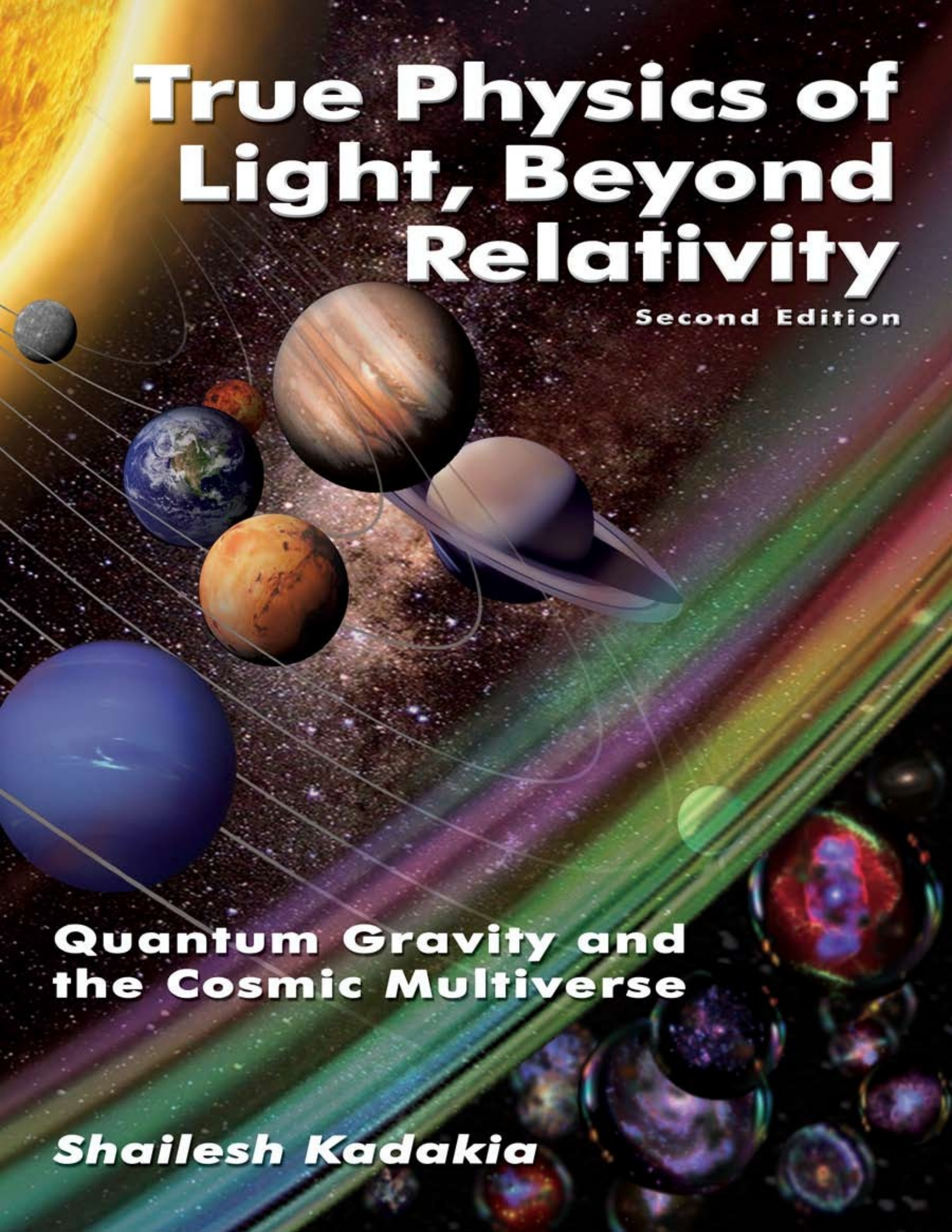
True Physics of Light, Beyond Relativity

Second Edition



Quantum Gravity and the Cosmic Multiverse

Shailesh Kadakia

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Shailesh (Sky) Kadakia

With 75 illustrations of which 74 are in Color

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Shailesh R. Kadakia, MSEE, 602 Suburban Court, Apt. 3, Rochester, NY 14620 USA

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Dedication

To my daughters

Sheryl S. Kadakia and Crystal S. Kadakia

Thank you for continued support and encouragement

Shailesh Kadakia

Preface

Light is one of the most perceptible, abundant, and essential sources of energy and yet is also, the most misinterpreted entity. It is known to have no material mass yet has revealed visible and physical characteristics of mass through several physical phenomena, such as photoelectron emissions, scattering of X-rays in the Compton's effect and others. The misunderstanding of the strange behavior of light energy waves led many physicists of the past including profound physicist Albert Einstein to formulate a principle that light behaves both as a wave and as a particle. This book intuitively penetrates the overall understanding of light behavior, drawing upon research of many brilliant physicists of the past and present together to support the theory that light only behaves as a wave. We arrived at the premise after many hours of discussion with many colleagues and fellow enthusiasts on the issue.

