E=mc² = E=m: The Constants Illusion Exposed
Why Einstein's c-constant conceals the fundamental error
From Dynamic Ratios to the Constants Illusion

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Abstract

This work reveals the central point of Einstein's relativity theory: E=mc² is mathematically identical to E=m. The only difference lies in Einstein's treatment of c as a "constant" instead of a dynamic ratio. By fixing c = 299,792,458 m/s, the natural time-mass duality $T \cdot m = 1$ is artificially "frozen," leading to apparent complexity. The T0 theory shows: c is not a fundamental law of nature, but only a ratio that must be variable if time is variable. Einstein's error was not E=mc² itself, but the constant-setting of c.

Contents

1 The Central Thesis: E=mc² = E=m

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The Fundamental Recognition

E=mc² and E=m are mathematically identical!
The only difference: Einstein treats c as a "constant," although c is a dynamic ratio.
Einstein's error: c = 299,792,458 m/s = constant
T0 truth: c = L/T = variable ratio

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1.1 The Mathematical Identity

In natural units:
$$E = mc^2 = m \times c^2 = m \times 1^2 = m \tag{1}$$

This is not an approximation - this is exactly the same equation!

1.2 What is c really?

$$c = \frac{\text{Length}}{\text{Time}} = \frac{L}{T} \tag{2}$$

c is a ratio, not a natural constant!

2 Einstein's Fundamental Error: The Constant-Setting

2.1 The Act of Constant-Setting

Einstein set: $c = 299,792,458$ m/s = **constant**
    What does this mean?

$$c = \frac{L}{T} = \text{constant} \quad \Rightarrow \quad \frac{L}{T} = \text{fixed} \tag{3}$$

Implication: If L and T can vary, their **ratio** must remain constant.

2.2 The Problem of Time Variability

Einstein recognized himself: Time dilates!

$$t' = \gamma t \quad \text{(time is variable)} \tag{4}$$

But simultaneously he claimed:

$$c = \frac{L}{T} = \text{constant} \tag{5}$$

This is a logical contradiction!

2.3 The T0 Resolution

T0 insight: $T \cdot m = 1$
    This means:

- Time T **must** be variable (coupled to mass)

- Therefore $c = L/T$ **cannot** be constant

- c is a **dynamic ratio**, not a constant

3 The Constants Illusion: How it Works

3.1 The Mechanism of the Illusion

Step 1: Einstein sets c = constant

$$c = 299,792,458 \text{ m/s} = \text{fixed} \tag{6}$$

Step 2: Time becomes "frozen" by this

$$T = \frac{L}{c} = \frac{L}{\text{constant}} = \text{apparently determined} \tag{7}$$

Step 3: Time dilation becomes "mysterious effect"

$$t' = \gamma t \quad (\text{why?} \rightarrow \text{complicated relativity theory}) \tag{8}$$

3.2 What Really Happens (T0 View)

Reality: Time is naturally variable through $T \cdot m = 1$
  Einstein's constant-setting "freezes" this natural variability artificially
  Result: One needs complicated theory to repair the "frozen" dynamics

4 c as Ratio vs. c as Constant

4.1 c as Natural Ratio (T0)

$$c(x,t) = \frac{L(x,t)}{T(x,t)} \tag{9}$$

Properties:

- c varies with location and time

- c follows the time-mass duality

- No artificial constants

- Natural simplicity: $E = m$

4.2 c as Artificial Constant (Einstein)

$$c = 299,792,458 \text{ m/s} = \text{constant everywhere} \tag{10}$$

Problems:

- Contradiction to time dilation

- Artificial "freezing" of time dynamics

- Complicated repair mathematics needed

- Inflated formula: $E = mc^2$

5 The Time Dilation Paradox

5.1 Einstein's Contradiction Exposed

Einstein claims simultaneously:

$$c = \text{constant} \tag{11}$$
$$t' = \gamma t \quad \text{(time varies)} \tag{12}$$

But:

$$c = \frac{L}{T} \quad \text{and} \quad T \text{ varies} \quad \Rightarrow \quad c \text{ cannot be constant!} \tag{13}$$

5.2 Einstein's Hidden Solution

Einstein "solves" the contradiction through:

