

## Robert M L Baker Jr.'s Theory of Our Universe and the Speed of Time, July, 2016

### New Theory of our Universe

My idea is very simple: our Universe starts out at "time zero" (Planck Time) and all the coordinates of space (x ,y, z or East, North, Up) are also zero (Planck Length) and then all these dimensions, of what Einstein called "spacetime" begin to ROLL OUT and grow and grow very fast initially and then slow down like an old clock.

#### "Big Bang" Alan Guth

"...that the nascent Universe passed through a phase of exponential expansion soon after the Big Bang, driven by a positive vacuum energy density."



#### "Big Rollout" R. M L Baker, Jr.

"... that our Universe Rolled Out with time moving extremely fast, and with infinitesimally small dimensions and that these spacetime coordinates are growing."



Our Universe is not a "Big Bang"[1], but rather a "Big Rollout" in space and time, spacetime [2], [3], [4] from the shortest length, Planck Length, (the smallest measure of length because shorter than it, quantum effects dominate and it becomes meaningless to consider exact values of measurements) and the shortest meaningful measure of time, Planck Time (the time it would take a photon travelling at the speed of light to across a distance equal to the Planck Length). It is speculated that space dimensions grow very rapidly at first (actually dimensions initially rolling out near light speed) and that time also grows very rapidly at first. As time increases, the rate of its change could be erratic, that is although in general it slows (rate of time slows approaching zero at the end of time), its rate of change could decelerate, pause or perhaps accelerate for a while since there is no apriori reason for constancy. (An interesting comment by Ray Comfort [5] was that "Three different places in the Bible (Isaiah 51:6; Psalm 102:25, 26 and Hebrews 1:11) indicate that the earth is wearing out ... everything is running down ..."). Since the rotational rate of galaxies (leading to the concept of dark matter ) and the variation of the Hubble constant (leading to the concept of dark energy ) might well be dependent on the speed of time (pp.. 108-110 of [4]) their existence might be determined by the speed of time and might, in fact, be utilized to measure the speed of time.

#### Observational Evidence for the Rollout Theory

The relationship between the change in the speed of time and the change in the space dimensions is important since they rollout (p. 89 [2]) in concert in order to preserve the constancy of the speed of light. At the beginning of our Universe the (change in the space dimensions) divided by the (change in the speed of time) equals (zero to the Planck Length during Planck Time) / (zero to Planck Time

during Planck Time), which equals the (speed of light). It is speculated that this **fundamental equation (1)** (Eq. (2), p.108 of [4]) is correct and endures so that:

$$\text{(change in the space dimensions)} = (\text{speed of light}) \times \text{(change in the speed of time dimension)} \quad (1)$$

Equation (1) can be rearranged as:

$$\text{(change in the space dimensions)} / \text{(change in the speed of time dimension)} = (\text{speed of light}) \quad (2)$$

