T0-Theory: Unified Calculator Results

Masses and Physical Constants from Geometric Principles

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:

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

$$\ell_\mathrm{P} = 1.616000e - 35 \text{ m (Planck length)} \tag{2}$$

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

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

2.1 Geometric Derivation of ξ

The geometric constant ξ arises from the fundamental field equation:

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

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

$$r_0 = 2Gm \quad \text{and} \quad \xi = \frac{r_0}{\ell_\mathrm{P}} \tag{6}$$

3 Particle Mass Calculations

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

$$m = r \times \xi^p \times v \tag{7}$$

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	$\frac{16}{5}$	1	105.0	105.7	0.66
Tau	$\frac{8}{3}$	$\frac{2}{3}$	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

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

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

4.2 Level 2: Gravitational Constant

The gravitational constant is directly derived from ξ:

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

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

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.

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