

# Producing Matter and Energy from Time

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## **Abstract**

In this paper we propose a quantum field theory involving Dark Matter and Dark Energy, explaining the expansion of the Universe. The theory is presented through a Feynman diagram.

**Categories:** **Quantum Gravity and String Theory**  
**Relativity and Cosmology**

## **1) Introduction**

The goal of modern theoretical physics is to arrive at a definitive “**Theory of Everything**” (known also by the acronym TOE), which fully explains and connects all of the known physical phenomena.

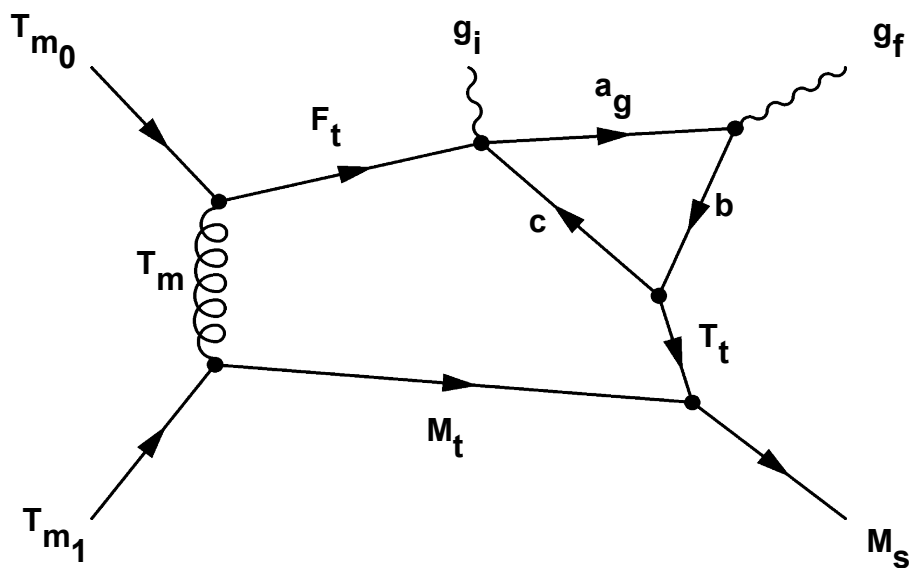
While many theories have been put forward in the last century, none have been experimentally confirmed, not even the 11-dimension **M-Theory** that has been endorsed by some physicists but criticised by others.

The “Theory of Everything” should, therefore, unify the four basic interacting actions in nature (**gravity, strong nuclear force, weak nuclear force, and electromagnetic force**) with **dark energy** and **dark matter** (together they comprise approximately 95% of the universe as we know it), which are composed of basic particles outside of the Standard Model of Physics framework.

## 2) Axioms for the new TOE

In the text that follows, we shall present a **new “Theory of everything”** in anticipation of suitable confirmation that might arrive from experimental laboratories. The axiom of the theory is as follows: there are not four basic interactions (forces) of nature (**gravity, strong nuclear force, weak nuclear force, and electromagnetic force**), but five. Indeed, the fifth is the most important as it is the source of all of the others: **Time**. However, the time we are dealing with here is not “classic time” (also known as  $T_t$ ), which, until now, has been defined as “the dimension in which the passing of events is understood and measured”, but a new particle,  $T_m$ , of which  $T_t$  is only an effect, a perception, just as the fall of the apple is only the perception of gravitational force. As such, the origin of the universe was not a “**Big Bang**”, an “explosion”: it was simply a “**Start**”, a “**Go**” of  $T_m$ . The “setting in motion” of the elementary particle  $T_m$  would have created the dark energy that expands the universe and generates the Einsteinian space/time and the dark matter from which the mass and the known energy are derived.

## 3) Feynman diagram



In this Feynman diagram, the fields  $T_{m_0}$  and  $T_{m_1}$  interact through the  $T_m$  particle to create the dark energy,  $F_t$ , and the dark matter,  $M_t$ .

