

“Creativity
is making the complicated simple.”

CHARLES MINGUS
JAZZ LEGEND

P R O L O G U E

The Creative Director

I am a creative director, not a physicist or an astrophysicist. Viewing situations from a new or unexpected angle is something I do for a living.

Thought experiments

Many of the most creative minds in human history have been in non-artistic fields. One of my favorites, Albert Einstein would routinely apply his unparalleled creativity to thought experiments in which he would examine a hypothesis and think through its consequences without the aid of physical experiments or the observation inherent in them.

A short while back, for some inexplicable reason, I decided to embark in a task reminiscent of Einstein's thought experiments. The topic was **time travel** and what follows is the result of such an exercise.

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By: J. M. SAGARDIA

Travel in time

Who wouldn't want to travel to the past and watch a historical event in person, change a particular event in one's life, or go to the future to see what's coming? Yes, traveling to other ages has always fascinated humankind. But the fact is that we have been traveling in what we perceive as time all along. When we move through three-dimensional space we do so in time. You need time to go from New York to Paris. Not because time is a path you must traverse, but because you are traveling in time, in the present time to be precise. Let me explain...

Picture yourself going to Paris using a *highway* that's called time. In this peculiar *highway* the length will be measured in hours instead of miles. So, if you were departing from New York at the speed of a passenger airline plane, then the length of that time *highway* would be approximately 7 hours. At the end of your 7-hour trip you would have traveled from New York to Paris through time.

We have been traveling in time all our existence. Granted, only in the present time and only in one direction: towards the future, but in time nonetheless. What we really want to accomplish when we colloquially say, “travel in time” is actually to step away from the present and travel **outside of time**.

What is time?

In order to address the topic of traveling outside of time we must start by understanding what time is. Easier said than done. Defining time is one of the hardest things physicists and philosophers have faced through the ages. Some believe that it doesn't exist at all; that it is an illusion. Others see it as a human construct, something we have devised to order our existence. Nevertheless, one of the most widely accepted definitions of time states that it is a dimension, the fourth dimension in our space-time continuum. But if time is a dimension, what does it add to the other three?

We know that when we have one dimension we have a line. When we have two dimensions we have a flat plane. And when we add depth to that plane we have three-dimensional space. But, what happens to that three-dimensional space when we add the fourth dimension we call time? What are we adding?

To answer this we must first envision **a universe without time**.

Three-dimensional space and no time

Traveling outside of time means that we would traverse through a three-dimensional space that lacks time. What is this space like?

A timeless space is actually a very peaceful place, although after a short while it becomes extremely boring. The reason being that there won't be any movement whatsoever.

Barring time entails that it would be impossible to define rate of speed since speed is defined as distance moved divided by the time it takes to complete the movement.

$$r = \frac{d}{t}$$

No time means that the equation for speed would be a division by zero, an operation that produces an undefined result.

First let's explain why a division by zero is considered undefined. The following example explains it in very simple terms:

$$\text{If } \frac{8}{4} = 2 \quad \text{then } 8 = 2 \times 4$$

But if we substitute 4 by zero then we would have:

$$\frac{8}{0} = \textit{what?} \quad \text{and thus } 8 = 0 \times \textit{what?}$$

It's impossible to have a number that multiplied by 0 would give a result other than 0, so the equation $8 = 0 \times \text{what?}$ has no answer.

Ok, so this simple exercise explains why a division by zero is considered undefined, so let's go back to the formula for speed:

$r = \frac{d}{t}$ where r stands for rate of speed, d stands for distance and t is time.

If time doesn't exist, then t becomes zero and the formula produces an undefined result

$$r = \frac{d}{0} = UNDEF$$

This leads to a significant finding about time's effect on our universe...

Taking time out of the equation

Let's see what happens when we take the time factor out of Albert Einstein's famous equation: $E = mc^2$

In this equation E stands for amount of energy, m equals mass, and c is the speed of light. It is precisely this last element of the equation, the speed of light, which creates a very interesting situation in the absence of time.

Let's see:

$$E = mc^2$$

Let's substitute m by its unit of measurement (Kilograms) and c by its value and units (299,792.458 Kilometers/second):

$$E = Kg \left(\frac{299,792.458 Km}{1s} \right)^2$$

Now let's substitute time by zero:

$$E = Kg \left(\frac{299,792.458 Km}{0s} \right)^2$$

We end up with the mass being multiplied by the product of a division by zero, something we have established it's undefined:

$$E = Kg(UNDEF)^2$$

Therefore the amount of energy would be undefined since it would be the product of the mass multiplied by an undefined amount.

