

# SCIENTIFIC PROOF OF A UNIVERSAL PRESENT MOMENT

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# THE TWINS EXAMPLE

1. It's well known from relativity that time is observed to pass more slowly on the clock of a relatively moving object. This is called *time dilation*.
2. This is illustrated by the well-known *Twins Example* where one of two twins embarks on a space flight at relativistic speeds and returns to Earth some years later younger than the twin he left behind, with less time having passed on his clock.
3. Time dilation is well-established, measured on the ISS, and is used to program the accuracy of GPS satellites.

# THE COMMON PRESENT MOMENT

1. However, the important fact that isn't properly understood is that even though their clocks show different times *both twins reunite in a common present moment*.
2. Thus, there are clearly *two distinct types of time, the actual proper time reading of a clock, and the current present moment* in which clocks can read different proper times.
3. What is this current present moment and is it universal or just local? This is an extremely important question this talk definitively answers.
4. Many physicists doubt the existence of a universal present moment even though it's intuitively obvious that for every moment of Earth time there should be only a single well-defined moment of time happening everywhere else. In fact, *there is such a universal now*, and once we understand what it actually is, it's easy to prove it exists using relativity itself.

# TIME DILATION

1. In relativity, a *frame* is the view of spacetime from a particular inertial perspective. Observers typically view spacetime in terms of frames in which they are at rest (comoving with the frame). Inertial frames are used because they provide consistent views of spacetime.
2. In relativity the *elapsed proper time* (distance advanced in time) of a clock moving relative to a frame is  $c d\tau = \sqrt{c^2 dt^2 - dx^2}$ . The elapsed proper time of a relatively moving clock equals the square root of the square of the elapsed time on a stationary (comoving with the frame) clock minus the square of the spatial distance traversed by the moving clock.
3. [Distances in time are multiplied by  $c$ , the speed of light, to put them in the same units as spatial distances so both can be added and subtracted.]
4. This equation actually holds for every clock in the frame including stationary clocks whose velocities relative to themselves are zero. The greater distance traveled in space, the less distance (less elapsed proper time) traveled in time.

# SPACETIME DISTANCE

1. Now this equation can be rewritten as  $cdt = \sqrt{c^2d\tau^2 + dx^2}$ . The square root of the sum of the squares of elapsed time (distance through time) and distance through space of all clocks viewed from a frame equals the elapsed time on a clock comoving with the frame. Or more simply the vector sum of distance in space and distance in time of all objects viewed from a frame is identical.
2. This applies to everything that exists without exception including light. Everything in the universe viewed from any frame continually moves the same distance through spacetime (combined space and time) as light does at the speed of light.
3. And since the speed of light is the same in all frames, everything moves the same distance through spacetime as light per unit time in every frame.
4. This *identical spacetime distance everything moves per unit time is the definition of the current present moment.*

# FUNDAMENTAL PRINCIPLE OF RELATIVITY

1. Thus, we have a *fundamental principle of relativity; that everything that exists is observed to have a continuous velocity through spacetime equal to  $c$ , the speed of light in a vacuum.* There are no exceptions.
2. If there is no velocity through space, things move through time at the speed of light.
3. If there is any spatial velocity, the velocity through time is decreased so the total spacetime velocity remains equal to  $c$ .
4. And since light has no intrinsic velocity in time, all its speed of light velocity is through space. This is why light itself always moves through space at the speed of light.
5. This is a universal principle true in all cases in all frames for everything that exists, but to properly understand it we must properly understand spatial velocity.

# UNDERSTANDING SPATIAL VELOCITY

1. Observers in relative motion each observe the other having equal and opposite spatial velocities. Thus, each observes the clock of the other running slower so its total space plus time velocity remains equal to  $c$ .
2. We can call this *observational time dilation* since it ceases as soon as the relative motion stops with no permanent effect on either clock.
3. On the other hand, if a clock moves in space relative to its *own original inertial path (OIP)* it undergoes an *actual time dilation* that produces a permanent effect. Specifically, as John Baez of Caltech says, “Time Dilation is due to deviation from an inertial path.”
4. This is what happens in the Twins example. During their separation both twins observe the clock of the other running slower due to observational time dilation, but when they reunite only the clock of the space traveling twin shows less actual elapsed proper time since only he deviated from the original inertial path he shared with the Earth.

