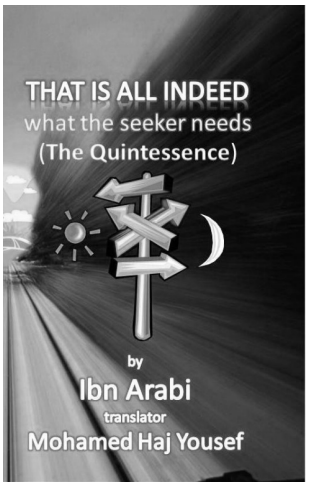

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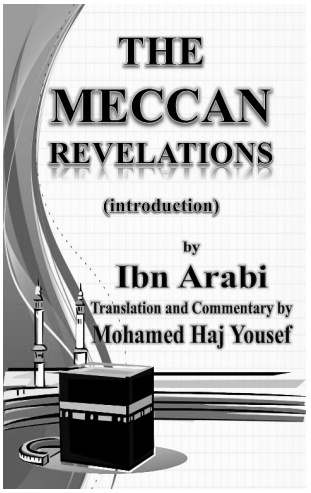

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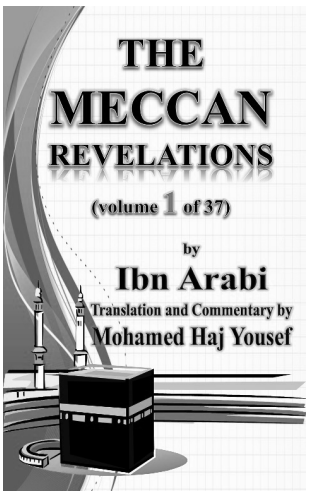

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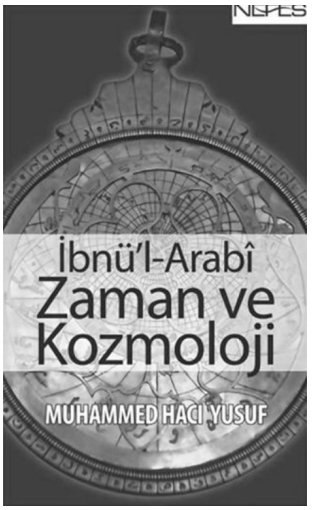

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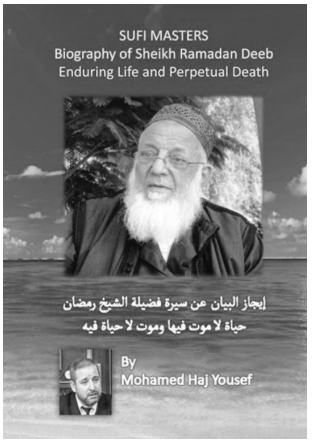

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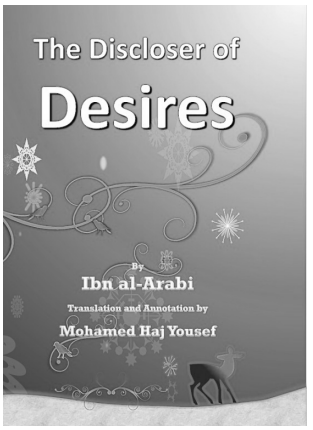

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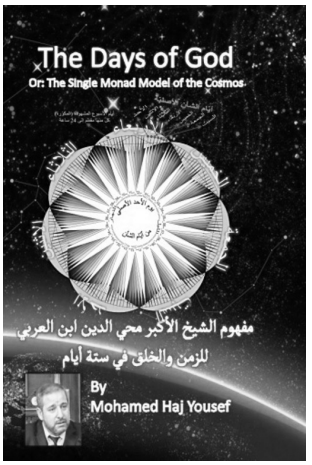

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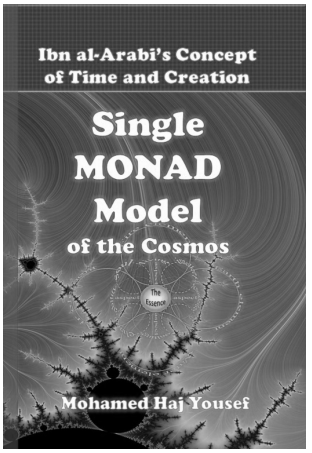

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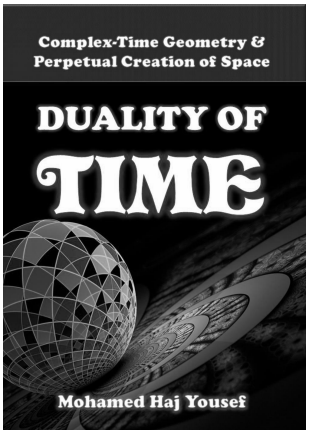

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