To determine the elusive truth about the behavior of light, we passionately studied the competing theories on the strange behavior of light, Quantum Electrodynamics (QED) from Richard Feynman which favored wave nature of light. While we were putting all the loose pieces together in search of the true nature of light, we struck with an idea that light photon particle defined by Einstein does not have the key characteristics of a particle, a center of gravity. Therefore photons, light particles described by Einstein in the past, must be of a different kind. We decided to probe the issue further and realized that light photon particles are hypothetical and should be classified as virtual particles. Thus, in this text book we decided to refer light and radiation energy waves as, a conspicuous source of energy, Planck's quantum waves.

Another source of energy is the force of gravity whose cause is not known to date. In this expanded second edition, we have attempted to analyze the root causes of the force of gravity among different celestial objects in the Universe by describing the bizarre force utilizing the effect of gravitational entanglement. Another puzzling question is: At what speed does the force of gravity propagate? Profound physicist Albert Einstein had suggested that in vacuum, the propagation speed of gravity is the same as the speed of light waves. According to the postulates of the special theory of relativity (STR) from Einstein, the speed of light in a vacuum is constant **c** and does not vary in different inertial systems. From our perspective, the speed of light is no longer constant in accordance with the **Skylativity**® theory developed by us and varies obeying Galileo transformations among inertial and accelerating frames of reference. Our criterion for the propagation speed of light is harmonious with the varying speed of light (VSL) theory proposed by the Portuguese physicist, João Magueijo, a research fellow in theoretical physics at Cambridge University. Therefore, the answer to the question, at what speed does the force of gravity among different objects propagate is still an enigma for modern time physicists and should be an active area of research.

The main intention of this book is to correct the basic understanding of the fundamental ideas regarding the nature of light, the special theory of relativity, and the general theory of relativity (GTR). The book is written for the sophomore class physics students as well as

experienced physicists. The reader of this book is assumed to know the basic facts of atomic and nuclear physics and to have been exposed to the basic principles of elementary math from freshman class. Since our emphasis is on improving the conceptual understanding of physics, and not to understand mathematical rigors, we have discussed analytical expressions with simplicity. Another purpose of this book is to determine an ideal theory of everything, unifying all forces of nature and their interactions among different objects in the Universe encompassing huge celestial objects, galaxies, super nova, and nebulae as well as the tiniest fundamental particles, quarks, fermions and even strings of string theory. We intend to utilize the concepts of the **Skylativity**® theory and the techniques developed by integrating effects of gravity into quantum arena, to marry classical mechanics with quantum mechanics, and create a universal unified field theory (UUFT) of everything.

The content of this newer edition is organized as follows:

The central point of Chapter 1 is to prove that light strictly behaves as a wave. Light particles photons identified by Einstein and his collaborators are hypothetical virtual particles. In this chapter we investigate details of several experiments performed to prove particle nature of light. Further we analyze results of tests performed to measure bending of light. We compared bending of light by phenomena of natural refraction vs. effect of gravitation. In this chapter, we successfully establish that some of the ideals proposed by Einstein, and subsequently promoted by Lorentz and others required further analysis.

The gist of Chapter 2 is to distinguish differences between the physical properties of real particles and energy waves. We showed that light and radiation waves originate as a result of oscillations of bound electrons in atom's orbits. The electromagnetic radiations occur as a result of oscillations of free mobile charge carriers electrons and holes in electric circuits. Therefore we re-examined Maxwell's theory of electromagnetic radiation model of light waves. We developed a new model for light waves based on Max Planck's theory of radiation. Then we scrutinize validity of Einstein's famous mass to energy transformation relation $\mathbf{E = M \times c^2}$. We inferred that the energy released during a nuclear explosion event is from the liberation of the binding energy. We ended the chapter by presenting corrected model for determining the temperature inside the core of the Sun.

The main purpose of Chapter 3 is to familiarize and refresh reader's perspective on the basic concepts of the general and special theories of relativity, first introduced by Einstein in Mid 1920's. Next, we introduced postulates of the special and general **Skylativity**® theories invented by us. Then, we assess the effects of varying speed of light and concepts of **Skylativity**® theory on Maxwell's field equations and on the solution of Einstein's field equation.