# ACTUAL VERSUS OBSERVATIONAL TIME DILATION

1. Thus, *actual time dilation* is the actual slowing of a clock and is due entirely to its own motion, not to how it's observed.
2. *Observational time dilation* is the apparent slowing of a relatively moving clock. It depends entirely on the relative motion and ceases as soon as the relative motion stops. Of course, observational time dilation is *a valid actual observation*, but it doesn't affect the clock that's being observed.
3. In the Twins, the Earth is assumed to maintain an inertial path from which it doesn't deviate, thus the Earth twin undergoes no actual time dilation.
4. In contrast the space traveling twin deviates from the original inertial path he shared with the Earth, and thus he undergoes an *actual* time dilation.
5. This is why when they reunite only the space twin is actually younger, having traveled a lesser distance through time because only he deviated from his OIP.



# ACTUAL VERSUS OBSERVATIONAL VIEWS

1. So, because of their relative motion, the Earth and space twins have different observational views of their paths between separation and reunion events.
2. However, since the Earth twin doesn't deviate from his OIP, and it's also the OIP of the space twin, his view is the view that shows the *actual time dilations of both twins*, and in which *their actual common present moment sweeps upward along the paths of both twins in sync with the Earth clock*.
3. Of course, both views are *valid relativistic views*, but only the Earth view represents the *actual* ongoing time dilations of both clocks and their shared present moment correctly. Only for a frame with no deviation from an OIP does the observational view capture the actual view.
4. So, *to view the actual time dilation and present moment of any spacetime path it must be viewed from its original inertial path*.

# PROOF OF A UNIVERSAL PRESENT MOMENT

1. *So, the actual time dilation and actual present moment of every path in the universe can be correctly seen from the frame of its OIP.*
2. Now time passes at *the same intrinsic rate* in all OIPs since they have no actual time dilation. Thus, the unit time rate of all OIPs is identical and universal.
3. This means that everything in all OIPs continuously moves the same number of identical time units at the same  $c$  velocity through spacetime as everything else.
4. *So the actual distance everything in all OIPs continuously travels through spacetime is identical.*
5. And since the total distance traveled through spacetime is the current present moment, and it's the same for everything that exists, everything in the universe is in the same current present moment.
6. *Thus, there is a universal current present moment, defined as the identical total spacetime distance everything in the universe is currently at.*

# COSMOLOGICAL IMPLICATIONS

1. There is a universal process of happening, dating back to the big bang, that carries everything that exists along with it through spacetime at the speed of light.
2. Thus, the entire universe and everything in it exists only in the current universal present moment. *There is a common current universal now.*
3. In every tick of present moment time everything moves through spacetime the same distance as light at the speed of light. In each tick local elapsed proper times are computed based on actual spatial velocity relative to an OIP.
4. Everything that exists has one and only one *actual current proper time* in every tick of universal present moment time, and these may differ.
5. Outside of this universal current present moment there is not even nothing.
6. This discovery has no effect on standard observational relativity in which frames continue to observe each other exactly as before.

# EXTENSION TO GENERAL RELATIVITY

1. Gravitational fields are best modeled as fields of intrinsic spatial velocity in the form of ultrafine vibrations of space itself. See my book *Universal Reality 2.0* for the specifics.
2. Objects within gravitational fields experience this spatial velocity and as a result their *actual velocity through time* decreases so their total spacetime velocity always remains equal to  $c$ . This is called *gravitational time dilation*.
3. Thus, the original inertial path of an object in a gravitational field is what that same path would be in empty space where the gravitational field didn't exist.
4. Seen from its empty space OIP, the actual time dilation and present moments of any path in a gravitational field are correctly viewed.
5. Thus, our proof of a current universal present moment holds for the entire real actual universe.

I believe this proof, first published by me 1/23/2020, is an important advance in our understanding of relativity and the universe. I challenge anyone to find a single error. I can be contacted at [EdgarLOwen@icloud.com](mailto:EdgarLOwen@icloud.com).

This is all explained in much greater detail in my *Complete Theory of Everything* at [EdgarLOwen.info](http://EdgarLOwen.info). Thanks for watching and I hope you find our universe as wonderful and inspiring as I do!