So the amount of energy is undefined, but what about the amount of mass in a timeless environment?

From Einstein's equation $E = mc^2$ we can derive:

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

Again, we substitute c by its value and units (299,792.458 Kilometers/second):

$$m = \frac{E}{\left(\frac{299,792.458Km}{1s}\right)^2}$$

Substitute time by zero:

$$m = \frac{E}{\left(\frac{299,792.458Km}{0s}\right)^2}$$

Let's write down the squared denominator as a multiplication:

$$m = \frac{E}{\left[\left(\frac{299,792.458Km}{0s}\right)\left(\frac{299,792.458Km}{0s}\right)\right]}$$

Now, lets solve the equation in the denominator and rewrite the division by a fraction changing it to its proper alternate form of a multiplication by its inverse:

$$m = \frac{E}{\left(\frac{89,875,517,873.682Km^2}{0s^2}\right)}$$

$$m = \frac{E}{1} \times \frac{0s^2}{89,875,517,873.682Km^2}$$

Zero seconds divided by 89,875,517,873.682 Km² produces a result of 0, thus:

$$m = \frac{E}{1} \times 0$$

Mass equals the amount of energy multiplied by zero, hence mass equals zero:

$$m = 0$$

In the absence of time there is no mass! Or in other words, **matter needs time to exist!**

What time adds to three-dimensional space

What time does, as the fourth dimension, is add matter to three-dimensional space.

So we can say that time, instead of being a path through which we move into the future, it's the dimension that allows the future to materialize.

Time allows the material universe to be! **It's the great materializer!**

Going back to the time *highway* image

The reason we need time in order to go from New York to Paris is that we need every step of the trip to materialize in order for us to reach Paris. The trip becomes a construction process that requires 7 hours to be completed. Without time, the moment of us in Paris would not materialize.

This view changes what we measure as time. But we don't have to come up with new units of measure; we can use the current units of time. But, instead of using them to measure the amount of time, we use them to measure the length of the materializing process. The materializing process of going from New York to Paris on a plane is seven hours long.

The Big Bang

The concept of time as the materializer simplifies the explanation of a big bang type event as the starting point of our known universe. The big bang becomes literally "the beginning of time". The moment when time came in contact with three-dimensional space, and matter started to form creating the space/time continuum as we know it today.

The primordial three-dimensional field of energy

This approach also allows us to visualize what existed before the big bang. Let's go back to the measurement of energy that was established as "undefined" earlier:

$$E = Kg(UNDEF)^2$$

We got there through this equation:

$$E = Kg\left(\frac{299,792.458Km}{0s}\right)^2$$

Now, let's add the quantity of mass in a timeless universe which has been determined to be 0:

$$E = 0Kg \left(\frac{299,792.458Km}{0s} \right)^2$$

This takes us to:

$$E = \frac{0}{0}$$

The division of zero by zero is considered “indeterminate” and one of its possible results is infinity, thus, it is possible that in a timeless universe energy is infinite:

$$E = \infty$$

In deriving his $E = mc^2$ formula Einstein visualized a central source emitting energy evenly in all directions so as to stay in the same place. Now let's take that visualization and eliminate the mass of the source and keep only the three-dimensional field of energy. Add to that the possibility of that energy field to be infinite and we have an image of what existed before time merged with three-dimensional space: an infinite three-dimensional *field of pure inert energy devoid of all matter* in a timeless environment. I call this primordial energy field **“the infinite singularity”**.

Traveling outside of time

This insight tells us that only energy can exist in the absence of time. Therefore, traveling outside of time would only be possible if we eliminate all matter. Only pure energy can travel from one point to another in three-dimensional space outside of time. And since there's no speed because there's no time then the "trip" becomes something different from what we are used to in terms of movement. Some might be tempted to describe it as energy flowing from one point to another, but the fact is that even a slow flow would have speed and we have established that there can be no speed in the absence of time. So, how can one "move" when there's no speed?

To answer this we must first understand the nature of a three-dimensional field of pure energy in a timeless environment. The closest we can get to that in our fourth dimensional reality is the universe of our mind. It is filled with thoughts, ideas, emotions and memories. Each one of them occupies a position in the energy universe that is our mind. And when you go from one to another you travel through this space of pure energy. And how do you do it? You shift your focus. You change your point of concentration. That's how you go from point A to point B in an energy environment unaffected by time.

