

$E=mc^2$ Revisited

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Capítulo 1

$E=mc^2$ Revisited

$E=mc^2 = E=m$: The Constants Illusion Exposed
Why Einstein's c -constant conceals the fundamental error
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Resumen

This work reveals the central point of Einstein's relativity theory: $E=mc^2$ 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 $E=mc^2$ itself, but the constant-setting of c .

1.1. The Central Thesis: $E=mc^2 = E=m$

The Fundamental Recognition

$E=mc^2$ and $E=m$ are mathematically identical!

The only difference: Einstein treats c as a constant, although c is a dynamic ratio.

Einstein's error: $c = 299,792,458 \text{ m/s} = \text{constant}$

TO truth: $c = L/T = \text{variable ratio}$

1.1.1. The Mathematical Identity

In natural units:

$$E = mc^2 = m \times c^2 = m \times 1^2 = m \quad (1.1)$$

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

1.1.2. What is c really?

$$c = \frac{\text{Length}}{\text{Time}} = \frac{L}{T} \quad (1.2)$$

c is a ratio, not a natural constant!

1.2. Einstein's Fundamental Error: The Constant-Setting

1.2.1. The Act of Constant-Setting

Einstein set: $c = 299,792,458 \text{ m/s} = \text{constant}$

What does this mean?

$$c = \frac{L}{T} = \text{constant} \quad \Rightarrow \quad \frac{L}{T} = \text{fixed} \quad (1.3)$$

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

1.2.2. The Problem of Time Variability

Einstein recognized himself: Time dilates!

$$t' = \gamma t \quad (\text{time is variable}) \quad (1.4)$$

But simultaneously he claimed:

$$c = \frac{L}{T} = \text{constant} \quad (1.5)$$

This is a logical contradiction!

1.2.3. The T0 Resolution

T0 insight: $\cdot m = 1$

This means:

- Time **must** be variable (coupled to mass)
- Therefore $c = L/T$ **cannot** be constant
- c is a **dynamic ratio**, not a constant

1.3. The Constants Illusion: How it Works

1.3.1. The Mechanism of the Illusion

Step 1: Einstein sets $c = \text{constant}$

$$c = 299,792,458 \text{ m/s} = \text{fixed} \quad (1.6)$$

Step 2: Time becomes "frozen" by this

$$T = \frac{L}{c} = \frac{L}{\text{constant}} = \text{apparently determined} \quad (1.7)$$

Step 3: Time dilation becomes "mysterious effect"

$$t' = \gamma t \quad (\text{why?} \rightarrow \text{complicated relativity theory}) \quad (1.8)$$

1.3.2. What Really Happens (T0 View)

Reality: Time is naturally variable through $\cdot m = 1$

Einstein's constant-setting "freezes" this natural variability artificially

Result: One needs complicated theory to repair the "frozen" dynamics

1.4. c as Ratio vs. c as Constant

1.4.1. c as Natural Ratio (T0)

$$c(x, t) = \frac{L(x, t)}{T(x, t)} \quad (1.9)$$

Properties:

- c varies with location and time
- c follows the time-mass duality
- No artificial constants
- Natural simplicity: $E = m$

1.4.2. c as Artificial Constant (Einstein)

$$c = 299,792,458 \text{ m/s} = \text{constant everywhere} \quad (1.10)$$

Problems:

- Contradiction to time dilation
- Artificial "freezing" of time dynamics
- Complicated repair mathematics needed
- Inflated formula: $E = mc^2$

1.5. The Time Dilation Paradox

1.5.1. Einstein's Contradiction Exposed

Einstein claims simultaneously:

$$c = \text{constant} \quad (1.11)$$

$$t' = \gamma t \quad (\text{time varies}) \quad (1.12)$$

But:

$$c = \frac{L}{T} \quad \text{and} \quad T \text{ varies} \quad \Rightarrow \quad c \text{ cannot be constant!} \quad (1.13)$$

1.5.2. Einstein's Hidden Solution

Einstein "solves" the contradiction through:

- Complicated Lorentz transformations
- Mathematical formalisms
- Space-time constructions
- **But the logical contradiction remains!**

1.5.3. T0's Natural Solution

No contradiction in T0:

$$m = 1 \quad \Rightarrow \quad \text{time is naturally variable} \quad (1.14)$$

$$c = \frac{L}{T} \quad \Rightarrow \quad c \text{ is naturally variable} \quad (1.15)$$

No constant-setting \rightarrow No contradictions \rightarrow No complicated repair mathematics

1.6. The Mathematical Demonstration

1.6.1. From E=mc² to E=m

Starting equation: $E = mc^2$

c in natural units: $c = 1$

Substitution:

$$E = mc^2 = m \times 1^2 = m \quad (1.16)$$

Result: $E = m$

1.6.2. The Reverse Direction: From E=m to E=mc²

Starting equation: $E = m$

Artificial constant introduction: $c = 299,792,458 \text{ m/s}$

Inflating the equation:

$$E = m = m \times 1 = m \times \frac{c^2}{c^2} = m \times c^2 \times \frac{1}{c^2} \quad (1.17)$$

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

$$E = mc^2 \quad (1.18)$$

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

1.7. The Arbitrariness of Constant Choice: c or Time?

1.7.1. Einstein's Arbitrary Decision

The Fundamental Choice Option

One can choose what should be constant:

Option 1 (Einstein's choice): $c = \text{constant} \rightarrow \text{time becomes variable}$

Option 2 (alternative): $\text{time} = \text{constant} \rightarrow c \text{ becomes variable}$

Both describe the same physics!

