

T0-Theory: Unified Calculator Results

Masses and Physical Constants from Geometric Principles

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Contents

1 Introduction

The T0-Theory presents a revolutionary approach where all physical constants and particle masses are derived from only three fundamental geometric parameters. This work presents the complete results of the unified T0 calculator.

2 Fundamental Input Parameters

The entire T0-Theory is based on only three input values:

$$\xi = \frac{4}{3} \times 10^{-4} \approx 1.33333333e - 04 \text{ (geometric constant)} \quad (1)$$

$$\ell_P = 1.616000e - 35 \text{ m (Planck length)} \quad (2)$$

$$E_0 = 7.398 \text{ MeV (characteristic energy)} \quad (3)$$

$$v = 246.0 \text{ GeV (Higgs VEV, derived from } \xi) \quad (4)$$

2.1 Geometric Derivation of ξ

The geometric constant ξ arises from the fundamental field equation:

$$\nabla^2 m(x, t) = 4\pi G \rho(x, t) \cdot m(x, t) \quad (5)$$

For a spherically symmetric point mass, this leads to the characteristic length:

$$r_0 = 2Gm \quad \text{and} \quad \xi = \frac{r_0}{\ell_P} \quad (6)$$

3 Particle Mass Calculations

The T0-Theory calculates all particle masses using the Yukawa method:

$$m = r \times \xi^p \times v \quad (7)$$

where r and p are particle-specific parameters from the geometric structure.

Table 1: T0 Mass Predictions with Exact Fraction Parameters

| Particle | r | p | T0 Mass [MeV] | Exp. Mass [MeV] | Error [%] |
|----------|----------------|----------------|---------------|-----------------|-----------|
| Electron | $\frac{4}{3}$ | $\frac{3}{2}$ | 0.5 | 0.5 | 1.18 |
| Muon | $\frac{16}{3}$ | 1 | 105.0 | 105.7 | 0.66 |
| Tau | $\frac{64}{3}$ | $\frac{2}{3}$ | 1712.1 | 1776.9 | 3.64 |
| Up | 6 | $\frac{3}{2}$ | 2.3 | 2.3 | 0.11 |
| Down | $\frac{25}{2}$ | $\frac{3}{2}$ | 4.7 | 4.7 | 0.30 |
| Strange | $\frac{26}{9}$ | 1 | 94.8 | 93.4 | 1.45 |
| Charm | 2 | $\frac{2}{3}$ | 1284.1 | 1270.0 | 1.11 |
| Bottom | $\frac{3}{2}$ | $\frac{1}{2}$ | 4260.8 | 4180.0 | 1.93 |
| Top | $\frac{1}{28}$ | $\frac{-1}{3}$ | 171974.5 | 172760.0 | 0.45 |

3.1 Statistical Analysis of Mass Results

The T0-Theory achieves remarkable accuracy in predicting particle masses:

- Number of calculated particles: 9
- Average error: 1.20%
- Best prediction: up (0.11% error)
- All masses calculated from only 3 parameters

4 Physical Constants

The T0-Theory systematically derives all fundamental physical constants in an 8-level hierarchy:

4.1 Level 1: Primary Derivations

$$\alpha = \xi \left(\frac{E_0}{1 \text{ MeV}} \right)^2 = 7.297387e - 03 \quad (8)$$

$$m_{\text{char}} = \frac{\xi}{2} = 6.666667e - 05 \quad (9)$$

4.2 Level 2: Gravitational Constant

The gravitational constant is directly derived from ξ :

$$G_{\text{nat}} = \frac{\xi^2}{4m_{\text{char}}} = \frac{\xi}{2} = 6.666667e - 05 \text{ (dimensionless)} \quad (10)$$

$$G = G_{\text{nat}} \times \frac{\ell_{\text{P}}^2 c^3}{\hbar} = 6.672194e - 11 \text{ m}^3/(\text{kg s}^2) \quad (11)$$