Interacting with a graviton,  $g_i$ , the dark energy  $F_t$  produces a loop (the  $a_g$ ,  $b$ , and  $c$  segments) that keeps the average density of the universe constant (in accordance with the **Steady-State Theory** that is compatible with **Hubble's Law**) and creates two particles:

- 1) a new graviton,  $g_f$ , which causes the expansion of the universe
- 2) and particle  $T_t$  (which corresponds to classic time).

Interacting with the dark matter  $M_t$ , particle  $T_t$  creates the standard matter  $M_s$ .

In conclusion: both the expansion of the universe and, indirectly, the production of the standard matter  $M_s$  are derived from  $T_m$ .

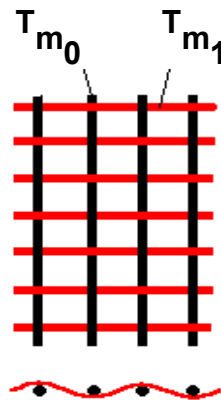
This would mean, then, that  $T_m$  is the real “glue” of the universe, whilst  $T_t$  would only be an effect of the expansion of the universe itself.  $T_m$  (through the interaction of fields  $T_{m_0}$  and  $T_{m_1}$ ) would have generated the  $F_t$  (dark energy) force and the pre-matter  $M_t$  (dark matter) or the **embryonic matter**, which, with the involvement of  $T_t$ , would slowly transform into the mass known as  $M_s$  (atoms and subatomic particles), thereby keeping the average density of the universe itself constant and reconciling the **Steady-State Theory** with **Hubble's Law**.

Furthermore, the discovery of  $T_m$  as a particle does not contradict the **Heisenberg Uncertainty Principle** (a keystone of **quantum mechanics**). To the contrary, it seems to align the **criteria of classical physics** with those of **quantum mechanics** because the aforementioned principle, while formulated for the **position-movement couple**, also proves to be applicable to the other **time and energy couple**.

#### 4) Interaction between $T_{m_0}$ and $T_{m_1}$

We can, therefore, define the universe as a “**fabric**” that is composed of  $T_{m_0}$  (the “**warp**”) and  $T_{m_1}$  (the “**weft**”), which, at the points of contact, generate the primary elementary particle  $T_m$  that encloses both the dark energy,  $F_t$ , which contributes to the expansion of the universe (the aforementioned fabric is elastic, but not homogeneous since the  $T_{m_0}$  and  $T_{m_1}$  frequencies are different) and the mass  $M_t$ , or the dark matter, within itself.

The “**weft**” and the “**warp**” that compose the “**fabric**” of the universe are formed solely by  $T_{m_0}$  and  $T_{m_1}$ , because it is the simplest and yet most complete and effective system possible (see also the neural operation of the human mind, as well as the binary language of computer science/data transmission).

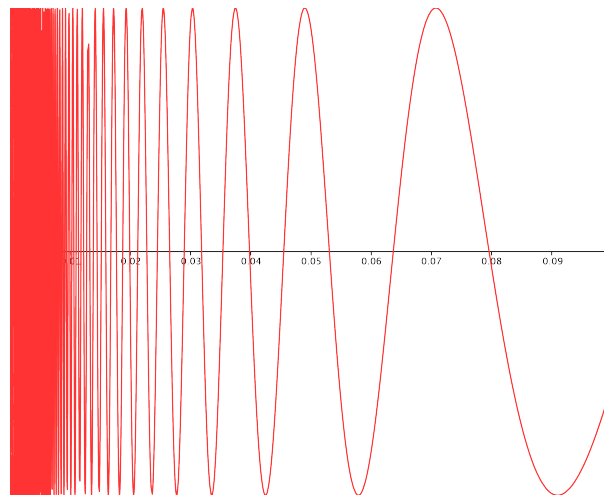


$T_t$ , ordinary time, is both an effect of the expansion of the universe (consequently, if the universe were to stop expanding, ordinary time “would stop”) and the cause of the periodic transformation of  $M_t$  (dark matter) into  $M_s$  (ordinary matter) with the **Timer** function.

We can represent the frequencies of  $T_{m_0}$  and  $T_{m_1}$  as variables in space, with the highest frequencies corresponding to the areas in which the energy,  $F_t$ , and the matter,  $M_t$ , are produced.

