

# The Ultimate Secrets of the Universe

## Fundamentals Series

### 3: Computing a Relativistic Universe.

In each tick of processor time, the universal processor runs a separate *instance (copy)* of the elemental program to compute each coherent particle process in the universe. This is done in a manner that automatically creates a relativistic universe.

The key principle of relativity is that everything in the universe, including us, is continuously moving through the 4 dimensions of spacetime at  $c$ , the speed of light in a vacuum. This is what we experience as our passage through clock time in the present moment.

If we have no spatial velocity, we continually travel only through time at the speed of light. But if we have some actual spatial velocity, our velocity through time is slowed so our total 4-dimensional velocity through spacetime always remains equal to  $c$ . This slowing of time is called *relativistic time dilation* and has been extensively verified.

To compute a universe in which this is true, the processor just needs to use the same large *fixed number of cycles* to compute each tick of processor time for each particle process. It first uses the cycles necessary to compute the spatial velocity of each process. Then it uses any remaining cycles to compute the *internal evolution of the process* which is its velocity through time.

The result is that every particle process continually advances through the 4 dimensions of spacetime at the same rate of  $c$ , *whose value is set by the fixed number of cycles used to compute the total velocity of each process.* The exact mechanism used is somewhat speculative but must be similar because it works.

This generates the universe we actually observe in which all processes share the same current present moment but each process is computed with its own local clock time rate based on its actual spatial velocity.

Now, since everything in the universe continually moves at the same  $c$  velocity through the 4 dimensions of spacetime, everything continually moves the *same identical distance* through spacetime in every tick of processor time. This identical distance everything continually moves through spacetime is the definition of the *current universal present moment*. To my knowledge I'm the first to have understood and published this...



This is confirmed in relativity by rewriting the standard spacetime diagram equations for any two arbitrarily *moving objects i and j* :

$(c\tau_i)^2 = (ct)^2 - x_i^2$  &  $(c\tau_j)^2 = (ct)^2 - x_j^2$   
which say the lesser distance *i* and *j* move through *time* is due to the distance they traveled through *space* subtracted from the distance light traveled at *c*.

Rewriting and combining:

$(c\tau_i)^2 + x_i^2 = (c\tau_j)^2 + x_j^2 = (ct)^2$   
says the *vector sum* of distances moved through time and through space of any two objects equals the distance traveled by light at *c*. Thus *everything continuously moves the same distance through the 4 dimensions of spacetime at c*, the speed of light, which is universal.

*So every observer sees everything continually move the same identical distance through spacetime.* Observers may measure this identical distance differently, but all observers agree it's an identical distance. This also demonstrates why the *current present moment is universal* and shared by all entities in the universe contrary to what some argue. All entities in the universe have local time rates determined by their actual spatial velocity, but all share the same current common present moment since all travel the same total distance as light through spacetime in every tick of processor time.

Now, it's very important to properly understand *spatial velocity*. If one twin embarks on a relativistic space trip and the other stays on Earth, they both see each other's time slow due to their equal and opposite *relative* spatial velocities. But when they meet back on Earth only the space travelling twin has actually aged less. Only his clock actually ran relatively slower and passed less time during their separation.

This is because only the space twin had *actual* spatial velocity with respect to the *original inertial path* he had shared with Earth and his other twin. *Actual*, as opposed to *observed*, spatial velocity is velocity relative to an *original inertial path*, and this in turn produces *actual* versus *observational* time dilation. As John Baez of Caltech says, “Time dilation is caused by deviation from an inertial path.”

All relative motion produces *observational* time dilation, but only spatial velocity relative to an original inertial path produces *actual* time dilation. Actual time dilation is time dilation relative to an ideal clock that has never left its original inertial path.

Actual time dilation is time dilation relative to a ideal clock that has never left its original inertial path which is the average spatial velocity of the Cosmic Microwave Background. So the age of the universe measured from a location at rest with respect to the CMB should be greater than from Earth because the measuring clock should be running faster. This is a testable hypothesis.

Now, the vitally important fact that is always overlooked in the twins example is that the twins reunite in the *same current present moment* even though they have different clock times. In fact they shared the same current present moment throughout their separation. This confirms there are *two separate kinds of time*, clock time, which varies from clock to clock depending on actual spatial velocity, and present moment or processor time, which is universal and shared by all.

This is how the computational universe automatically computes a universe that is inherently relativistic in which everything exists in the current universal present moment with individual clock times and rates depending on the history of their actual spatial velocities.



## YouTube Fundamentals series:

1. Everything is Information
2. The Computational Universe
3. Computing a Relativistic Universe
4. Computing General Relativity
5. Computing the Quantum Universe
6. Unifying Quantum theory & Relativity
7. Time Travel & Space Travel

See also:

The Complete Theory of  
Everything at [EdgarLOwen.info](http://EdgarLOwen.info)