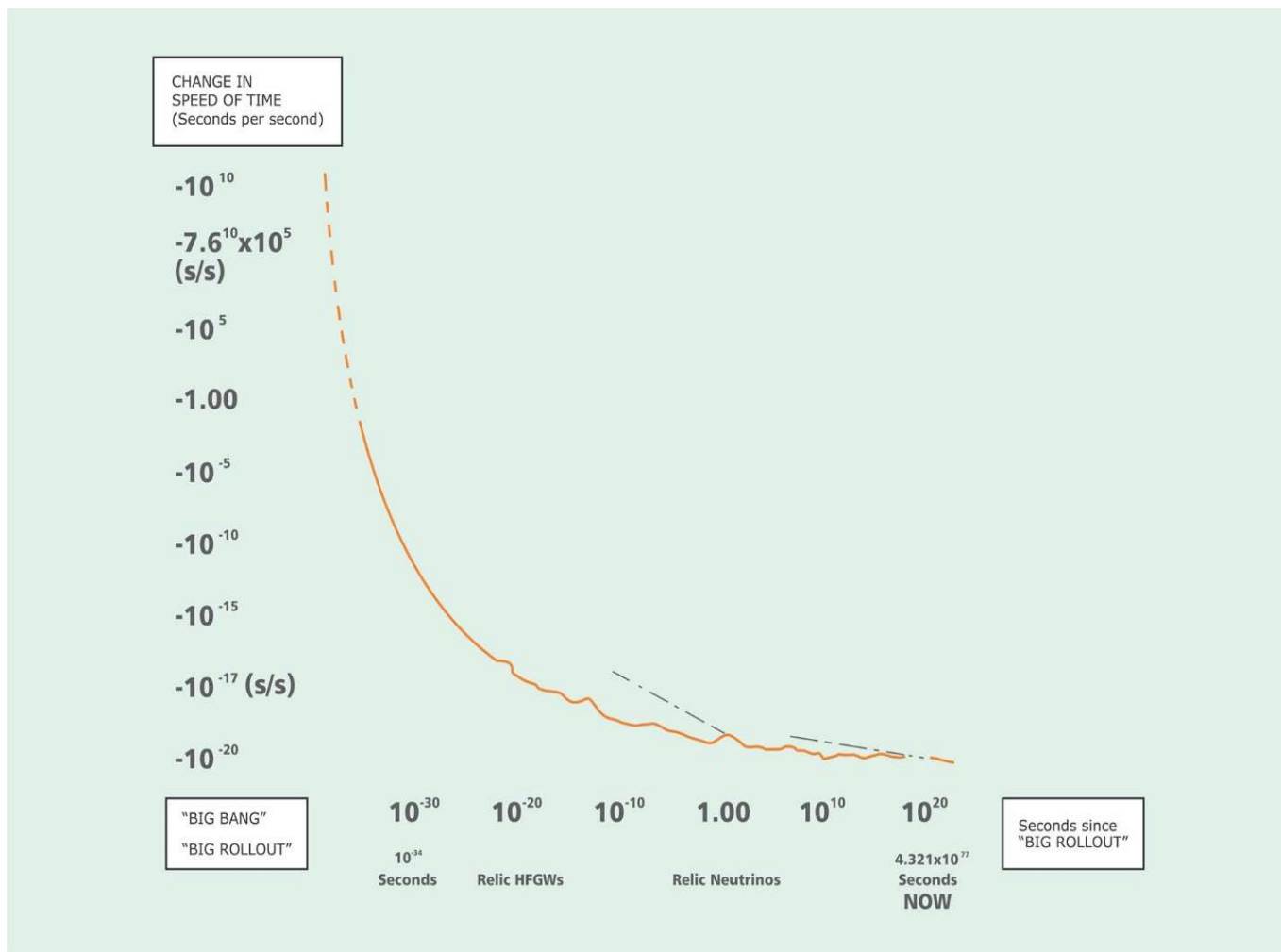
We can interpret Eq. (1) as meaning that the four-dimensional spacetime expands at exactly the speed of light!

The aforementioned Hubble “constant” measurements provide a means to validate the Rollout Theory since this “constant” is essentially the separation speed of cosmic objects due to the speed of time. The Cosmic Microwave Background (CMB) occurred about 400,000 years (in length of today’s apparent years) after the beginning of our Universe, then we would see separation motion of the cosmos commensurate with the speed of time then. Specifically,  $6.75 \pm .05 \times 10^4$  m/s per Mpc (Alam, 2017) [6]. Several billion years (today’s years) after the beginning of our Universe it was measured as  $7.4 \pm 1.5 \times 10^4$  m/s per Mpc (Riess, 2019) [7]. No “Dark Energy” need be assumed. The average of these two measurements is  $7.07 \times 10^4$  m/s per Mpc. As Viktor Toth [8] points out this average “...can be expressed in terms of inverse seconds, since a megaparsec is just about 30.9 million trillion kilometers; substitute and let the length units cancel, take the inverse, and you find that the Hubble parameter is the reciprocal of about  $4.4 \times 10^{17}$  seconds (~ 13.8 billion (apparent) years, about the age of our Universe)... Now this is exactly the way it should be ... in a universe expanding at a constant rate” (i.e., the speed of time)