This is because: the higher the frequencies the more likely the particles  $T_{m_0}$  and  $T_{m_1}$  will be able to interact.

The following figure is a representation of these frequencies:



We do not see these interactions near our solar system and, therefore, we may assume that we are located far from the  $M_t$  matter and  $F_t$  energy formation areas.

Working backwards, in the very moment that was the “**Start**” of the universe,  $T_{m_0}$  and  $T_{m_1}$  neighbored each other at a point (we shall call this the “**singularity of the Start point**”): the “**Start**” was the event that transformed their frequencies, thereby allowing them to interact.

These points of interaction between  $T_{m_0}$  and  $T_{m_1}$  can be defined as the “engines” of the expansion of the universe, which is accelerating in that the dark energy,  $F_t$ , still represents approximately 72% of the universe’s energy as we know it.

We wish to emphasise that, without dark energy ( $F_t$ ), the expansion of the universe would stop together with time. This would, therefore, leave us with the “end of times”, or the “**Big Freeze**”.

## 5) Gravitational singularity

Aside from the “singularity of the Start point”, as described in the previous paragraph (defined as the point in which the wavelengths of  $T_{m_0}$  and  $T_{m_1}$  are equal to 0), the points at which the frequencies  $T_{m_0}$  and  $T_{m_1}$  are equal to 0 are found at the opposite end.

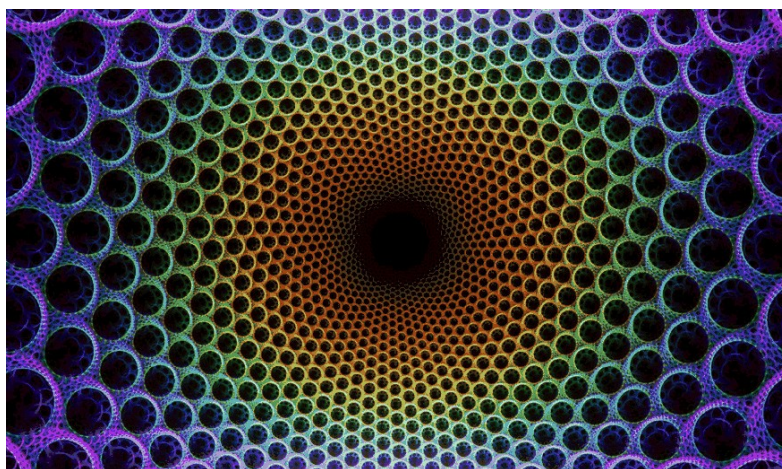
This naturally occurs in the **black holes** where space/time is so deformed that the “**fabric**” defined by  $T_{m_0}$  and  $T_{m_1}$  is stretched (or “stringed”) in such a way that their frequencies are decreased to zero.

A consequence of this is that  $T_{m_0}$  and  $T_{m_1}$  do not interact inside a black hole, causing the “**end of time**” described above.

With our new “**Theory of Everything**”, we explain “**why**” time (or rather, space-time) did not exist before the Big Bang (which, in truth, should be defined as the “**Start**”). The theory that we propose is, in fact, “**background-free**”, i.e. it does not need space-time to exist. Indeed, it explains from where space and time come.

Moreover, we notice that the **Law of Conservation of Information** is not violated. Indeed, there is no relationship between “**information**” and “**time**”: the state of the

matter (and its information) also exists without time (it should be remembered that our theory is “**background-free**”). Therefore, even at the “**end of time**” information is completely preserved.



$T_{m_0}$  and  $T_{m_1}$  fields inside a black hole

## 6) Integration with the Standard Model

It is noteworthy that this new approach to the “Theory of Everything” does not modify the parameters of the **Standard Model**. The decay (average life) of the neutron, for example, remains at 886.8 seconds, the average life of the muon 2.2 us, and the magnetic moment of the same muon  $4.4904514 \cdot 10^{-26}$  J/T.

As an example, note how the **standard matter can have a charge** (a similar logic also applies to the other physical properties such as spin, strangeness, taste, etc.).

