

Relativity and Quantum Mechanics without Hypothesis and Origin of Gravitation

Chen Shaoguang

$$f^{\text{QFT}} = f^{\text{GR}} = f = \frac{\delta(m\mathbf{v})}{\delta t} = f_p + f_c$$

$$f_p = m \frac{\delta \mathbf{v}}{\delta t} = -G \frac{mM}{r^2} \frac{\mathbf{r}}{r}$$

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Preface

Relativity and Quantum Mechanics are two foundations of the modern physics, the required course for undergraduates majoring in physics. They have exerted a great and far-reaching influence on physics, astrophysics, spatial science, philosophy and social science, and an even more far-reaching influence on the twenty-one century's natural science and social science.

For the passed century the controversy about the essence of "Relativity and Quantum Mechanics" had never been interrupted. Besides the causation of the difference of people's understandings, another never neglected causation is the expressive disfigurement of itself: based on the hypothetical principles, at the start they peeled off the experimental facts, but used the elusory coordinate transformation (such as time expanding, space shrink, space bend) and the nonobjective probability-operator to discuss the problem.

The author of this book is an experimental physical scientist, he tries to understand "Relativity and Quantum Mechanics" from the measuring course of dimensional quantity (length and time of physical basis). To measure the length and time we must have the length unit **meter** and time unit **second** which come from their international

definition. The author, just according to the international definition about meter and second, ultimately established the **Relativity and Quantum Mechanics** without the **special and general relativity principle**, the **invariance of velocity of light principle**, the **equivalence principle** and the **uncertainty principle**. Thereby, Relativity and Quantum Mechanics will be entirely set up on the foundation of metrical results, and no longer have any assumptive component. These two theories will completely become the experimental results.

In this book the long-term problem of the origin of gravitation is solved, at the same time, the long-term problem of the origin of the basal geo-electric field and basal geomagnetic field is solved, too.

It is an interesting joyment to read this book, just like reading a novel of discovery. Along with the auctorial thought-route, one first will amazedly find; the born recognized immeasurable one-way velocity of light becomes measurable by an ingenious experimental method; and again find; the born general relativity (GR) and the quantum field theory (QFT) recognize each other's independent, yet the equation of GR is deduced from the weak action of QFT by an analogic inference process of Casimir effect, it makes the describing discontinuous matter kinetic QFT and describing continuous matter kinetic GR wondrously and simply unified.

The power of attraction of this book also is due to; the great unification of the known four kind forces in nature, cosmology, microwave background radiation, Hubble redshift, black hole, gravitational wave, dark matter, dark energy, un-modeled anomalous acceleration

of Pioneer 10/11 and the advance of Lense-Thirring effect detected by GP-B etc gave their original opinions. These opinions in this book, at first view, appear rebel against the orthodoxy, but by carefully checking, one will discover that these opinions are completely the necessary inference from the strict solution of GR and QFT.

In this book, the relativity and the quantum mechanics are newly founded only with the experimental results and the international definition about **meter** and **second**. Thereby, its content is straight-sight and lifelikeness which may be easily understood by the readers with the knowledge of senior high school. This book will lead us into a simple and clear physical world.

Prof. Jiang Bangben

In Peking University at 4 May 2009

Introduction

The change in science research from qualitative description to quantitative description makes the physics separate out from the philosophy. The philosophical time, space and matter are a kind of abstract, general, unspecific concept which need not to be measured, but the physical time, space and matter are the concrete, measurable quantities which must have the metrical unit and operable method, concretely speaking, the physical matter needs to be described with mass showed by a numeral and a unit **kilogram**, the physical time needs to be described by a numeral and a unit **second**, the physical space needs to be described by a unit **meter** and three numerals of three-dimensional values: they are length, breadth, height. The physical time, space and mass are essentially a kind of tool to measure other various physical quantities with a definitional unit such as second, hour, meter, centimeter, feet, gram and kilogram etc. , which possess the subjectivity and the multiformity. But the philosophical time, space and matter are objective and exclusive. That is the distinct boundary between the philosophy and the physics.