- Complicated Lorentz transformations

- Mathematical formalisms

- Space-time constructions

- **But the logical contradiction remains!**

5.3 T0's Natural Solution

No contradiction in T0:

$$T \cdot m = 1 \quad \Rightarrow \quad \text{time is naturally variable} \tag{14}$$

$$c = \frac{L}{T} \quad \Rightarrow \quad \text{c is naturally variable} \tag{15}$$

No constant-setting → No contradictions → No complicated repair mathematics

6 The Mathematical Demonstration

6.1 From E=mc² to E=m

Starting equation: $E = mc^2$
c in natural units: $c = 1$
Substitution:

$$E = mc^2 = m \times 1^2 = m \tag{16}$$

Result: $E = m$

6.2 The Reverse Direction: From E=m to E=mc²

Starting equation: $E = m$

   Artificial constant introduction: $c = 299,792,458$ m/s
   Inflating the equation:

$$E = m = m \times 1 = m \times \frac{c^2}{c^2} = m \times c^2 \times \frac{1}{c^2} \tag{17}$$

   If one defines c^2 as "conversion factor":

$$E = mc^2 \tag{18}$$

   This shows: $E = mc^2$ is only $E = m$ with **artificial inflation factor c^2!**

7 The Arbitrariness of Constant Choice: c or Time?

7.1 Einstein's Arbitrary Decision

> **The Fundamental Choice Option**
>
> **One can choose what should be "constant"!**
> **Option 1 (Einstein's choice)**: c = constant → time becomes variable
> **Option 2 (alternative)**: time = constant → c becomes variable
> **Both describe the same physics!**

7.2 Option 1: Einstein's c-constant

Einstein chose:

$$c = 299,792,458 \text{ m/s} = \text{constant (defined)} \tag{19}$$

$$t' = \gamma t \quad \text{(time becomes automatically variable)} \tag{20}$$

   Language convention:

- "Speed of light is universally constant"

- "Time dilates in strong gravitational fields"

- "Clocks run slower at high velocities"

7.3 Option 2: Time-constant (Einstein could have chosen)

Alternative choice:

$$t = \text{constant (defined)} \tag{21}$$

$$c(x,t) = \frac{L(x,t)}{t} = \text{variable} \tag{22}$$

   Alternative language convention:

- "Time flows equally everywhere"

- "Speed of light varies with location"

- "Light becomes slower in strong gravitational fields"

7.4 Mathematical Equivalence of Both Options

Both descriptions are mathematically identical:

Phenomenon	Einstein view	Time-constant view
Gravitation	Time slows down	Light slows down
Velocity	Time dilation	c-variation
GPS correction	"Clocks run differently"	"c is different"
Measurements	Same numbers	Same numbers

Table 1: Two views, identical physics

7.5 Why Einstein Chose Option 1

Historical reasons for Einstein's decision:

- **Michelson-Morley**: c seemed locally constant

- **Aesthetics**: "Universal constant" sounded elegant

- **Tradition**: Newtonian constant physics

- **Conceivability**: c-constancy easier to imagine than time constancy

- **Authority effect**: Einstein's prestige fixed this choice

  But it was only a convention, not a natural law!

7.6 T0's Overcoming of Both Options

T0 shows: Both choices are arbitrary!

$$T \cdot m = 1 \quad \text{(natural duality without constant constraint)} \tag{23}$$

T0 insight:

- **Neither** c nor time are "really" constant

- **Both** are aspects of the same T · m dynamics

- **Constancy** is only definition convention

- **E = m** is the constant-free truth

7.7 Liberation from Constant Constraint

Instead of choosing between:

- c constant, time variable (Einstein)

- Time constant, c variable (alternative)

  T0 chooses:

- **Both dynamically coupled** via T · m = 1

- **No arbitrary fixations**

- **Natural ratios** instead of artificial constants

8 The Reference Point Revolution: Earth → Sun → Nature

8.1 The Reference Point Analogy: Geocentric → Heliocentric → T0

> **The Reference Point Revolution: From Earth → Sun → Nature**
>
> **Geocentric (Ptolemy)**: Earth at center
> - Complicated epicycles needed
> - Works, but artificially complicated
>
> **Heliocentric (Copernicus)**: Sun at center
> - Simple ellipses
> - Much more elegant and simple
>
> **T0-centric**: Natural ratios at center
> - $T \cdot m = 1$ (natural reference point)
> - Even more elegant: $E = m$