At the beginning of our Universe the “change in the space dimension” does not imply that one can measure a dimension during the initial Planck-Time “interval” because conventional physical laws no longer apply and Euclidian Geometry is completely distorted. It simply means that it represents the dimensional change from a “time zero” epoch to Planck Time at which point physical laws begin to have meaning.

In essence, it is speculated that quantum mechanics is the boundary or initial condition for our general-relativity behaving Universe of today. It is also speculated that the beginning of our Universe could be the osculating point with other universes. (Discussed in United States Patent Number 6,160,336, filed November 19, 1999 and granted December 12, 2000; section on **Space time universe Geometry.**)

Next follows a notional graph (Fig. 3, p.71 of [3] and Fig. 3, p. 109 of [4]), of the change-of-speed-of-time variation with today’s time dimension. Notice different slopes (tangents) and irregularities, including a possible increase in the speed of time, especially between 1 and  $10^{20}$  seconds after the “BIG ROLLOUT” or the “start” time zero or Planck Time. The most dramatic manifestation of my new Theory will manifest itself for times less than a picosecond from time zero.



Such a notional graph of the speed of time versus **today's seconds** as displayed in the graph has some philosophical/cosmological consequences. In essence as we view the past through our telescopes (and HFRGW detectors), we are not simply viewing 13.8 billion years of "existence" (or even out to the conventional cosmological horizon), but possibly more than 113.8 billion "years" of existence – in fact, an unimaginably, almost infinitely long period of time! The size or value of seconds, minutes, hours, days and years change during this progression of our Universe. Our current Universe may be of a very old age. The phrase "long, long ago and far, far away" of George Lucas' "Star Wars" would take on new meaning. Of course, all physical processes as we find them today and the speed of time, should remain intact, entropy grows. These processes and the laws of Physics could essentially continue "forever," that is until the end of time. As described in the next figure the "speedy photon" moves at the same speed, but as the time slows down (or varies) the space dimensions lengthen (or varies, "... one centimeter (inch) might be billions of

kilometers (miles) ...” p.89 of [2]) so as to keep a constant light speed according to the foregoing fundamental equation. They will commence the change of time and space dimensions (spacetime) at the beginning of time e.g., Planck time, when time “approaches” extremely fast motion (if viewed from our Century -- “... speed up a clock ...”(p. 91of [2]), and will cause the material systems of our Universe (stars, black holes, galaxies, etc.) to evolve according to “conventional” Laws of Physics.



The speedy photon’s speed,  $c = 186,282.397$  miles per second and is the same in all frames of reference , which is the hypothesis underlying Einstein's special theory of relativity



Smaller second offset by smaller “standard” mile! After time “zero” or Planck time, the speed of time slows and the space dimension grows from the infinitesimal Planck length to today’s. **Both changes (slow/grow) in the same proportion to insure the constancy of the photon's speed of light!**

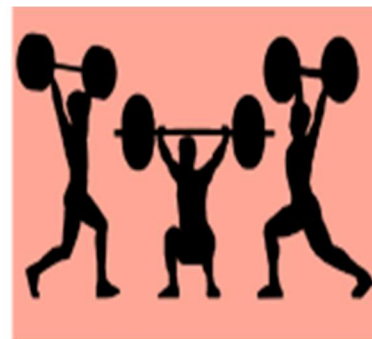
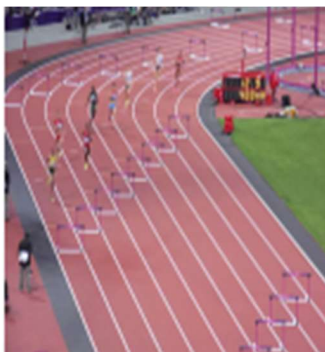


### Gedankenexperiment

We look back in time several billion years – in actuality we do this when telescopes look at stars billions of light-years away! We see a galaxy. It appears to be rotating faster and a little less spread out than expected. Next we look at an Olympics Games Coliseum on a duplicate Earth (we are pretending here – a thought experiment or Gedankenexperiment).