If you were an entity of sentient energy traveling outside of time, your interaction with the universe would be quite different from what you experience

now as a being with a physical body. Your energy form would merge with its surroundings and, as one becomes all, going from point A to point B is an instantaneous event guided simply by a shifting of your focus, just as you can shift your mind from focusing on your hand to focusing on your foot.

Past, present and future

Our view of time as a materializer gives us the foundation to define what the past, the present and the future really are. They no longer would be seen simply as stages on the path of time but as three concepts very different in nature from one another.

If time is a materializer, then what we call *the past* is a solid construct. Something like frames in a movie with each frame being a moment in time. The moments exist forever, unaltered, created by the effect of time on the three-dimensional space of energy, and spilling over into our present. See, we are actually living “in the past”. Everything that surrounds us is a remnant of the past; an existing past construct that spills over into our *now*.

The future, on the other hand, is an atemporal field of energy, a three-dimensional field devoid of matter because it hasn't been affected by time yet. While *the past* is a material world, *the future* is an all-energy environment.

The present is the edge of time. It's where our conscience lives, between the built *past* and the still-to-be *future*. We live at the edge of time, at the exact moment when time touches the atemporal field of energy that is *the future* and fills it with matter. *The present* is the dynamic materializing process of the universe.

As you can see, *the past*, *the present* and *the future* are three very different things. *The past* is a material construct. *The present* is a materialization process. And *the future* is an all-energy field.

Visiting other moments in time

Following our reasoning, a moment, once constructed, stays there in the material world of the past for anyone to visit later on. On the other hand, all we would experience if we travel to the future is an energy field.

When physicists talk about traveling to the future what they mean is that, theoretically, man can accelerate his pace through time by approaching the speed of light. The most common example used for this "trip to the future" is the classic "Twin Paradox".

The example presents a set of twins. One goes on a spaceship traveling close to the speed of light and the other one stays on Earth. After a year and a half of traveling, the twin on the spaceship returns home and finds out that the twin that

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stayed on Earth is now 50 years older although for him only a year and a half has elapsed.

Even though it would be understandable for the traveling twin to think that he has traveled to the future, the reality is that he just experienced the present time at a different pace than his brother. Einstein called this effect “time dilation” and it’s a very different concept than what science fiction writers have envisioned through generations in their time-traveling adventures into the future.

Some physicists have adopted the theory of multiple realities - multiple futures dependent on the choices made by people in the present. But, even though we agree that the future is fully choice-dependent, our theory suggests that only one future will materialize when the edge of time that is the present reaches its particular point in the energy field that is the future.

So it seems that traveling to the future would never be the exciting adventure brought forth by science fiction writers through the ages, but a boring immersion in an endless sea of energy.

Traveling to the past is another story since it is a material world sitting there unaltered forever. Every moment in human history is a physical construct as solid as Paris or New York. But in order to visit the past, we must first break away from the present and step outside of time. Since matter cannot exist outside of time, to accomplish that we must first become energy.

Energy travel

If traveling outside of time can only be achieved in an all-energy state then there would be three ways of accomplishing it: body separation, dematerialization, energy transport.

Body separation – Some people and cultures claim they have being able to do this. Some times known as out-of-body travel or astral projection, this method consists of separating our energy self from our physical body and traveling through our space-time continuum without any barriers.

Dematerialization - This is the method made famous by the series Star Trek. The individual is converted into energy and transported through space to another location where he or she is rematerialized. Although in the series the method was not used to travel through time we believe that the dematerialization approach would make traveling outside of time possible.

Energy transport – This would entail building a vehicle made out exclusively of energy. It would make its crew seem like all-energy beings while inside the craft thus allowing them to travel in their physical forms outside of time. This approach would avoid the perils inherent in a dematerialization process.

The dematerialization and energy transport approaches are out of our realm of possibilities at the moment. We are not even close to being

technologically close to achieve them. But the body separation approach seems attainable in the foreseeable future.

Stephen Hawking's time travel experiment

In 2009 Dr. Stephen Hawking conducted an experiment in an attempt to prove that time travel will exist in the future. He organized a party for time travelers and announced the time and location of the party after the event was over. The idea was that the only way to attend was to find out in the future and travel back in time to attend. Dr. Hawking concluded that time travel to the past was not possible because nobody showed up the day of the event. Or did they?