Einstein's c-constant corresponds to the geocentric system:

- **Human** reference point at center (like Earth at center)

- **Complicated** mathematics needed (like epicycles)

- **Works** locally, but artificially inflated

T0's natural ratios correspond to the heliocentric system:

- **Natural** reference point at center (like Sun at center)

- **Simple** mathematics (like ellipses)

- **Universally** valid and elegant

8.2 Why We Need Reference Points

Reference points are necessary and natural:

- **For measurements**: We need standards for comparison

- **For communication**: Common basis for exchange

- **For technology**: Practical applications require units

- **For science**: Reproducible experiments need standards

The question is not WHETHER, but WHICH reference point:

System	Reference Point	Complexity	Elegance
Geocentric	Earth	Epicycles	Low
Heliocentric	Sun	Ellipses	High
Einstein	c-constant	Relativity theory	Medium
T0	$T \cdot m = 1$	$E = m$	Maximum

Table 2: Reference point systems comparison

8.3 The Right vs. Wrong Reference Point

Einstein's error was not to choose a reference point:

- **But to choose the wrong reference point!**

Wrong reference point (Einstein): c = 299,792,458 m/s = constant

- Based on human definition

- Leads to complicated mathematics

- Creates logical contradictions

Right reference point (T0): $T \cdot m = 1$

- Based on natural ratio

- Leads to simple mathematics: $E = m$

- No contradictions, pure elegance

9 When Something Becomes "Constant"

9.1 The Fundamental Reference Point Problem

> **The Reference Point Illusion**
>
> **Something only becomes "constant" when we define a reference point!**
> **Without reference point**: All ratios are relative and dynamic
> **With reference point**: One ratio becomes artificially "fixed"
> **Einstein's error**: He defined an absolute reference point for c

9.2 The Natural Stage: Everything is Relative

Before any reference point definition:

$$c_1 = \frac{L_1}{T_1} \tag{24}$$

$$c_2 = \frac{L_2}{T_2} \tag{25}$$

$$c_3 = \frac{L_3}{T_3} \tag{26}$$

$$\vdots \tag{27}$$

All c-values are relative to each other. None is "constant".

9.3   The Moment of Reference Point Setting

Einstein's fatal step:

$$\text{"I define: } c = 299,792,458 \text{ m/s} = \text{reference point"} \tag{28}$$

What happens at this moment:

- An **arbitrary reference point** is set

- All other c-values are measured relative to this

- The **dynamic ratio** becomes a "constant"

- The **natural relativity** is artificially "frozen"

9.4   The Reference Point Problematic

Every reference point is arbitrary:

- Why 299,792,458 m/s and not 300,000,000 m/s?

- Why in m/s and not in other units?

- Why measured on Earth and not in space?

- Why at this time and not at another?

9.5   T0's Reference Point-Free Physics

T0 eliminates all reference points:

$$T \cdot m = 1 \quad \text{(universal relation without reference point)} \tag{29}$$

- No arbitrary fixations

- All ratios remain dynamic

- Natural relativity is preserved

- Fundamental simplicity: $E = m$

9.6   Example: The Meter Definition

Historical development of meter definition:

1. **1793**: 1 meter = 1/10,000,000 of Earth meridian (Earth reference point)

2. **1889**: 1 meter = prototype meter in Paris (object reference point)

3. **1960**: 1 meter = 1,650,763.73 wavelengths of krypton-86 (atom reference point)

4. **1983**: 1 meter = distance light travels in 1/299,792,458 s (c reference point)

What does this show?

- Each definition is **human arbitrariness**

- The **reference point** changes with human technology

- There is **no "natural" length unit** - only human agreements

- **Humans make c "constant" by definition** - not nature!

9.7   The Circular Error: Humans Define Their Own "Constants"

In 1983 humans defined:

$$1 \text{ meter} = \frac{1}{299,792,458} \times c \times 1 \text{ second} \tag{30}$$

This makes c automatically "constant" - through human definition, not through natural law:

$$c = \frac{299,792,458 \text{ meters}}{1 \text{ second}} = 299,792,458 \text{ m/s} \tag{31}$$

Circular reasoning: Humans define c as constant and then "measure" a constant!
Nature is not asked in this process!

