

Time and Mass: A New Perspective on Old Formulas – and Liberation from Traditional Constraints

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1 Introduction: Traditional Views and the Obscured Perspective

Physics has achieved tremendous success with abstract concepts like quantum fields and spacetime curvature. But have we perhaps moved too far from an *intuitive, real* description of the world? Traditional perspectives, particularly our choice of units of measurement, may have obscured our view of a deeper, *more unified* description of nature. This approach attempts to take a step back to the fundamentals – and to free physics from unnecessary constraints.

2 Natural Constants and Units: More Than Just Arbitrary Numbers?

Our units of measurement (meters, seconds, kilograms) have evolved historically and are practical for everyday use, but are they also *fundamental*? In the laws of nature, *natural constants* appear (such as the speed of light c , the reduced Planck constant \hbar , the gravitational constant G , the fine-structure constant α). Physicists often set $c = 1$ and $\hbar = 1$ ("natural units") to simplify formulas. But the traditional view often considers these constants as *independent, given* quantities. Is this really the case? Or do they conceal a deeper connection?

3 The Time-Mass Dualism: An Alternative Perspective

The *time-mass dualism* offers a new perspective that challenges this traditional view:

* **Standard view (Theory of Relativity):** The *rest mass* of an object is constant, while *time* is relative (time dilation). * **Alternative perspective:** What if *time* is absolute, but *mass* is variable?

Imagine an "internal clock" (*intrinsic time*) for each particle. This clock ticks faster the *heavier* the particle is. Lighter particles have a slower internal clock.

4 All Constants Become Natural: Energy as the Unifying Principle

The crucial step is now: The time-mass dualism, combined with an *extended* choice of natural units, allows us to express *all* physical constants as *dimensionless numbers*. They become *ratios* of a single fundamental quantity – and this quantity is *energy*. The traditional constants lose their status as independent, given quantities; they become *derived* quantities that emerge from energy.

5 No New Formulas, But a Liberated View of Old Formulas

This approach does *not* lead to completely new equations. We consider the *same* fundamental formulas of quantum mechanics and relativity – but in a *new reference frame* where all constants are dimensionless, i.e., "natural". This seemingly small change has far-reaching consequences because it reveals the *limitations* and *gaps* of previous theories:

1. **Incompleteness of quantum mechanics (from existing formulas):** The *known* formulas of quantum mechanics, transferred into this new system, no longer describe *all* phenomena correctly. They are *incomplete* because they do not fully capture the dynamic relationship between mass, time, and *energy*.

2. **Extension within the existing framework:** Quantum mechanics *must* be extended. But this extension is not achieved through arbitrary new assumptions, but through a *more consistent* application of the *already existing* principles, particularly energy conservation and the inseparable connection between mass and time.

3. **Dual perspectives as the key to reality:** The wave-particle duality and the time-mass duality are not mere "interpretations". They are *hints* that we overlook or misinterpret aspects of reality when we cling to traditional, restricted perspectives. They point the way to a *more real*, *more intuitive*, and *more unified* description of the physical world.

6 Concrete Implications: Toward a More Comprehensive Theory

This "liberated" perspective on physics has concrete implications:

- * **Quantum gravity:** A unification based on an *extended* and *more consistent* QM becomes more tangible.
- * **Quantum entanglement:** The interpretation through intrinsic time questions the *current* QM and opens new perspectives.
- * **Dark energy/matter:** New, *concrete* relationships emerge between mass, energy, and the expansion of the universe that go beyond current models.
- * **Fundamental constants:** A *deeper* understanding, as all constants are traced back to *one* fundamental quantity (energy).

7 Experimental Verification and Conclusion: A New Beginning

This approach is not only theoretical but *experimentally verifiable*. It makes *different* predictions than the *current*, incomplete QM (e.g., with precision clocks and entangled particles of different mass).

The time-mass dualism, the "naturalization" of all constants, and the resulting extension of quantum mechanics are a radical but promising path. They show that we must *fundamentally* reconsider physics – not by discarding proven formulas, but by *liberating* ourselves from traditional constraints and returning to a *more real, more intuitive*, and above all *more unified* perspective. It is a new beginning toward a more comprehensive theory that could solve the great mysteries of the universe.