The loop that keeps the average density of the universe constant (segments  $a_g$ ,  $b_t$  and  $c$  of the previous Feynman diagram) is able to generate particle  $T_t$  (corresponding to classic time) that has, moreover, an “**alternate charge**” (+1, -1, 0).

If we suppose that, at the beginning of the loop, the particle  $\mathbf{a}_g$  (“anti-gravity”) has a 0 charge, particle  $\mathbf{b}$  will have a 0 charge; at this point,  $\mathbf{b}$  decays in particle  $\mathbf{T}_t$  with a +1 charge and in particle  $\mathbf{c}$  with a -1 charge.

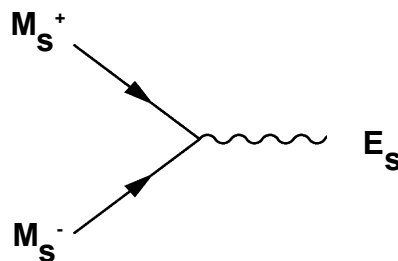
In the next phase,  $\mathbf{a}_g$  shall, therefore, have a -1 charge,  $\mathbf{b}$  a -1 charge, and  $\mathbf{T}_t$  a -1 charge, whilst  $\mathbf{c}$  will have a 0 charge.

Continuing in the loop:  $\mathbf{a}_g$  will have a 0 charge and the cycle will be repeated.

Consequently, the  $\mathbf{M}_s$  produced by the interaction between  $\mathbf{M}_t$  (0 charge) and  $\mathbf{T}_t$  (alternatively with a +1 and -1 charge will have a **NOT NULL charge**.

Finally, particle  $\mathbf{b}$  may also statistically decay in a 0-charge particle  $\mathbf{T}_t$ , with, consequently, a 0-charge  $\mathbf{M}_s$ .

**The Standard Energy** is generated by the annihilation of the standard matter  $\mathbf{M}_s$  with a +1 charge and of the standard matter  $\mathbf{M}_s$  with a -1 charge, as shown in the following Feynman diagram:



## 7) Experimental setting

Note that, in this construction, time  $\mathbf{T}_t$  allows for a charge. This can be experimentally verified by studying the behaviour of an atomic watch close to a large magnet.

With the means available to us, we “see” neither the  $\mathbf{T}_m$  particle (interaction between  $\mathbf{T}_{m_0}$  and  $\mathbf{T}_{m_1}$ ) nor dark energy ( $\mathbf{F}_t$ ) and dark matter ( $\mathbf{M}_t$ ) (which, together, account



for approximately 95% of the universe as we know it and, in this case, the mathematics and the “physical effects” that have already been verified are exact). This is because, although present and operating in the same universe, they are in a “state” of **embryonic pre-matter** and **pre-energy** (see diagram) with respect to  $M_s$  and  $E_s$  (the matter and the energy of the Standard Model, experimentally known and equal to approximately 5% of our universe, less the “**Higgs boson**”).

It is noteworthy that we are speaking exclusively about a different “**state**” of matter and the energy that is incompatible with the focus of the current experimental verifications.

However, we could, for example, demonstrate experimentally that ordinary time ( $T_t$ ) has alternate charges (+1, -1, and sometimes 0) and, thereby, have the first concrete confirmation of the new “Theory of Everything”. We could then act on the ordinary time ( $T_t$ ) itself, which is subject to precise and noted physical laws, such as the speed of expansion of the universe and possible interaction (which we have also already outlined) with a powerful and directional electromagnetic field, etc.

## 8) Conclusions

Based on the new “Theory of everything”, our young universe (which is in continuous and irreversible expansion and acceleration) still possesses an enormous “**life reserve**”, even if, as an “isolated system” in line with the second law of thermodynamics, its destiny would be an entropic death that should inexorably lead it towards an inevitable, but still far off, “**Big Freeze**”.