There we see a little track with little runners going around – wow! They make 4 circuits (mile) in a few seconds by my wristwatch! Everything a little faster and a little smaller or less spread out like the galaxy! Now I look at the weight-lifting pavilion. There are little weight lifters also moving quickly and pushing up little bar bells. The laws of physics appear to be as usual to them. *A fast-moving miniature World with objects getting closer together – density of our Universe increasing as we go further back in time! But densities of the barbells and their gravitational fields are unchanged*

*so possibly no significant gravitational time dilation due to them. The scenes will have a reddish hue due to the Doppler Effect.*



The following quote is paraphrased from United States Patent Number 6,160,336, R. M L Baker, Jr. & F. W. Noble, filed November 19, 1999 and granted December 12, 2000; specifically, paraphrased from the section on **Spacetimeuniverse** Geometry: (This Patent memorialized many of the new concepts developed during my UCLA Lectures in 1950, 1960 and 1970.):

“All universes are not necessarily viable: some may be massless, some may be of no physical significance, and some may have no chance at all to lead to life as we know it. According to this conjecture or working hypothesis, the intractable frontier between a smooth Spacetimeuniverse fabric or geometry and apparent, quantum-mechanical `frenzy` at small scales [9] (such as Planck Time and Planck Length) is nothing more or less than the interface between osculating universes in which entities could shift back and forth at will--actually smooth transitions with mass/energy and momentum conserved and entropy constant (the speed of time may or may not transfer), possibly at the initial condition or “birth” of multiuniverses” or even at other frontiers.”

*This Patent memorialized the concepts developed during my UCLA Lectures in 1950, 1960 and 1970.*

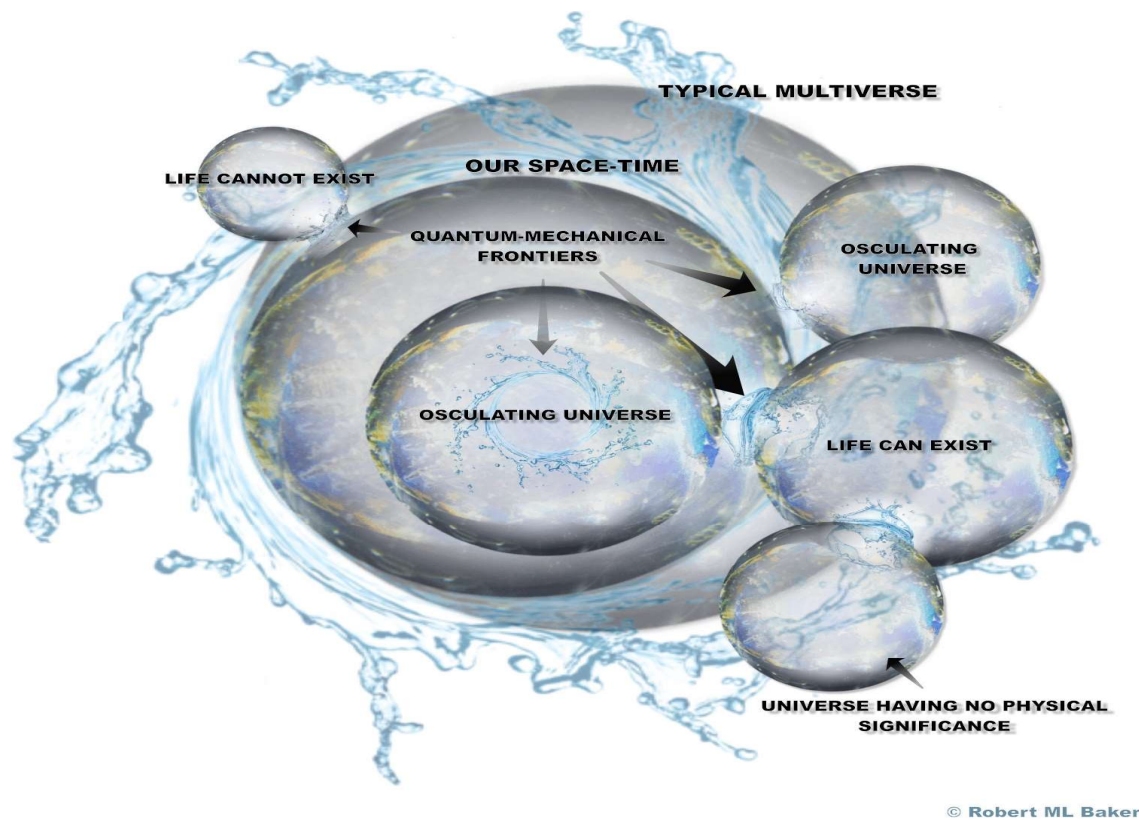
In essence, it is speculated as a *working hypothesis* is that quantum mechanics is the boundary or initial condition for our general-relativity behaving Universe of today:

- It is also speculated that the beginning or “birth” of our Universe, or any multiverse, could be the osculating point with other universes at other frontiers-- the “multiverse connection.”
- Our Universe need **not** be unique – need not be the “first one”! The dimension of “Time” is a property, like the three dimensions of “Space”, of any given universe – that is, there need not be a timed sequence of the birth of universes – they **ARE** a dimension of the Spacetimeuniverse Geometry and **not necessarily** a function of time.



- A notional schematic of the concept of the Spacetimeuniverse (or STU) follows, essentially a **Fifth Dimension**. Basically we have a locator: “We will meet at room 23 West (x), in the North Hall (y), fourth floor (z) at 3 pm (time) in the Ambassador hotel (universe). A very hypothetical experiment concerning a quantum-mechanical frontier in our Universe involving a pseudo horserace is to be found on pages 135-137 of [2].

## SPACETIME UNIVERSE AND MULTIVERSE




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### REFERENCES (added June, 2020):

- [1] B. Lemley and L. Fink, (2002), “Guth’s Grand Guess,” *Discover Magazine*, 23, N 4, 1/8—8/8, April (2002).
- [2] Robert M L Baker, Jr. (2017), *Gravitational Waves, The World of Tomorrow, a Primer*, Infinity Publishing, PA, USA, Third Printing, pp. 89, 91, Exercise 8.2, p. 229.
- [3] Robert M L Baker, Jr. (2019), “A Working Hypothesis on The Muon-Decay Time Shortening and Time” *Journal of Space Science and Technology*, No. 3, August, pp. 70, 74.

- [4] Andrew W. Beckwith and Robert M L Baker, Jr (2020), "Value of High-Frequency Relic Gravitational Wave (HFRGW) Detection to Astrophysics and Fabrication and Utilization of the Li-Baker HFRGW Detector," *Journal of High Energy Physics, Gravitation and Cosmology* , Volume 6, No. 1, January, pp.107-111.
- [5] Ray Comfort (2001), *Scientific Facts in the Bible*, Bridge-Logos. Newberry, Florida, p.13.
- [6] S. Alam, et al. (2017), *Mon. Not. R. Astron. Soc.* **470**, 2617.
- [7] A. G., Reiss, et al. (2019), *Astrophysical Journal* **876**, 85
- [8] Viktor T. Toth (2020), *Quora*, June 7
- [9] B. Greene (1999), *The Elegant Universe*, Norton, N.Y., pp. 367-370, 385, 387.