In Chapter 4, we explore the limitations of Einstein's general and special theories of relativity, when applied to the measurement of length, time, and mass. We introduced novel concepts of complex mass and complex dimensions for length and time measurements based

on the principles of quantum theory and the perturbation theory. Next we critically analyzed the three tests performed to validate principles of GTR from Einstein. We conclude that the results of the tests did not provide adequate proof to support his theory completely. The theory of relativity from Einstein worked well for predicting the trajectory of vast celestial objects but did not describe behavior of light waves and very small size particles of quantum geometries accurately. To honor his efforts, we developed a special theorem Uniqueness of gravitation and proved the theorem.

The main point of Chapter 5 is to explicate why Lorentz transformations were necessary in Einstein's theory of relativity. Einstein utilized the transformations to determine length of rods and time delays in different inertial systems. To investigate the effect of the variable speed of light on the length and the time measurement, we re-derived the Lorentz transformation equations. We analyze the values of length and time measurements for two different scenarios, the approaching systems and the receding systems. In the infinite Universe, these two scenarios play more crucial role in the space coordinate transformations than the linear motion in the X, Y and Z directions of systems.

The focus of Chapter 6, is to highlight the benefits derived when the new postulates of the **Skylativity**® theory are applied to astronomy and space science projects of the future. We discuss issues which are critical to conduct space missions involving travel speed near the speed of light and the design considerations for developing next generation spacecrafts. Next we elucidate alpha, beta and gamma decay processes. Our goal is to show that no mass is consumed and transformed into energy in these processes. We ended the chapter by discussing an interesting note on the birth of precious diamonds in planet's ore.

The central idea of Chapter 7 is to develop the universal unified field theory (UUFT) that assimilates the effect of gravity from macroscopic objects, celestial stars, galaxies, and nebulae, with the strong colour charge forces in the standard model which deals with microscopic particles quarks. We discovered that the tidal forces from the Moon on the Earth have a very detrimental effect on the weather forecast. We suggested procedure to increase the accuracy of the weather prediction by improving the forecast simulation model.

In Chapter 8, our focus is the black holes and the origin of the Universe. First we described varieties of black holes discovered in the Universe and their characteristics. Many scientists have claimed that black holes are massive with a super gravitational field in which light is trapped. We present a new school of thought that light does not escape from black holes because it is absorbed and provided a formal proof of our theory. Next, we look at details on life cycle of the Universe, birth of the Solar systems and evolution of living organisms on the planet Earth. Thereafter we provide answer to interesting astronomical questions why some planets rotates east to west on their orbits and why the orbits of comets are oblong.

The gist of Chapter 9 is to bridge the gap between the classical Newtonian mechanics and the quantum mechanics. To achieve our objective, we succinctly described the concepts of black body radiation from Max Planck, quantum ideas introduced by Erwin Schrödinger, ideas of

Quantum Electrodynamics from Paul Dirac and integration of gravity at quantum scales, an idea invented by us. Proponents of quantum theory and Schrödinger suggested that quantum particles escape through nucleus of atoms on the basis of tunneling mechanisms. We provided an interesting but unheard of mechanism of leaks in quantum potential wells as a source of escaping trapped radiation and particles from nucleus. Finally in this chapter we discussed the history and details of the mysterious phenomenon of quantum entanglement. We unfolded the mystery of quantum entanglement with an interesting twist.

The subject matter of the final chapter is to understand properties of quarks the fundamental constituents of the smallest stable particles hadrons and rules of engagement among quarks. Another objective is to develop a cogent explanation for the origin of matter creation in the Universe. We concisely and accurately specified the rules of quark interaction to form heavier particles than quarks. The rules are based on the principle of symmetry in quantum interactions. To gain the knowledge of how matter is created in the Universe, it is imperative that one must learn energy to mass translation processes. Drell Yan Annihilation (DYA) is a prime example of a process in which energy from vacuum is extracted from space to materialize into mass via quark fragmentation and lepton annihilation process. We shed light on DYA process and explained its role in birth of hydrogen in the Universe after Big Bang. At last, we discussed identifiable characteristics of cosmic Multiverse because physicists and students always wish to learn where the physical Universe and the spiritual Universe intersect. We end the chapter with future of physics and final thoughts for your glory.

After reading this book you will realize that we have attempted to answer many difficult questions by applying logic that contradicts conventional thinking but we found explanation the most satisfying and we hope you feel the same. Further information and details about the topics discussed in this book is available on the web site.

http://www.Matrixwriters.com.

