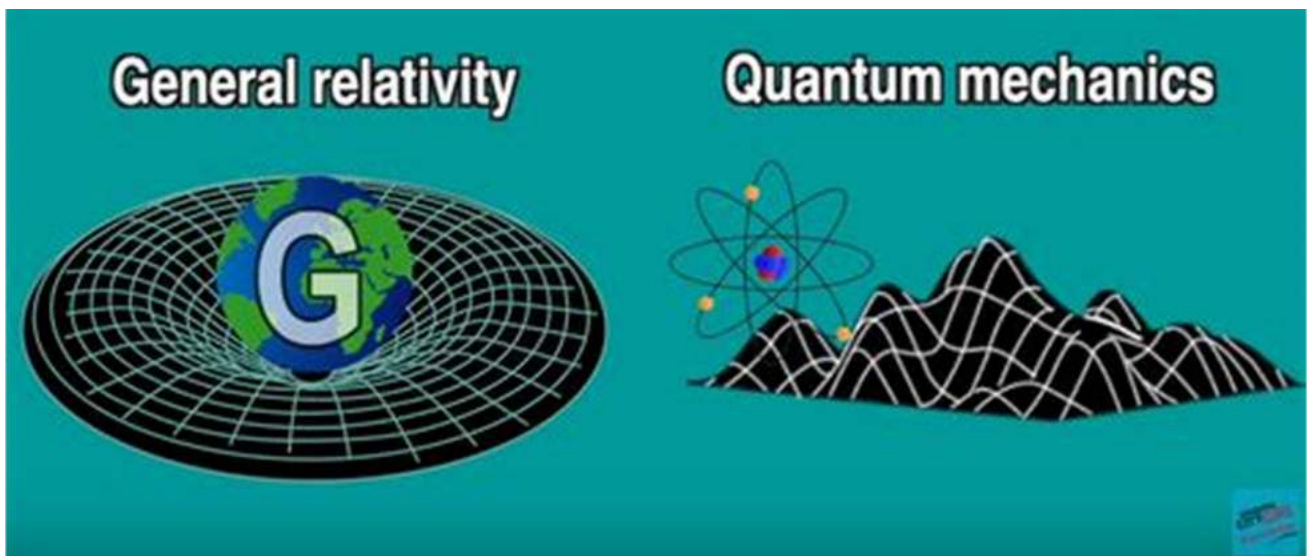


# Unraveling the Secrets: Unification of Quantum Mechanics and General Relativity and the Four Fundamentals

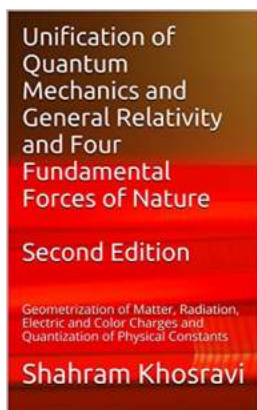
**The Quest for the Ultimate Theory: Merging the Microscopic and Macroscopic**



The realms of quantum mechanics and general relativity have long stood as the cornerstones of modern physics, delving into the depths of the microscopic and macroscopic worlds respectively. While these two theories have been highly successful in their respective domains, scientists have been tirelessly working towards their unification to develop a Theory of Everything (ToE). This article explores the fascinating journey towards harmonizing quantum mechanics and general relativity, and delves into the four fundamental forces that govern the universe.

## The Quantum Quandary

Quantum mechanics, the theory that explains the behavior of particles at the smallest levels, portrays a world filled with uncertainty, probability, and wave-particle duality. Although it has accurately described a vast range of phenomena, it seems to be incompatible with general relativity, the theory of gravity that elegantly explains the macroscopic world. This disparity has perplexed scientists for decades, sparking numerous attempts to reconcile the two theories.