Mass, length and time, these three physical quantities constitute the whole other physical quantities and are called as the basic dimen-

sional quantities. The space and time of the physical quantity are separated out from the philosophy. Besides possessing the measurable characteristic, the other important characteristic is that it to be described by the mathematical coordinates. And according to the mathematical rule it can be transformed and carried through the operation of adding and subtracting etc.. Generally speaking, Galileo time/space transformation coordinates and Lorentz time-space transformation coordinates, which make the physics and the mathematics look like the cheek by jowl connected together. As a rule, the physical law is always showed by mathematical language, in which the depiction of mathematical equation is most precise, most simple and most direct. For physics the fundamentality of mathematics is self-evident, but the physics is essentially a metrical science to research the relationship among physical quantities and to discover the rule of movement of matter by the measurement. For physical research the hypothetic principle and mathematical symmetric relation are helpful, but ultimately confirm the physical law only by the experimental measurement. The mathematical space is a quantity that needs not to be measured. The boundary between physics and mathematics cannot be erased, no less than the boundary between physics and philosophy cannot be erased.

In this book the philosophical time and space which contain everything and the universal relationship between the movement of matter and the time, space (such as Mach's principle) will not be discussed, only a measurable time and space in physics and the measur-

able idiographic relationship between the movement of matter and the time/space will be discussed from the observational and experimental results.

In the 17th century, from the definition of units of time, length and mass, scientists had already established Galilean coordinates which are used to measure the physical quantities, such as velocity and acceleration etc. , and from the observational and experimental results about the movement of ethereal and telluric matter with mass they had established Newtonian mechanics. In the 18th century the classical(ether) wavy optics had been established. The acoustical and optical Doppler-Fizeau effect had been discovered via many observations and experiments in the period from 1842 to 1848.

In this book, with the aforementioned knowledge before Maxwell's theory of the electromagnetic radiation of light was published in 1860, the relativity and the quantum mechanics are founded on the metrical time/space of Galilean original idea in which has no any man-made restriction such as Galilean invariance or Lorentz invariance; First, the method of the direct measure of one-way velocity of light is to be proposed and discussed, and to unite the measurement of Doppler-Fizeau effect a new relativity and a new quantum mechanics are to be established without any hypothesis. Then the combination of relativity and quantum mechanics constitutes a quantum field theory(QFT) without any hypothesis. Again from the QFT a new gravitational formula will be deduced by an analogical deductive method of Casimir force. This new gravitational formula of quasi-Ca-

simir pressure can just also be deduced from general relativity (GR). The constant Θ of quasi-Casimir pressure calculated from the Weinberg-Salam electroweak theory has the same order of magnitude as the experimental gravitational constant G . The gravitational constant G in Newtonian mechanics and GR has no the theoretical value and can only take the experimental value, when the quasi-Casimir pressure constant Θ also takes the experimental value, then $\Theta \equiv G$, the gravitation just comes from the polarization effect in Dirac vacuum fluctuation and the gravitational theory will be merged into Glashow-Weinberg-Salam electroweak theory to come true grand unification of gravitation and strong, weak, electromagnetic interactions in the standard model of $U(1) \times SU(2) \times SU(3)$:

$$f^{\text{QFT}} = f^{\text{GR}} = f$$

$$f \equiv \frac{\delta(m\mathbf{v})}{\delta t} = f_p + f_c$$

$$f_p = m \frac{\delta \mathbf{v}}{\delta t} = -G \frac{mM}{r^2} \frac{\mathbf{r}}{r}$$

$$f_c = \mathbf{v} \frac{\delta m}{\delta t} = -G \frac{m}{r^2} \frac{M}{c} \frac{\mathbf{v}}{c}$$

In nether chapters, the primary inferences of the new gravitational formula such as the gravitational quantum effect, the origin of the basal geo-electric field and basal geomagnetic field, the gravitational velocity depending, the gravitational nonlinear effect (shielding effect), the gravitational redshift on the way and the true universe etc. will be discussed.

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