### Bibliographic references

- [1] Brian Greene, *La trama del cosmo*, collana Einaudi tascabili - Saggi, traduzione di Luigi Civalleri e Adria Tisconi, Einaudi, 2006
- [2] Brian Greene, *L'universo elegante - Superstringhe, dimensioni nascoste e la ricerca della teoria ultima*, collana Super ET, Einaudi, 2005

- [3] Feynman, R.P., *Quantum Electrodynamics*, Perseus Publishing, 1998
- [4] Stephen W. Hawking, *La Grande storia del tempo*, BUR SCIENZA, Rizzoli, 2006
- [5] Stephen W. Hawking, *La Teoria del tutto*, BUR SCIENZA, Rizzoli, 2004
- [6] Vernon Barger, Wai-Yee Keung, Danny Marfatia, *Electromagnetic properties of dark matter: dipole moments and charge form factor*, [arXiv:1007.4345](https://arxiv.org/abs/1007.4345)
- [7] Joschka Beyer, Sami Nurmi, Christof Wetterich, *Coupled dark energy and dark matter from dilatation anomaly*, [arXiv:1012.1175](https://arxiv.org/abs/1012.1175)
- [8] Thomas Buchert, *Towards physical cosmology: geometrical interpretation of Dark Energy, Dark Matter and Inflation without fundamental sources*, [arXiv:1012.3084](https://arxiv.org/abs/1012.3084)
- [9] Christopher D. Carone, Joshua Erlich, Reinard Primulando (William and Mary), *Decaying Dark Matter from Dark Instantons*, [arXiv:1008.0642](https://arxiv.org/abs/1008.0642)
- [10] Spencer Chang, Rafael F. Lang, Neal Weiner, *Impure Thoughts on Inelastic Dark Matter*, [arXiv:1007.2688](https://arxiv.org/abs/1007.2688)
- [11] S. Chatterjee, *Inhomogeneities in dusty universe - a possible alternative to dark energy?*, [arXiv:1012.1706](https://arxiv.org/abs/1012.1706)
- [12] Adam J. Christopherson, *Gauge conditions in combined dark energy and dark matter systems*, [arXiv:1008.0811](https://arxiv.org/abs/1008.0811)
- [13] Max I. Fomitchev, *Dark Matter and Dark Energy as Effects of Quantum Gravity*, [arXiv:1009.1369](https://arxiv.org/abs/1009.1369)
- [14] Yasunori Fujii, Kensuke Homma, *An approach toward laboratory searches for the scalar field as a candidate of Dark Energy*, [arXiv:1006.1762](https://arxiv.org/abs/1006.1762)
- [15] Mingzhe Li, Yifu Cai, Hong Li, Robert Brandenberger, Xinmin Zhang, *Dark Energy Perturbations Revisited*, [arXiv:1008.1684](https://arxiv.org/abs/1008.1684)
- [16] Heather E. Logan, *Dark matter annihilation through a lepton-specific Higgs boson*, [arXiv:1010.4214](https://arxiv.org/abs/1010.4214)
- [17] M.Hirsch, S.Morisi, E.Peinado, J.W.F.Valle, *Discrete dark matter*, [arXiv:1007.0871](https://arxiv.org/abs/1007.0871)
- [18] Jonathan A. Pearson, *Charge, domain walls and dark energy*, [arXiv:1010.3195](https://arxiv.org/abs/1010.3195)
- [19] Christophe Ringeval, Teruaki Suyama, Tomo Takahashi, Masahide Yamaguchi, Shuichiro Yokoyama, *Dark energy from primordial inflationary quantum fluctuations*, [arXiv:1006.0368](https://arxiv.org/abs/1006.0368)

- [20] Burra G. Sidharth, *Dark Matter, Gravity Waves, Higgs Bosons and other Elusive Entities*, [arXiv:1011.4575](https://arxiv.org/abs/1011.4575)
- [21] Fergus Simpson, *Scattering of Dark Matter and Dark Energy*, [arXiv:1007.1034](https://arxiv.org/abs/1007.1034)
- [22] Cheng-Yi Sun, *Interaction between Dark Energy and Dark Matter Crosses Non-interacting Line*, [arXiv:1009.1214](https://arxiv.org/abs/1009.1214)

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