

From what relativistic reference frame can the creation of the universe in 7 days be observed?

Discussions are occurring from time to time with people that claim that God created the world in seven days and not billions of years. However, according to Einstein's theory of relativity time and space are not absolute and are perceived different from alternate angles in the universe. We can perceive billions of years going by on earth while someone else in the universe can see this as happening within seven days. To give an extreme example: If we observe the light from a galaxy billions of light-years away then our retina in the eyes register photons (smallest light particles) emitted from that galaxy billions of years ago from our perspective. However, the lifetime of the photon itself is zero since it travels with the speed of light. If we would take a ride with one of those photons, the travel from that distant galaxy to here would take no time at all.¹

We can now calculate how an observer must move relative to the earth so that seven days pass by while 13.7 billions years passed for us here on earth. According to Einstein's Special Theory of Relativity the time dilation (this is the difference in how time is experienced) between two reference frames (positions of observers in the universe) is given by:

$$\Delta\tau = (1 - v^2 / c^2)^{1/2} \Delta t$$

Where $\Delta\tau$ is the time recorded by a clock moving with the speed v relative to the inertial frame K during an interval Δt and c is the speed of light. Obviously, the clock for the observer with the relative speed v is slowed down.²

In our case, the reference frame K is our inertial frame on the earth. The time that has passed on earth since the big bang is 13.7 billion years according to recent results of the WMAP probe that mapped the early universe.³ For simplicities sake we will calculate with 14 billion years. The time that has passed in the 7-day reference frame is, surprise, 7 days. Substituting these yields:

$$7 \text{ days} = (1 - v^2 / c^2)^{1/2} 14 * 10^9 \text{ years}$$

Resolving this to calculate v results in:

$$v = (1 - 1/4 * 10^{-9})^{1/2} c$$

Which means v is:

$$v = 0.99999999998749999999 c$$

¹ Photons travel at the speed of light, have no rest mass and therefore cannot have a lifetime according to relativity.

² J. Foster and J.D. Nightingale, *A Short Course in General Relativity* (Springer-Verlag, 1995), 197.

³ Results WMAP Homepage at < <http://map.gsfc.nasa.gov> > accessed February 25th, 2003. See also Dennis Overbye, "Cosmos Sits for Early Portrait, Gives Up Secrets," *New York Times* (February 12, 2003).

in more commonly known measurements:

$$v = 299792.46 \text{ km/sec}$$

Or

$$v = 185999.999 \text{ miles/sec}$$

One who observes the creation of the universe in seven days must be moving with nearly the speed of light (99.99999999% of the speed of light!) relative to the earth.

The calculations were done using *special relativity* meaning that the effects of gravitation have been neglected. The calculations could be redone using *General Relativity* considering the gravitational fields of the earth, the solar system and the galaxies involved which would be much more complex but the result would not vary by much.

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