### Unification of Quantum Mechanics and General Relativity and Four Fundamental Forces of Nature: Geometrization of Matter, Radiation, Electric and Color Charges and Quantization of Physical Constants by Shahram Khosravi ([Print Replica] Kindle Edition)

★★★★☆ 4.2 out of 5

Language : English  
File size : 3372 KB  
Screen Reader : Supported  
Print length : 240 pages  
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Paperback : 393 pages  
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Dimensions : 6.69 x 1.13 x 9.61 inches  
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## General Relativity: The Fabric of Spacetime

General relativity, formulated by Albert Einstein, provides a geometric description of gravity, where masses curve the fabric of spacetime. It successfully explains the motion of celestial bodies, the bending of light by massive objects, and the

existence of black holes. However, at extremely tiny scales where quantum effects dominate, general relativity's classical picture breaks down, calling for a more encompassing theory.

## **The Four Fundamental Forces**

In this cosmic puzzle of unification, we must first understand the nature of the four fundamental forces that govern the universe: gravity, electromagnetism, and the strong and weak nuclear forces. Gravity, the weakest but most familiar force, governs the motion of celestial bodies and the shape of the universe.

Electromagnetism, on the other hand, governs the behavior of electrically charged particles and underlies the functioning of our everyday gadgets. The strong nuclear force binds atomic nuclei together, while the weak nuclear force is responsible for certain types of radioactive decay. These forces govern the interactions between matter and energy, and unraveling their interplay is crucial to achieving a unified theory.

## **String Theory and Beyond**

One of the leading contenders for reconciling quantum mechanics and general relativity is string theory, which suggests that particles are not point-like entities, but rather tiny, vibrating strings. These strings oscillate at different frequencies, resulting in the diverse particles we observe. String theory also introduces extra dimensions beyond the usual four (three spatial and one temporal) that are fundamental to understanding the intricacies of the quantum realm and gravity. While promising, string theory is yet to produce predictions that can be experimentally verified.

## **Quantum Gravity: The Nexus of Unification**

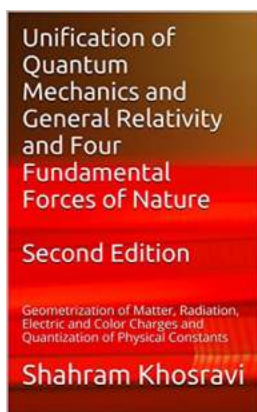
The unification of quantum mechanics and general relativity ultimately seeks to establish a quantum theory of gravity, known as quantum gravity. This elusive

theory aims to describe the behavior of spacetime itself on a quantum scale. While various approaches have been pursued, such as loop quantum gravity and cosmic strings, a complete and mathematically consistent theory of quantum gravity remains one of the biggest challenges in theoretical physics.

## The Long Road Ahead

As scientists unravel the mysteries of the universe and strive to unify quantum mechanics and general relativity, we are reminded of the vast expanse of our knowledge and the gaps yet to be filled. Nevertheless, the pursuit of a theory that encompasses all aspects of the universe continues to captivate our minds and could potentially revolutionize our understanding of the cosmos.

The unification of quantum mechanics and general relativity is an ongoing scientific endeavor that aims to merge the microscopic and macroscopic worlds, paving the way for a complete theory of the universe. While progress has been made, challenges remain, and elusive concepts such as quantum gravity and extra dimensions continue to intrigue and perplex physicists. As we continue to explore the boundaries of our knowledge, our quest for unification remains an ever-engrossing journey into the unknown.



## Unification of Quantum Mechanics and General Relativity and Four Fundamental Forces of Nature: Geometrization of Matter, Radiation, Electric and Color Charges and Quantization of Physical

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This article presents a new approach to unify Quantum Mechanics and General Relativity and the four fundamental forces of nature and to the physics of the dark matter and dark energy and a new resolution of the black hole information paradox. The author can be reached at [shahramkhosravi6@yahoo.com](mailto:shahramkhosravi6@yahoo.com).

There is a background of matter/radiation/electric charge/color charge and geometry on which both quantum mechanics and general relativity rely. Quantum mechanics focuses on measuring the state functions of this background matter (e.g. in the form of a particle such as an electron), radiation, electric charge, and color charge within this background geometry. General relativity on the other hand focuses on measuring the curvatures that this background matter (e.g. in the form of a cosmological object such as a star), radiation, and electric charge causes within this background geometry.

An important key step towards the unification of quantum mechanics and general relativity is to redefine the relationship between matter/radiation/electric charge/color charge and geometry. I'll introduce a new notion of spacetime matter radiation charge where matter, radiation, electric charge, and color charge are baked into geometry itself as new geometrical dimensions.