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Munawar Karim
St. John Fisher College

Meet Kadakia, Student of Medicine
KEM Hospital, Mumbai

Lyndon Taylor
The University of Texas

Kirit Dharia
Cousin Brother

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Ingo Leubner, RPCN
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Prologue

This book is about the true science of light and what Einstein missed. For centuries physicists had delusions regarding the exact nature of light as it related to different events, either occurring naturally or created by human efforts. They portrayed a sense that light behaves as waves in certain events and occasionally it behaves as particles. This ambiguous description of light pondered pioneer physicist Albert Einstein and led to formulation of complex concepts of special theory of relativity (STR) and general theory of relativity (GTR). Subsequently, renowned physicists, such as John Wheeler, Charles Misner and Kip Thorne, extended Einstein's principles to explicate the mysteries surrounding distant celestial vast objects, black holes. In their discussions, they and physicist Stephen Hawking have inadvertently stated that black holes have super gravitational fields. From our point of view, black holes absorb light and not trap because they are not super dense as elucidated in Chapter 8. In past several experiments were performed to prove particle nature of light. If results of all the experiments were examined closely and were interpreted correctly, they will prove that light is indeed a wave. This book aims to review many of these experiments critically to aid a new interpretation for the behavior of light.

In this enlarged second edition, we have identified inadequacies of Einstein's theory of relativity which did not explore the motion of light in accelerating frames. His incorrect application of GTR principles to propagation of light and radiation waves led to the development of complicated Lorentz transformations and introduced a curvature in spacetime. Through a decade of research in this new millennium, Mr. Kadakia has postulated the principles of the **Skylativity®** theory which provide a simplistic view for several phenomena of complex nature such as the bending of light as it passes nearby a star and the time dilation effect observed by atomic clocks situated at different altitudes in flying aircrafts. The ideas in this text book extend the Varying Speed of Light (VSL) theory proposed by the Portuguese physicist, João Magueijo, a research fellow in theoretical physics at Cambridge University.

Our intention is that after reviewing this book, you will gain a precise understanding of the events related to propagation of light by applying the basic principles of atomic physics described here consistent with Quantum Electrodynamics theory (QED) developed by Richard Feynman. We have achieved a great degree of success by taking advantage of the modern techniques and advances made by particle physicists. We have provided answers to many questions about the creation of the solar systems and the Universe that were not answered by previous creation theories, such as the Big Bang. In this new edition, we have included discussion on special topics such as accurate weather forecasting, complex dimensions, mass to energy transformation mechanisms, mystery of entanglement phenomenon, unidentified Multiverse, quark structure of atoms and many more.

The principles of **Skylativity®** were developed from a common sense approach to expound phenomena of complex nature simplifying several computations thereby ultimately

facilitating the journey to the stars in the Universe. It is anticipated that application of **Skylativity**® theory to stellar computations will provide a closer match between the experimental data and the theory than in the past. The new theory leads us to the formulation of the Universal Unified Field Theory (UUFT) unifying all four types of forces observed in nature. Another distinguished characteristics of UUFT is it enables specifying invariant scales of time, length and mass measures for any frame of reference, mobile and stationary without the use of Lorentz transformations.

After studying this book you will realize that Einstein took a risk when he formulated his famous theory and relied on unrealistic assumptions. He stated that time measured in different inertial systems by identical clocks will exhibit time dilation (slow clock time), he ignored the fact that the clocks ceased to remain identical in design, when stationed in each of the inertial systems. Further, he assumed that the speed of light is a constant in James Maxwell's field equations. More recent advances in technology have verified that the speed of light has varied since the beginning of time and it varies according to the frame of reference, obeying the laws of Galileo transformation. We make a final point that light behavior is straight forward and can be very accurately characterized as a wave, regardless of the type of event. Our sense of accomplishment and quest will be complete when dedicated physicists and astronomers apply the ideas of this book and redirect their resources to build a solid foundation for the future space expeditions.

To the Student

In my experience, learning about physics can be an enjoyable experience, especially if you become involved. Often students are frightened by the list of equations and the formulae appearing in the most books of physics. We have done every effort to eliminate the fear of students and to encourage them to study this fascinating branch of science by avoiding detailed steps in the derivation of formulae. At the same time we have included enough relevant information so that bright students can easily find the trail. We offer you a word of caution for retrieving information on the internet about the subject matter of this book. Please be careful on the time you spend on the internet and manage your time wisely. There is so much material out there that it is very easy to lose track.

I would like to give a brief explanation on the cover of this book. It shows a view of our Sun and the planets of solar systems. The rainbow colored perimeter on the solar systems and other galaxies signify gravitational interaction among different celestial objects. Because the nature and the cause of gravity is not fully understood yet, it gives a fuzzy appearance. You are open to your own imagination for the interpretation of the picture. And remember, all of the information in this book is also available in electronic media. A friendly advice, the time never comes back and money does not grow on trees so spend both wisely. Thank you for buying this book and wish you the best in your physics studies, a remarkable adventure of your life. Feel free to write a blog and communicate with us on any social media Facebook, Twitter and E-mail via website at http://www.Matrixwriters.com