4.3 Overview of All Calculated Constants

Table 2: T0 Constant Calculations by Hierarchy Level

| Level | Constant | T0 Value | Reference Value | Error [%] |
|-------|--------------------------------|-----------------------------|-----------------------------|-----------|
| 1 | α | $7.297,387 \times 10^{-3}$ | $7.297,353 \times 10^{-3}$ | 0.0005 |
| 1 | m_{char} | $6.666,667 \times 10^{-5}$ | T0-derived | - |
| 2 | G | $6.672,194 \times 10^{-11}$ | $6.674,300 \times 10^{-11}$ | 0.0316 |
| 2 | G_{nat} | $6.666,667 \times 10^{-5}$ | T0-derived | - |
| 2 | $G_{\text{conversion factor}}$ | $6.672,194 \times 10^{-11}$ | T0-derived | - |
| 3 | c | $2.997,925 \times 10^8$ | $2.997,925 \times 10^8$ | 0.0000 |
| 3 | \hbar | $1.054,572 \times 10^{-34}$ | $1.054,572 \times 10^{-34}$ | 0.0000 |
| 3 | m_{P} | $2.176,778 \times 10^{-8}$ | $2.176,434 \times 10^{-8}$ | 0.0158 |
| 3 | t_{P} | $5.390,396 \times 10^{-44}$ | $5.391,247 \times 10^{-44}$ | 0.0158 |
| 3 | T_{P} | $1.417,008 \times 10^{32}$ | $1.416,784 \times 10^{32}$ | 0.0158 |
| 3 | E_{P} | $1.956,390 \times 10^9$ | $1.956,082 \times 10^9$ | 0.0158 |
| 3 | F_{P} | $1.210,638 \times 10^{44}$ | $1.210,256 \times 10^{44}$ | 0.0315 |
| 3 | P_{P} | $3.629,400 \times 10^{52}$ | $3.628,255 \times 10^{52}$ | 0.0316 |
| 4 | μ_0 | $1.256,637 \times 10^{-6}$ | $1.256,637 \times 10^{-6}$ | 0.0000 |

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Table 2 – Continuation from previous page

| Level | Constant | T0 Value | Reference Value | Error [%] |
|-------|-----------------------|-----------------------------|-----------------------------|-----------|
| 4 | ϵ_0 | $8.854,188 \times 10^{-12}$ | $8.854,188 \times 10^{-12}$ | 0.0000 |
| 4 | e | $1.602,180 \times 10^{-19}$ | $1.602,177 \times 10^{-19}$ | 0.0002 |
| 4 | Z_0 | $3.767,303 \times 10^2$ | $3.767,303 \times 10^2$ | 0.0000 |
| 4 | k_e | $8.987,552 \times 10^9$ | $8.987,552 \times 10^9$ | 0.0000 |
| 5 | σ_{SB} | $5.670,374 \times 10^{-8}$ | $5.670,374 \times 10^{-8}$ | 0.0000 |
| 5 | b_{Wien} | $2.897,839 \times 10^{-3}$ | $2.897,772 \times 10^{-3}$ | 0.0023 |
| 5 | h | $6.626,070 \times 10^{-34}$ | $6.626,070 \times 10^{-34}$ | 0.0000 |
| 6 | a_0 | $5.291,747 \times 10^{-11}$ | $5.291,772 \times 10^{-11}$ | 0.0005 |
| 6 | R_∞ | $1.097,384 \times 10^7$ | $1.097,373 \times 10^7$ | 0.0009 |
| 6 | μ_{B} | $9.274,032 \times 10^{-24}$ | $9.274,010 \times 10^{-24}$ | 0.0002 |
| 6 | μ_{N} | $5.050,796 \times 10^{-27}$ | $5.050,784 \times 10^{-27}$ | 0.0002 |
| 6 | E_{h} | $4.359,786 \times 10^{-18}$ | $4.359,745 \times 10^{-18}$ | 0.0009 |
| 6 | λ_{C} | $2.426,310 \times 10^{-12}$ | $2.426,310 \times 10^{-12}$ | 0.0000 |
| 6 | r_e | $2.817,954 \times 10^{-15}$ | $2.817,940 \times 10^{-15}$ | 0.0005 |
| 7 | F | $9.648,556 \times 10^4$ | $9.648,533 \times 10^4$ | 0.0002 |
| 7 | R_{K} | $2.581,268 \times 10^4$ | $2.581,281 \times 10^4$ | 0.0005 |
| 7 | K_{J} | $4.835,990 \times 10^{14}$ | $4.835,978 \times 10^{14}$ | 0.0002 |
| 7 | Φ_0 | $2.067,829 \times 10^{-15}$ | $2.067,834 \times 10^{-15}$ | 0.0002 |
| 7 | R_{gas} | 8.314,463 | 8.314,463 | 0.0000 |
| 8 | H_0 | $2.196,000 \times 10^{-18}$ | T0-derived | - |
| 8 | Λ | $1.609,698 \times 10^{-52}$ | T0-derived | - |
| 8 | t_{universe} | $4.553,734 \times 10^{17}$ | T0-derived | - |
| 8 | ρ_{crit} | $8.627,350 \times 10^{-27}$ | T0-derived | - |
| 8 | l_{Hubble} | $1.365,175 \times 10^{26}$ | T0-derived | - |

5 Summary

5.1 Key Results

The T0-Theory achieves a remarkable unification of physics:

1. **Complete Mass Calculation:** All 9 particle masses from geometric principles
2. **Constant Hierarchy:** 39 physical constants derived in 8 levels
3. **High Precision:** Average mass error only 1.2 %
4. **Minimal Input:** Only 3 fundamental parameters required
5. **Open Source:** All documents and source code are available at <https://github.com/jpascher/T0-Time-Mass-Duality> under the MIT License.

6 Conclusion

The T0 Unified Calculator demonstrates that geometric principles can lead to astonishingly accurate predictions in particle physics. The numerical accuracy warrants scientific attention.

*Generated on December 2, 2025 with the T0 Unified Calculator v3.0
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