State functions are no longer the state functions of locations of matter, radiation, electric charge, and color charge within background spacetime geometry. They

are instead the state functions of space, time, matter, radiation, electric charge, and color charge themselves.

I'll show that these geometrical state functions manifest themselves in the form of geometrical stress tensor components that cause curvatures in spacetime matter radiation charge.

I'll then quantize physical constants where each physical constant quantum is associated with a specific value of a physical constant quantum number. Each portion of geometry can be in any of these possible physical constant quantum states. The portions of geometry with the same physical constant quantum state constitute universes of their own. The Universe is structurally multi-universe where all its constituent universes share the same geometry.

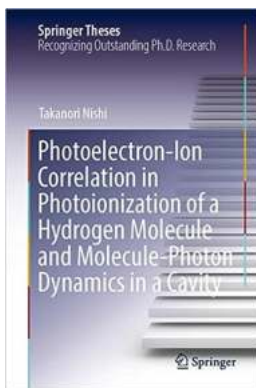
I'll then present my new quantum and general relativity field equations that together unify quantum mechanics and general relativity and the four fundamental forces of nature.

My approach to quantum gravity shows that the matter, radiation, electric charge, and color charge content of the Universe is composed of not only ordinary matter, radiation, electric charge, and color charge that portions of the spacetime matter radiation charge with the zero value of physical constant quantum number contribute but also non-ordinary matter, radiation, electric charge, and color charge that portions of the spacetime matter radiation charge with non-zero values of physical constant quantum number contribute. I propose that these non-ordinary matter, radiation, electric charge, and color charge contributions constitute what is known as the dark matter and dark energy. My approach to quantum gravity provides a new approach to the physics of the dark matter and dark energy.

I'll show the classical limit at which my new quantum and general relativity field equations recover the classical Schrodinger and general relativity field equations and use my approach to quantum gravity to derive Hawking entropy and temperature, to add higher order corrections to them, and to extend them to non-black hole spacetimematterradiationcharge regions as well as black holes.

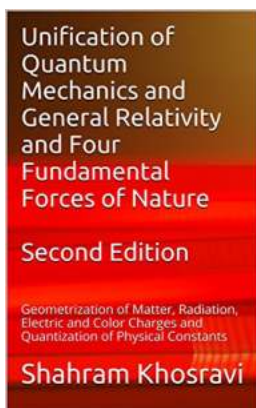
I'll use actual cosmological data and a simple model to derive the physical constants associated with the physical constant quantum number one and show that they are different from ordinary physical constants.

I'll also provide quantum mechanism for the main characteristics of black holes and show how my new approach to quantum gravity resolves the black hole information paradox.



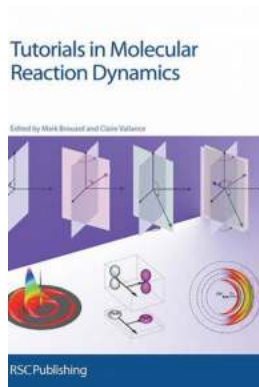
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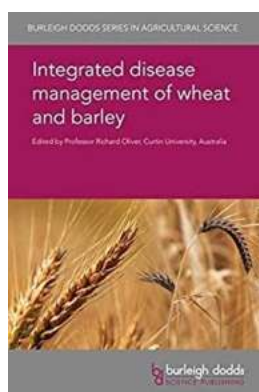
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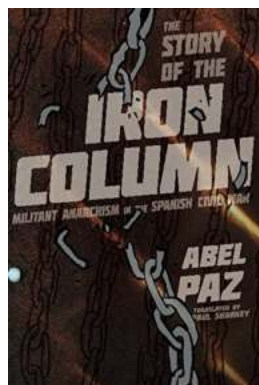
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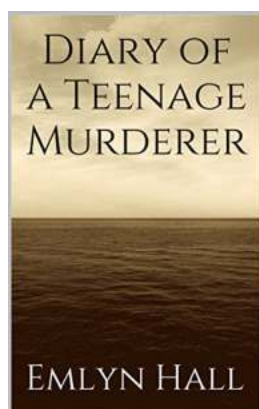
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