If traveling outside of time can only be possible in energy form, then the time travelers that made it to Dr. Hawking's party could have only shown up as energy. Was the energy level at Dr. Hawking event measured? Was there any difference in the energy levels before and during the event? Does a time traveler affects the energy level at its destination? What energy frequency should we be looking at?

In his book *Cosmic Evolution*, Astrophysicist Eric J. Chaisson presents his findings on energy requirements associated to increased complexities in the universe. In order to compare the energy used by the Sun to the energy used by our brains he incorporated the factor density into the equation as an equalizer. When the difference in density is taken

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into account the comparison shows that our brain uses 75,000 times as much energy as the Sun.

This is the amount of energy used by our brain, the organ that houses the energy universe that is our mind!

With such an energy consumption related to our mind, we would expect some type of energy signature to show up in a place where a time traveler has arrived.

As for the time travelers that would use the dematerialization or energy transport methods to get to Dr. Hawking's party in their physical forms, their absence could be explained by the following. The dematerialization method would need a rematerializer at the destination in order for the traveler to arrive and regain his or her physical form. This limits its back-in-time traveling capability to the point in time when the first rematerializer is invented. Since this hasn't happened yet it would have been impossible for time travelers to use this method to get to the party.

The energy transport method can present such high complexities that its creation could very well be impossible. On the other hand, maybe it becomes feasible in the distant future, but it would have the limitation that travelers cannot step outside the energy vehicle because of dangers associated to traveling outside of time in physical form - an impossibility they have managed to circumvent but

that comes with the price of having to stay inside the vessel at all times (no pun intended).

Mind over matter

We have established that sentient energy would experience the universe as an energy field, and that movement within that energy field is instantaneous and subservient to focus.

But, if we are in an all-energy three-dimensional space traveling outside of time how can we experience the material time construct that cannot exist in such a place? How do we re-enter the space/time continuum?

The answer lies with the existence of our mind's all-energy universe in our fourth-dimensional world. Matter cannot exist in a universe without time, but nothing prevents a matterless energy field to exist in our space-time continuum. So, once it becomes possible for a person to travel outside of time in an all-energy form, he or she will be doing so within our reality. The fact that the traveler has to become an energy being doesn't imply that he or she has to leave this plane of existence. We wouldn't have to re-enter the space-time continuum because we never leave it. What would change is your perception of reality because you would be able to experience the world's energy component clearly and thus move through it as you would in a timeless all-energy environment.

In order to better visualize this I propose the following:

Within yourself resides the all-energy universe that is your mind. When you are transformed into an all-energy being, the only thing that will remain the same is your mind because it already was in the energy state needed. Your mind has been managing your physical body throughout your life and, since it remains the same in the transformation, it will continue to do so with your "new" energy self. The key to moving as an energy being in an energy field is your mind.

The timeless paradigm

We have presented a notion about time that changes the paradigm that has served as the basis for many a view on the concept. A definite explanation of time has challenged the most brilliant minds in history. I don't pretend to count myself among them. I respect and admire them too much to think for even a second that I can stand in their shadows. I just want to add my two cents worth of conceptual analysis to the topic.

I've been a creative director for the past 25 years. I'm not a physicist; I'm a concept man. That's what I do for a living, and that's why I've taken time to tackle the concept of time from a new perspective. The process has been a very fulfilling one regardless of the outcome.

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This *Timeless* paper has been written. It's now part of that physical construct we call the past, and it will stand there forever. What will happen with it lies in the atemporal energy field that is the future. We will know what happens to it only when the materializing process we call the present enters in contact with that energy field and the *Timeless* destiny is physically manifested.

Until then, enjoy it, question it, challenge it.

E P I L O G U E

Higgs field's time

The Higgs field is a concept closely related to the Higgs boson, or God's particle. It has been conceived as an invisible field that exists throughout the universe interacting with energy to give it mass. Our theory opens the door for this field to be *time*, the great materializer in our universe.

The Higgs boson as a tool of time

The Higgs boson is popularly referred to as “God’s particle” because it is the particle endowed with the ability to add mass to energy, thus allowing matter to exist in our universe. If our theory of time as the dimension that allows matter to exist is true, then the Higgs boson would be an agent of time. Time’s materializing tool.

