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TASC

TASC's mission is to rebuild and strengthen the foundation of the Christian faith by increasing awareness of the scientific evidence supporting the literal Biblical account of creation and refuting evolution.

Dan Reynolds, PhD, Chairman

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The Big Stretch 2 - Evidence

By Joe Spears, MS

In a previous article, The Big Stretch - Part 1, http://tasc-creationscience.org/article/big-stretch-1, a cosmological model was introduced, the Setterfield Plasma-ZPE model.

There have been various arguments raised against this model. In this article, we will examine some of those arguments, to try to determine if they are valid or not.

We will start with a brief overview of the model; for more details, refer to The Big Stretch - Part 1 or to www.setterfield.org

Overview of the Setterfield Plasma-ZPE Model

Per the Setterfield model, in the beginning God *stretched out* the heavens. (This lines up well with the Bible statements that God did stretch out the heavens and also with the expansion of the universe of the Big Bang theory.) During that stretching process *energy was poured into* the cosmos, this energy ultimately manifesting as what is now known known as the ZPE, or Zero Point Energy. (The name refers to the fact that this background energy exists in space even at temperatures of absolute zero.)[1]

This process of transforming the initial potential energy invested via the stretching to the kinetic energy of the ZPE was *not immediate*, however, taking up to thousands of years. Therefore, in the early period of the history of the universe, the background ZPE was thinner (there was less of it), and this background energy gradually "thickened" over time.

This gradual increase in background energy, or ZPE, during ancient times altered the electric and magnetic properties of space. These, in turn, altered the speed of light, (specifically, light speed depends on the electric permittivity of space[2] and the magnetic permeability of space).[3]

Due to the background energy/ZPE being "thinner" in the remote past, light was much faster in ancient times, and certain atomic events proceeded much faster (such as decay processes used in dating).

Radiometric decay was affected, proceeding much more rapidly in ancient times, just as light traveled much faster then. This means that rocks exhibiting sufficient radiometric decay to be dated radio-metrically as millions of years old, would have produced that same amount of radiometric decay much faster than assumed in the early universe and therefore would not have taken so long as has been commonly assumed to produce the decay. Not having taken so much time to decay, the rocks containing those radiometric indicator elements would then be much *younger* than the ages that have been conventionally measured.

Also, the light we see from distant galaxies, and which is measured as having taken billions of years to reach earth, would, due to the thinner ZPE in the remote past, have traveled much faster in the past, and would have therefore arrived at the earth much sooner—not taking nearly so long to arrive at earth as has been assumed. Thus, stars, conventionally dated by the time it takes their light to arrive, would actually be much younger than indicated by current measurements, which assume no change in light speed.

[1] Zero-point energy <https://en.wikipedia.org/wiki/Zero-point_energy> Accessed 2017 Jan 26

[2] Dharan G, Hanania J, Stenhouse K, Donev J, Permittivity of free space <http://energyeducation.ca/encyclopedia/Permittivity_of_free_space> Accessed 2017 Jan 26

[3] Hanania J, Stenhouse K, Donev J, Permeability of free space <http://energyeducation.ca/encyclopedia/Permeability_of_free_space> Accessed 2017 Jan

Note: using this model, with the apparent (assumed) age of remote astronomical objects and the radiometrically assigned age of rocks and by taking into account the rate of change of the background energy indicated by the data, the actual age of remote astronomical objects and of rocks can be calculated. This has been done. We will look further into this in the next article of this series.

Significance of the model

This model explains much; it explains that the universe is less than 8000 years old, that there would have been light on the first day, that the sun could light up on day 4, that the earth could have existed before the sun lit up, why the cosmos seems to be billions of years old, and why rocks can be dated as millions of years old.

The focus of this article will be on the objections to the model, largely based on physics. A follow-up article is planned to deal with the predictions of this model, which largely deal with the model's agreement with biblical accounts.

Physics of the Model

The key that explains many predictions of this model and also answers many objections to it is the physics.

The key is that the background energy, or ZPE, was very thin originally and gradually increased over time (for approximately 2688 years).[4] This altered basic properties of space (such as magnetic permeability[3] and electric permittivity),[2] affecting several so-called "constants."[5]

This thinner background energy provided less resistance to light and thus allowed higher light speeds. This energy produced effects on atomic processes also. Calculations show the energy expended by electrons in orbit is identically equal to the energy this background would provide to them, thus ensuring atoms' stability is maintained without collapsing.[6] This means that, as this energy changed, atomic process would change in accordance. This background energy is electromagnetic in nature, and therefore its changing density would change electrical and magnetic properties of space. The result is that as this energy increased, some electric and magnetic processes slowed down. In the early days of the cosmos, when this energy was thinner, those same electric and magnetic processes would be much faster.

We can see that one key component of this model affects many physical properties and constants. This ties together in such a way that the theory predicts that while some properties or constants decrease, others will increase. Measurements have shown not only that these various constants have changed, but the relative direction of change with respect to other constants agrees with this model. For example, while c has decreased, Planck's constant has increased.

This explains why some objections to the theory are not valid; they assume one and only one constant is changing, and from that assume some kind of contradiction; but when it is taken into account that other constants are also changing (since the same driving cause impacts them all), often the seeming contradiction disappears.