9.8   T0's Resolution of the Reference Point Illusion

T0 recognizes:

- **Definition $\neq$ natural law**

- **Measurement reference point $\neq$ physical constant**

- **Practical agreement $\neq$ fundamental truth**

T0 solution:

$$\begin{aligned} \text{For measurements:} \quad &\text{Use practical reference points} \tag{32} \\ \text{For natural laws:} \quad &\text{Use reference point-free relations} \tag{33} \end{aligned}$$

10   Why c-Constancy is Not Provable

10.1   The Fundamental Measurement Problem

To measure c, we need:

$$c = \frac{L}{T} \tag{34}$$

But: We measure L and T with **the same physical processes** that depend on c!
Circular problem:

- Light measures distances $\rightarrow$ c determines L

- Atomic clocks use EM transitions $\rightarrow$ c influences T

- Then we measure c = L/T $\rightarrow$ **We measure c with c!**

10.2   The Gauge Definition Problem

Since 1983: 1 meter = distance light travels in 1/299,792,458 s

$$c = 299,792,458 \text{ m/s} \quad (\text{not measured, but defined!}) \tag{35}$$

One cannot "prove" what one has defined!

10.3   The Systematic Compensation Problem

If c varies, ALL measuring devices vary equally:

- **Laser interferometers**: use light (c-dependent)

- **Atomic clocks**: use EM transitions (c-dependent)

- **Electronics**: uses EM signals (c-dependent)

  Result: All devices **automatically compensate** the c-variation!

10.4   The Burden of Proof Problem

Scientifically correct:

- One **cannot prove** that something is constant

- One can only show that it **appears constant within measurement precision**

- **Each new precision level** could show variation

  Einstein's "c-constancy" was belief, not proof!

10.5   T0 Prediction for Precise Measurements

T0 predicts: At highest precision one will find:

$$c(x,t) = c_0 \left(1 + \xi \times \frac{T(x,t) - T_0}{T_0} \right) \tag{36}$$

with $\xi = 1.33 \times 10^{-4}$ (T0 parameter)
c varies tiny ($\sim 10^{-15}$), but measurable in principle!

11   Ontological Consideration: Calculations as Constructs

11.1   The Fundamental Epistemological Limit

> **Ontological Truth**
>
> **All calculations are human constructs!**
> They can **at best** give a certain idea of reality.
> **That calculations are internally consistent proves little** about actual reality.
> **Mathematical consistency $\neq$ ontological truth**

11.2   Einstein's Construct vs. T0's Construct

Both are human thought structures:
    Einstein's construct:

- $E = mc^2$ (mathematically consistent)

- Relativity theory (internally coherent)

- 10 field equations (work computationally)

- **But**: Based on arbitrary c-constant setting

T0's construct:

- E = m (mathematically simpler)

- T · m = 1 (internally coherent)

- $\partial^2 E = 0$ (works computationally)

- **But**: Also only a human thought model

11.3   The Ontological Relativity

What is "really" real?

- **Einstein's space-time**? (construct)

- **T0's energy field**? (construct)

- **Newton's absolute time**? (construct)

- **Quantum mechanics' probabilities**? (construct)

All are human interpretive frameworks of the inaccessible reality!

11.4   Why T0 is Still "Better"

Not because of "absolute truth," but because of:
1. Simplicity (Occam's Razor):

- E = m is simpler than E = mc²

- One equation is simpler than 10 equations

- Fewer arbitrary assumptions

2. Consistency:

- No logical contradictions (like Einstein's)

- No constant arbitrariness

- Unified thought structure

3. Predictive power:

- Testable predictions

- Fewer free parameters

- Clearer experimental distinction

4. Aesthetics:

- Mathematical elegance

- Conceptual clarity

- Unity

11.5 The Epistemological Humility

T0 does NOT claim to be "absolute truth."
  T0 only says:

- "Here is a **simpler** construct"

- "With **fewer** arbitrary assumptions"

- "That is **more consistent** than Einstein's construct"

- "And makes **more testable** predictions"

  But ultimately T0 also remains a human thought structure!