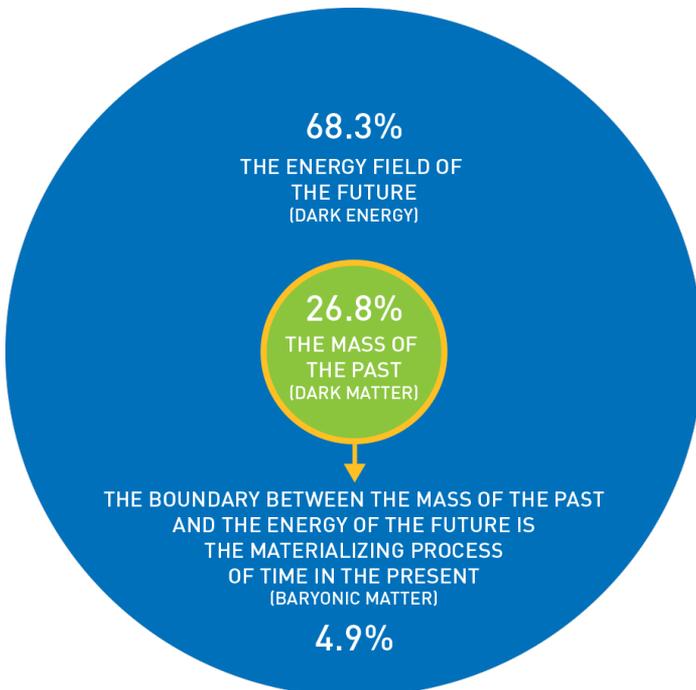
Dark matter and dark energy

Dark matter is a hypothetical concept created to explain the fact that there should be much more matter in the universe to explain the existing gravitational forces. Astrophysicists have found that the visible universe can only account for approximately 15% of the total mass needed for the gravitational forces in play in our known universe to exist as they do. So, the dark matter concept was created to account for the missing mass.

On the other hand, dark energy is another hypothetical concept created to explain why the universe seems to be expanding at an accelerated rate. Current measurements indicate that 68.3% of all the energy in the universe is dark energy, the energy in dark and ordinary (baryonic) matter is measured at 26.8% and 4.9% respectively. This last one is the amount of matter in the universe that we can actually see and account for without the use of theoretical concepts.

But what if all that missing mass, instead of being some mysterious dark matter that cannot be seen or detected, it's the mass of the past as we have presented it here: a physical construct? And what if the dark energy that accelerates the expansion of the universe is simply the future as we have described it in this essay: a field of energy that hasn't been touched by time yet?

Let's take this idea a step further. Here's a diagram that illustrates how this concept would affect our vision of the universe:



And here's some interesting math. Let's say that the size of the universe is 100. That means the size of the past is 26.8 and the future is 68.3. The radius of a circle with an area of 26.8 is:

$$r = \sqrt{\frac{26.8}{3.1416}} = 2.92$$

And the circumference of that circle is:

$$2 \times 3.1416 \times 2.92 = 18.347$$

Since such a circumference stands for a boundary between the past and the future, and that boundary has a total area of 4.9, then the "thickness" of that boundary is approximately:

$$4.9 \div 18.347 = 0.267$$

A number eerily similar to the 26.8% of dark matter believed to exist in the universe. Could it be that the universe is expanding at a rate directly related to the mass of the past? Could the expansion of the universe be accelerating because the present is becoming larger?

An observation on time paradoxes

When discussing the topic of time travel, many scientists bring up the issue of paradoxes in time. One of the most used examples of what this entails is what has come to be known as the “Grandfather Paradox”. This example illustrates a time paradox using the following scenario:

A person travels back in time and kills his grandfather before he meets his grandmother. This stops the birth of his father and eliminates the time traveler from the time continuum thus preventing him from going back in time to kill his grandfather to begin with.

If travelling outside of time can only be achieved by becoming an entity of pure energy then, most likely, interaction with past events would be impossible. We could only be observers of past events hence eliminating the possibility of creating time paradoxes.

Opening a door on wormholes

Einstein-Rosen bridges or wormholes, as theorized, are shortcuts through space/time. But, if traveling instantaneously across the universe is a result of traveling outside of time, then couldn't a wormhole be a point in space devoid of time? By our definition, a place of pure energy where no matter exists? A tunnel outside of time?

Bright lights in the sky

Many UFO sightings refer to bright lights in the sky. Sometimes these lights don't seem to have substance. Could they be travelers from other points in our space-time continuum using energy transports to travel vast interstellar distances outside of time?

TWENTY FIFTH OF MAY OF TWO THOUSAND SEVENTEEN