1.7.2. Option 1: Einstein's c-constant

Einstein chose:

$$c = 299,792,458 \text{ m/s} = \text{constant (defined)} \quad (1.19)$$

$$t' = \gamma t \quad (\text{time becomes automatically variable}) \quad (1.20)$$

Language convention:

- "Speed of light is universally constant"
- "Time dilates in strong gravitational fields"
- "Clocks run slower at high velocities"

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

Alternative choice:

$$t = \text{constant (defined)} \quad (1.21)$$

$$c(x, t) = \frac{L(x, t)}{t} = \text{variable} \quad (1.22)$$

Alternative language convention:

- "Time flows equally everywhere"
- "Speed of light varies with location"
- "Light becomes slower in strong gravitational fields"

1.7.4. 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

Cuadro 1.1: Two views, identical physics

1.7.5. 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!

1.7.6. T0's Overcoming of Both Options

T0 shows: Both choices are arbitrary!

$$m = 1 \quad (\text{natural duality without constant constraint}) \quad (1.23)$$

T0 insight:

- **Neither** c nor time are really constant
- **Both** are aspects of the same $T \cdot m$ dynamics
- **Constancy** is only definition convention
- $E = m$ is the constant-free truth

1.7.7. Liberation from Constant Constraint

Instead of choosing between:

- c constant, time variable (Einstein)
- Time constant, c variable (alternative)

T0 chooses:

- **Both dynamically coupled** via $T \cdot m = 1$
- **No arbitrary fixations**
- **Natural ratios** instead of artificial constants

1.8. The Reference Point Revolution: Earth \rightarrow Sun \rightarrow Nature

1.8.1. The Reference Point Analogy: Geocentric \rightarrow Heliocentric \rightarrow T0

The Reference Point Revolution: From Earth \rightarrow Sun \rightarrow 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

- $m = 1$ (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

[colback=red!5!white,colframe=red!75!black,title=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

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All c-values are relative to each other. None is \80\347onstant".

The Moment of Reference Point Setting
Einstein's fatal step:

$$\backslash 80 \backslash 317 \text{ define: } c = 299,792,458 \text{ m/s} = \text{reference point} \quad (1.23)$$

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 \80\347onstant"The natural relativity is artificially
"frozen"

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?

T0's Reference Point-Free Physics

T0 eliminates all reference points:

$$\cdot m = 1 \quad (\text{universal relation without reference point}) \quad (1.23)$$

No arbitrary fixations All ratios remain dynamic Natural relativity is
preserved Fundamental simplicity: $E = m$

Example: The Meter Definition

Historical development of meter definition:

1793: 1 meter = 1/10,000,000 of Earth meridian (Earth reference
point) 1889: 1 meter = prototype meter in Paris (object reference
point) 1960: 1 meter = 1,650,763.73 wavelengths of krypton-86
(atom reference point) 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 \80\347ons-
tant"by definition - not nature!

The Circular Error: Humans Define Their Own \80\307ons-
tants

In 1983 humans defined:

$$1 \text{ meter} = \frac{1}{299,792,458} \times c \times 1 \text{ second} \quad (1.23)$$

This makes c automatically \80\347onstant through human
definition, not through natural law:

$$c = \frac{299,792,458 \text{ meters}}{1 \text{ second}} = 299,792,458 \text{ m/s} \quad (1.23)$$

Circular reasoning: Humans define c as constant and then
"measure.a constant!

Nature is not asked in this process!

T0's Resolution of the Reference Point Illusion

T0 recognizes: Definition \neq natural law Measurement refe-

Since all theories are constructs:
Evaluation criteria are:

Simplicity (fewer assumptions) Consistency (no contradictions) Predictive power
(testable consequences) Elegance (aesthetic criteria) Unity (fewer separate domains)

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

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.

The Practical Consequences

Why $E=mc^2$ "Works"

$E=mc^2$ works because: It is mathematically identical to $E = m c^2$ com-
pensates the "frozen" time dynamics The T0 truth is unconsciously contained Local
approximations usually suffice

When $E=mc^2$ Fails

The constants illusion breaks down at: Very precise measurements Extreme con-
ditions (high energies/masses) Cosmological scales Quantum gravity

T0's Universal Validity

$E = m$ is valid everywhere and always: No approximations needed No constant
assumptions Universal applicability Fundamental simplicity

The Correction of Physics History

Einstein's True Achievement

Einstein's actual discovery was:

$$E = m \quad (\text{in natural form}) \quad (1.23)$$

His error was:

$$E = mc^2 \quad (\text{with artificial constant inflation}) \quad (1.23)$$

The Historical Irony

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The Pragmatic Consequence

Einstein discovered the fundamental simplicity $E = mc^2$,

but hid it behind the constants illusion $E = mc^2$!

The physics world celebrated the complicated form and overlooked the simple truth.

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The T0 Perspective: c as Living Ratio

c as Expression of Time-Mass Duality

In T0 theory:

$$c(x, t) = f\left(\frac{L(x, t)}{(x, t)}\right) = f\left(\frac{L(x, t) \cdot m(x, t)}{1}\right) \quad (1.23)$$

since $\cdot m = 1$.

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

The Dynamic Speed of Light

T0 prediction:

$$c(x, t) = c_0 \left(1 + \xi \frac{m(x, t) - m_0}{m_0}\right) \quad (1.23)$$

Light moves faster in more massive regions!

(Tiny effect, but measurable in principle)

Experimental Tests of c -Variability

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 $E \sim \text{TeV}$

Expected Results

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

Predicted c - variations

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1.10. Conclusions

1.10.1. The Central Recognition

The Fundamental Truth

$$\mathbf{E} = m\mathbf{c}^2 = \mathbf{E} = m$$

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.

1.10.2. Physics After the Constants Illusion

The future of physics:

- No artificial constants
- Dynamic ratios everywhere
- Living, variable natural laws
- Fundamental simplicity: $E = m$

1.10.3. 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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