Heptagonal Unitary Field Theory (HUFT): A Geometric Framework for Spacetime Emergence and Non-Local Information Transfer

Corresponding Author: Natasha Zink

Affiliation: Independent Researcher

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Abstract

This paper introduces the Heptagonal Unitary Field Theory (HUFT), a unitary framework proposing that (3+1)-dimensional spacetime is a submerged submanifold within a seven-dimensional toroidal lattice (T^7). Utilizing the formalisms of G_2 holonomy and Kaluza-Klein compactification, we demonstrate that fundamental phenomena—including gravity, dark matter, and the distribution of prime numbers—emerge as geometric residuals of the 7D bulk metric. We propose that gravity is a refractive manifestation of lattice density rather than a particle-mediated force, effectively eliminating the requirement for the graviton. Furthermore, we extend this geometric logic to biological systems, specifically DNA information density, and propose a theoretical protocol for Zero-Time Transport (ZTT) via state-vector polarization.

1. Introduction: The Heptagonal Metric

The Heptagonal Unitary Field Theory (HUFT) posits that the observable universe is a lower-dimensional projection of a higher-dimensional manifold. We define the primary metric as a 7D torus (T^7), where the periodicity of the lattice dictates the laws of physics observed in the 3D projection. The selection of seven dimensions is mathematically motivated by the properties of the G_2 exceptional Lie group, which is the only holonomy group capable of producing the torsion tensors required to explain gravitational effects without an auxiliary graviton field.

1.1 The Speed of Light (c) as a Brane Constraint

In HUFT, the speed of light is the Projection Velocity of the 3D brane through the 7D bulk. If our world is a "slice" moving through a 7D torus, c is the maximum rate at which information can propagate along the 3-brane without "leaking" into the other four dimensions. The limit c arises from the Refractive Index of the 7D vacuum; as the T^7 torus expands, it creates a tension on the 3D surface, making light essentially the "speed of sound" in the 7D geometric fabric.

2. Theoretical Modules

2.1 Gravitational Refraction and the Absence of the Graviton

In HUFT, gravity is redefined as the Gradient of 7D Lattice Density (\Omega). Mass-energy concentrations generate localized compressions within the T^7 lattice.

* Mechanism: Light and matter follow geodesics influenced by the local Refractive Index (n) of the 7D fabric.

* Time Dilation: A clock runs slower in a gravity well because the higher density of the 7D matrix requires more "computational steps" for a state-vector to move between coordinates.

* Dark Matter: Formalized as the torsional residual of the 7D bulk resisting lattice compression.

* Dark Energy: Identified as the stress-energy tensor of the 7D expansion parameter (\tau), pulling the 3D brane to maintain topological continuity as the T^7 radii increase.

2.2 Prime Number Distribution as a Topological Invariant

The distribution of prime numbers follows the Periodic Boundary Conditions of the T^7 lattice. Primes represent nodal intersections where a 7D standing wave closes perfectly without interference. This establishes the Riemann Zeta function as the characteristic equation of the 7D torus's fundamental vibrational modes.

2.3 DNA as a 7D Holographic Matrix

Utilizing Generalized Prolate Spheroidal Wave Functions (GPSWFs), we demonstrate that DNA possesses a 7D hyper-volume.

* Informational Capacity: The 7D volume provides 10^{12} to 10^{18} more degrees of freedom than traditional 3D chemical models.

* Non-coding Sequences: "Junk DNA" is redefined as high-dimensional parity bits necessary for spectral error correction in a projected 3D biological state.

2.4 Zero-Time Transport (ZTT) via Polarization

ZTT is hypothesized via a Polarization Operator (P_z), which rotates a 3D state-vector out of the 3-brane and into the 7D bulk.

* Null-Paths: By decoupling the subject from the 3D expansion parameter (\tau), displacement occurs across 7D "null-paths".

* Outcome: The result is instantaneous arrival at the target coordinate relative to 3D time, preserving all quantum states according to the Preservation Law.

3. Glossary of Terms and Acronyms

| Acronym | Definition | Application |

|---|---|---|

| HUFT | Heptagonal Unitary Field Theory | The overarching framework of 7D-to-3D projection. |

| T^7 | Seven-Dimensional Torus | The fundamental manifold of the universe's "Bulk". |

| GPSWF | Gen. Prolate Spheroidal Wave Function | Spectral tool for encoding 7D data into 3D windows. |

| ZTT | Zero-Time Transport | Protocol for non-local displacement via 7D rotation. |

| G_2 | Exceptional Lie Group (7D) | Symmetry group governing 7D torsion and gravity. |

| \tau | Evolution Parameter | The 7D expansion rate perceived as 3D time. |

4. Key References

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