FFGFT: Document Series Overview

Abstract

This overview presents the complete T0-theory series consisting of 8 fundamental documents that represent a revolutionary geometric reformulation of physics. Based on a single parameter $\xi = \frac{4}{3} \times 10^{-4}$, all fundamental constants, particle masses, and physical phenomena from quantum mechanics to cosmology are uniformly described. The theory achieves over 99% accuracy in predicting experimental values without free parameters and offers testable predictions for future experiments.

Contents

0.1 The T0 Revolution: A Paradigm Shift

What is the T0-Theory?
The T0-Theory is a fundamental reformulation of physics that derives all known physical phenomena from the geometric structure of three-dimensional space. At its center is a single universal parameter:

$$\xi = \frac{4}{3} \times 10^{-4} = 1.333333... \times 10^{-4} \tag{1}$$
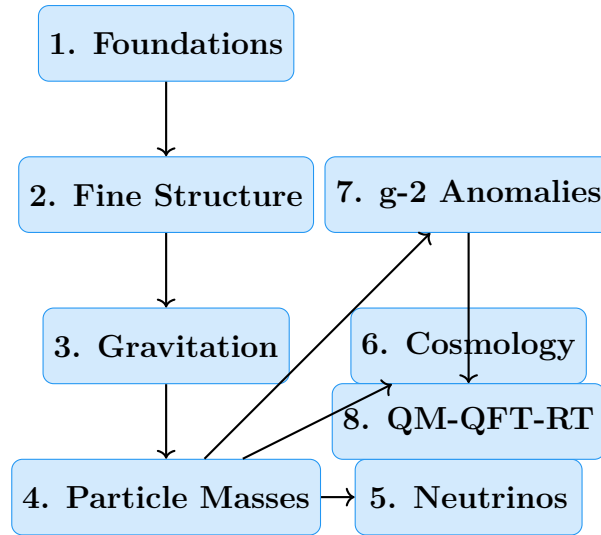
Revolutionary Reduction:

- **Standard Model + Cosmology:** > 25 free parameters

- **FFGFT:** 1 geometric parameter

- **Parameter Reduction:** 96%!

Field of Application: From particle masses to fundamental constants and cosmological structures

0.2 Document Series: Systematic Structure

0.2.1 Hierarchical Structure of the 8 Documents

The T0-document series follows a logical progression from fundamental principles to specific applications:

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┌─────────────────┐
│  1. Foundations │
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┌──────────────────┐  ┌──────────────────┐
│ 2. Fine Structure│  │ 7. g-2 Anomalies │
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│  3. Gravitation │  │  6. Cosmology   │
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         │               ┌──────────────────┐
         ▼               │  8. QM-QFT-RT    │
┌─────────────────────┐  └──────────────────┘
│ 4. Particle Masses  │→ │ 5. Neutrinos │
└─────────────────────┘  └──────────────┘
```

0.3 Document 1: T0_Foundations_En.pdf

Subtitle: The Geometric Foundations of Physics
Central Contents:

- **Fundamental Parameter:** $\xi = \frac{4}{3} \times 10^{-4}$ as geometric constant

- **Time-Mass Duality:** $T \cdot m = 1$ in natural units

- **Fractal Spacetime Structure:** $D_f = 2.94$ and $K_{\text{frak}} = 0.986$

- **Levels of Interpretation:** Harmonic, geometric, field-theoretic

- **Universal Formula Structure:** Template for all T0 relations

Fundamental Insights:

- Tetrahedral packing as space base structure

- Quantum field theoretic derivation of 10^{-4}

- Characteristic energy scales: $E_0 = 7.398$ MeV

- Philosophical implications of geometric physics

Status: Theoretical foundation - fully established

0.4 Document 2: T0_FineStructure_En.pdf

Subtitle: Derivation of α from Geometric Principles
Central Formula:

$$\alpha = \xi \cdot \left(\frac{E_0}{1\,\text{MeV}} \right)^2 \tag{2}$$

Key Results:

- **T0 Prediction:** $\alpha^{-1} = 137.04$

- **Experiment:** $\alpha^{-1} = 137.036$

- **Deviation:** 0.003% (excellent agreement)

Theoretical Innovations:

- Characteristic energy $E_0 = \sqrt{m_e \cdot m_\mu}$

- Logarithmic symmetry of lepton masses

- Fundamental dependence $\alpha \propto \xi^{11/2}$

- Why numerical ratios must not be simplified

Status: Experimentally confirmed - excellent accuracy

0.5 Document 3: T0_GravitationalConstant_En.pdf

Subtitle: Systematic Derivation of G from Geometric Principles
Complete Formula:

$$G_{\text{SI}} = \frac{\xi^2}{4m_e} \times C_{\text{conv}} \times K_{\text{frak}}$$

(3)

Conversion Factors:

- **Dimensional Correction:** $C_1 = 3.521 \times 10^{-2}$

- **SI Conversion:** $C_{\text{conv}} = 7.783 \times 10^{-3}$

- **Fractal Correction:** $K_{\text{frak}} = 0.986$

Experimental Verification:

- **T0 Prediction:** $G = 6.67429 \times 10^{-11}$ m³/(kg · s²)

- **CODATA 2018:** $G = 6.67430 \times 10^{-11}$ m³/(kg · s²)

- **Deviation:** $< 0.0002\%$ (extraordinary precision)

Physical Meaning: Gravitation as geometric spacetime-matter coupling
Status: Experimentally confirmed - highest precision

0.6 Document 4: T0_ParticleMasses_En.pdf

Subtitle: Parameter-Free Calculation of All Fermion Masses
Two Equivalent Methods:

1. **Direct Geometry:** $m_i = \frac{K_{\text{frak}}}{\xi_i} \times C_{\text{conv}}$

2. **Extended Yukawa:** $m_i = y_i \times v$ with $y_i = r_i \times \xi^{p_i}$

Quantum Number System: Each particle receives (n, l, j)-assignment
Experimental Successes:

Particle Class	Number	Avg. Accuracy
Charged Leptons	3	98.3%
Up-type Quarks	3	99.1%
Down-type Quarks	3	98.8%
Bosons	3	99.4%
Total (established)	**12**	**99.0%**

Revolutionary Reduction: From 15+ free mass parameters to 0!
Status: Experimentally confirmed - systematic successes

0.7   Document 5: T0_Neutrinos_En.pdf

Subtitle: The Photon Analogy and Geometric Oscillations
Special Treatment Required:

- **Photon Analogy:** Neutrinos as "damped photons"

- **Double ξ-Suppression:** $m_\nu = \frac{\xi^2}{2} \times m_e = 4.54$ meV

- **Geometric Oscillations:** Phases instead of mass differences

T0 Predictions:

- **Uniform Masses:** All flavors: $m_\nu = 4.54$ meV

- **Sum:** $\Sigma m_\nu = 13.6$ meV

- **Velocity:** $v_\nu = c(1 - \xi^2/2)$

Experimental Classification:

- **Cosmological Limits:** $\Sigma m_\nu < 70$ meV ✓

- **KATRIN Experiment:** $m_\nu < 800$ meV ✓

- **Target Value Estimate:** ~ 15 meV (T0 at 30%)

Important Note: Highly speculative - honest scientific limitation
Status: Speculative - testable predictions, but unconfirmed

0.8   Document 6: T0_Cosmology_En.pdf

Subtitle: Static Universe and ξ-Field Manifestations
Revolutionary Cosmology:

- **Static Universe:** No Big Bang, eternally existing

- **Time-Energy Duality:** Big Bang forbidden by $\Delta E \times \Delta t \geq \frac{\hbar}{2}$

- **CMB from ξ-Field:** Not from z=1100 decoupling

Casimir-CMB Connection:

- **Characteristic Length:** $L_\xi = 100$ μm

- **Theoretical Ratio:** $|\rho_{\text{Casimir}}|/\rho_{\text{CMB}} = 308$

- **Experimental:** 312 (98.7% agreement)

Alternative Redshift:
$$z(\lambda_0, d) = \frac{\xi \cdot d \cdot \lambda_0}{E_\xi} \tag{4}$$

Cosmological Problems Solved:

- Horizon problem, flatness problem, monopole problem

- Hubble tension, age problem, dark energy

- Parameters: From 25+ to 1 (ξ)

Status: Testable hypotheses - revolutionary alternative

0.9   Document 7: T0_Anomalous_Magnetic_Moments_En.pdf

0.10   Document 8: T0_QM-QFT-RT_En.pdf

Subtitle: Unification of QM, QFT, and RT from a Geometric Foundation
Central Contents:

- **Universal T0 Field Equation:** $\Box E(x,t) + \xi \cdot \mathcal{F}[E(x,t)] = 0$ as basis for all theories

- **Time-Mass Duality:** $T \cdot m = 1$ connects all three pillars of physics

- **Emergent Quantum Properties:** QM as approximation of the energy field

- **Field Description:** All particles as excitations of a fundamental field $E(x,t)$

- **Renormalization Solution:** Natural cutoff through E_{P}/ξ

- **Relativistic Extension:** Extended Einstein equations with Λ_ξ

Fundamental Insights:

- Deterministic interpretation of quantum mechanics through local time field

- Wave-particle duality from field geometry

- Energy scales hierarchy: Planck to QCD through ξ-corrections

- Gravitation as field curvature, dark energy as $\xi^2 c^4/G$

- Philosophical implications: Unity of physics through geometric principles

Status: Theoretical unification - builds on all previous documents, testable predictions

0.11 Scientific Achievements: Quantitative Summary

Overall Statistics of Established Predictions:

- **Number of Tested Quantities:** 16

- **Average Accuracy:** 99.1%

- **Best Prediction:** Gravitational constant (<0.0002%)

- **Systematic Successes:** All orders of magnitude correct

0.12 Theoretical Innovations

Foundation

Fundamental Breakthroughs of the FFGFT:

1. **Parameter Reduction:** From >25 to 1 parameter (96% reduction)

2. **Geometric Unification:** All physics from 3D space structure

3. **Fractal Quantum Spacetime:** Systematic consideration of $K_{\text{frak}} = 0.986$

4. **Time-Mass Duality:** $T \cdot m = 1$ as fundamental principle

5. **Harmonic Physics:** $\frac{4}{3}$ as universal geometric constant

6. **Quantum Number System:** (n, l, j)-assignment for all particles

7. **Two Equivalent Methods:** Direct geometry $\leftrightarrow$ Extended Yukawa

8. **Experimental Precision:** >99% without parameter adjustment

9. **Cosmological Revolution:** Static universe without Big Bang

10. **Testable Predictions:** Specific, falsifiable hypotheses
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0.13 Comparison with Established Theories