11.6 The Pragmatic Consequence

Since all theories are constructs:
  Evaluation criteria are:

1. **Simplicity** (fewer assumptions)

2. **Consistency** (no contradictions)

3. **Predictive power** (testable consequences)

4. **Elegance** (aesthetic criteria)

5. **Unity** (fewer separate domains)

  By all these criteria T0 is "better" than Einstein - but not "absolutely true".

11.7 The Ontological Humility

The deepest insight:

- **Reality itself** is inaccessible

- **All theories** are human constructs

- **Mathematical consistency** proves no ontological truth

- **The best** we have: **Simpler, more consistent constructs**

  Einstein's error was not only the c-constant setting, but also the claim to absolute truth of his mathematical constructs.
  T0's advantage is not absolute truth, but relative superiority as a thought model.

12 The Practical Consequences

12.1 Why E=mc² "Works"

E=mc² works because:

- It is mathematically identical to $E = m$

- c^2 compensates the "frozen" time dynamics

- The T0 truth is unconsciously contained

- Local approximations usually suffice

12.2   When E=mc² Fails

The constants illusion breaks down at:

- Very precise measurements

- Extreme conditions (high energies/masses)

- Cosmological scales

- Quantum gravity

12.3   T0's Universal Validity

E = m is valid everywhere and always:

- No approximations needed

- No constant assumptions

- Universal applicability

- Fundamental simplicity

13   The Correction of Physics History

13.1   Einstein's True Achievement

Einstein's actual discovery was:

$$E = m \quad \text{(in natural form)} \tag{37}$$

His error was:

$$E = mc^2 \quad \text{(with artificial constant inflation)} \tag{38}$$

13.2   The Historical Irony

> **The Great Irony**
>
> Einstein discovered the fundamental simplicity $E = m$,
> but **hid it behind the constants illusion** $E = mc^2$!
> The physics world celebrated the complicated form and overlooked the simple truth.

14   The T0 Perspective: c as Living Ratio

14.1   c as Expression of Time-Mass Duality

In T0 theory:

$$c(x,t) = f\left(\frac{L(x,t)}{T(x,t)}\right) = f\left(\frac{L(x,t) \cdot m(x,t)}{1}\right) \tag{39}$$

since $T \cdot m = 1$.

c becomes an expression of the fundamental time-mass duality!

14.2   The Dynamic Speed of Light

T0 prediction:

$$c(x, t) = c_0 \sqrt{1 + \xi \frac{m(x,t) - m_0}{m_0}} \tag{40}$$

Light moves faster in more massive regions!
(Tiny effect, but measurable in principle)

15   Experimental Tests of c-Variability

15.1   Proposed Experiments

Test 1 - Gravitational dependence:

- Measure c in different gravitational fields

- T0 prediction: c varies with $\sim \xi \times \Delta\Phi_{\text{grav}}$

  Test 2 - Cosmological variation:

- Measure c over cosmological time periods

- T0 prediction: c changes with universe expansion

  Test 3 - High-energy physics:

- Measure c in particle accelerators at highest energies

- T0 prediction: Tiny deviations at $E \sim$ TeV

15.2   Expected Results

Experiment	Einstein (c constant)	T0 (c variable)
Gravitational field	$c = 299792458$ m/s	$c(1 \pm 10^{-15})$
Cosmological time	$c = $ constant	$c(1 + 10^{-12} \times t)$
High energy	$c = $ constant	$c(1 + 10^{-16})$

Table 3: Predicted c-variations

16   Conclusions

16.1   The Central Recognition

> **The Fundamental Truth**
>
> **E=mc² = E=m**
> Einstein's "constant" c is in truth a variable ratio.
> The constant-setting was Einstein's fundamental error.
> T0 corrects this error by returning to natural variability.

16.2 Physics After the Constants Illusion

The future of physics:

- No artificial constants

- Dynamic ratios everywhere

- Living, variable natural laws

- Fundamental simplicity: $E = m$

16.3 Einstein's Corrected Legacy

Einstein's true discovery: $E = m$ (energy-mass identity)
   Einstein's error: Constant-setting of c
   T0's correction: Return to natural form $E = m$
   Einstein was brilliant - he just stopped one step too early!

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