# Classical, QM, GR, transient to GR, QM, Classical

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**Abstract**

This paper presents a structured exploration of the multidimensional interplay between string theory, quantum mechanics, and general relativity. The journey transitions through spatial and temporal dimensions, examining the hierarchical structure of matter from atoms to qubits, and delves into the complexities of spacetime curvature. Our approach integrates the principles of modern physics to provide a coherent narrative from the macroscopic world to the quantum realm and back, enriched by the interplay of space and time.

## Introduction

The study of the universe encompasses a range of scales and dimensions, from the macroscopic world described by classical mechanics to the subatomic realm governed by quantum mechanics and the curvature of spacetime articulated by general relativity. This paper presents a seven-part exploration that integrates these perspectives, providing a comprehensive framework that bridges the gaps between different physical theories.

## Lemma 1: Three Spatial Dimensions

Let $\mathcal{U}$ be a universe characterized by three spatial dimensions. Each point in $\mathcal{U}$ is defined by a triplet $(x, y, z)$, where $x, y, z \in \mathbb{R}$. This forms the familiar macroscopic space in which classical mechanics operates.

## Lemma 2: Spatial to Temporal Transection (Entry Point)

There exists a transection point $T_{\text{entry}}$ where the universe $\mathcal{U}$ transitions from purely spatial dimensions $(x, y, z)$ to include a temporal dimension $t$. At $T_{\text{entry}}$, spacetime is described by the coordinates $(x, y, z, t)$, marking the entry into a four-dimensional continuum.

## Lemma 3: Forking into String Theory Quantum Mechanics

Within the spacetime framework, matter reveals its hierarchical structure:

- **Atoms**: Defined as $(p, n, e)$, where $p$ (protons) and $n$ (neutrons) are composed of quarks, and $e$ are electrons.
- **Quarks**: Denoted as $q_i$ (i.e., up, down, strange, charm, top, bottom).
- **Qubits**: Represented as $|0\rangle$ and $|1\rangle$, fundamental units of quantum information obeying the principles of superposition and entanglement.

## Lemma 4: Two Dimensional Temporal Main Segment

In this segment, spacetime $((x, y, z, t))$ is dominated by temporal considerations:

- **General Relativity**: Governs the dynamics of spacetime curvature due to mass-energy, described by the Einstein field equations $G_{\mu\nu} = 8\pi T_{\mu\nu}$.

- **Gott Time**: Refers to theoretical constructs allowing for closed time-like curves (CTCs) as solutions to Einstein's equations, permitting the possibility of time loops.

## Lemma 5: Forking into Quarks to Atoms

The reformation process from fundamental particles back to atoms involves:

- **Qubits to Quarks**: Collapsing quantum states into definite particles, transitioning from $|0\rangle$ and $|1\rangle$ to quarks $q_i$.
- **Quarks to Atoms**: Aggregation of quarks to form protons and neutrons, which then combine with electrons to form atoms, represented as $(p, n, e)$.

## Lemma 6: Temporal to Spatial Transection (Exit Point)

At the transection point $T_{\text{exit}}$, the universe transitions back from a temporal-dominated framework to a spatial-dominated framework. Spacetime coordinates $(x, y, z, t)$ revert to purely spatial dimensions $(x, y, z)$.

## Lemma 7: Three Spatial Dimensions Again

The universe $\mathcal{U}$ is reestablished with three spatial dimensions $(x, y, z)$, enriched by the insights gained from the quantum and relativistic interplay experienced through the previous lemmas. This cyclical journey highlights the intricate connections between space, time, and the fundamental nature of reality.

## Conclusion

This structured exploration demonstrates the deep interconnections between different realms of physics, from the macroscopic to the quantum. By traversing through spatial and temporal dimensions and examining the hierarchical structure of matter, we gain a comprehensive understanding of the universe.

Future research can build on this framework to further integrate and unify the principles of string theory, quantum mechanics, and general relativity.

## References


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