Now we will look at some arguments against the model and examine their validity.

Arguments Against the Setterfield Model

1. The fine structure constant/Sommerfeld's constant

This argument is that the fine structure constant has not changed, which invalidates the claim of CDK (speed of light decay).

Why? The fine structure constant incorporates the speed of light as a factor. Therefore, this argument goes: if the speed of light (c) changed, the fine structure constant would also have changed, but the fine structure constant has not changed, and therefore light speed has not changed either.

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[4] Setterfield B, Setterfield H (2009) The atomic age of our galaxy in chapter Plasma, a zero point energy, and the cosmic background radiation, *Data and Creation: The ZPE-Plasma Model: the science behind creation* <http://www.setterfield.org/Data_and_Creation/ZPE-Plasma_model.html#atomi...> Accessed 2017 Jan 26

[5] Setterfield B (2007) Behavior of the zero point energy and atomic constants <http://www.setterfield.org/behaviorzpe.html> Accessed 2017 Jan 26

[6] Setterfield B, Behavior of the zero point energy and atomic constants, section 4, ZPE and atomic stability <http://www.setterfield.org/behaviorzpe4.html> Accessed 2017 Jan 26

But the fine structure constant is defined as (emphasis mine):

> The *ratio* of the velocity of the electron in the first circular orbit of the Bohr model of the atom to the speed of light in vacuum. This is Sommerfeld's original physical interpretation.[7]

So, since the properties of space that are affected by the changing density of background energy affect *both* light speed as well as electron orbital speed, the *ratio* of one to the other, that is, the fine structure constant, *would not change*.

So we see this constancy of the fine structure constant is not a problem!

Another perspective on this is to look at the fine structure constant in a more detailed way, examining the multiple factors of this constant: $e^2/(2hc\varepsilon)$. There are other factors than c in the fine structure constant that are also predicted to be modified by this model. These predicted changes in other factors of the fine structure constant *cancel each other out*.[8]

Also, the factors other than c involved in the fine structure constant that are predicted by the model to change as c changes have been individually measured and found to be slightly changing in the exact manner the model predicts.

So, rather than the constancy of the fine structure constants being a difficulty for this model, this model actually predicts the fine structure constant will not change.

A creationist colleague has stated that the arguments against the Setterfield model end up being arguments for it, which does indeed seem to be the case in several instances.

2. Energy conservation

This line of reasoning goes that, as c increases, so does energy, due to the famous equation: $E = mc^2$

If the speed of light, c, gets larger in this equation, the math dictates that so does energy, E.

But, it is argued that E cannot get larger; the law of conservation of energy (conservation of mass-energy) does not allow energy, E, to appear from nowhere; it must be conserved!

The physics and the math of this model, however, again predict that, while the speed of light increases, mass, m, will decrease in just such a manner as to compensate for the change in c, resulting in no violation of energy conservation. For the details and derivation, see the comprehensive details in the massive 465-page book by Setterfield, *Cosmology and the Zero Point Energy*.[9]

And so it is; the model predicts that, while c increases, m will decrease. The result is that E remains unchanged.

3. Atomic clocks

Another argument against this model is that atomic clocks fail to show a change in the speed of light. This is a little bit like taking two pieces of elastic, stretching them both at the same time, together, and then saying, "See, their relationship is exactly the same, which shows there are no changes." The fine structure constant actually is constant and does not change, that means that as c changes, *orbital electron speed must change also* to compensate.

Changing orbital electron speeds per this model means that this model predicts that atomic clocks change their rate and that they change their rate in sync with light speed, otherwise the fine structure constant would change. So this model actually *predicts* that there would be no measured change in light speed shown by using atomic clocks to measure light speed since the measuring device would be changing in concert with what is being measured. It would be like measuring the height of a tree with a meter-stick or yardstick that stretches at the same rate the tree grows.

The varying rate of atomic clocks has indeed been measured and reported on by someone other than the Setterfield model creator: a US Naval Observatory scientist, who reported that data showed atomic clocks are changing their rate and are changing in a direction that agrees with the prediction of this model in sync with

[7] Fine-structure constant <http://en.wikipedia.org/wiki/Fine-structure_constant> Accessed 2017 Jan 26

[8] Setterfield B (2007) Behavior of the zero point energy and atomic constants, section 3.9, The fine structure constant and electronic charge <http://www.setterfield.org/behaviorzpe3.html#fine39> Accessed 2017 Jan 26

[9] Setterfield BJ, Setterfield HJ (2013) *Cosmology and the Zero Point Energy*, Natural Philosophy Alliance Monograph Series <http://worldnpa.org/cosmology-and-the-zero-point-energy/> Accessed 2017 Jan 30.

measured changes in the speed of light.[10] Again, we see that what seemed to be an argument against the SPC model, on closer investigation, yields support for the model.

4. Invalid light speed conclusions?

The decay of the speed of light over time is known as cdk, where c is the speed of light and dk refers to decay.

One paper, published about 28 years ago has been pointed to as invalidating the hypothesis of cdk. Thus paper posits that a statistical analysis of the data does not indicate a decay in c. However, the data have been reviewed by a professional statistician (the author of the paper referenced above was not a statistician), and the conclusion is that the data do indeed indicate that the measured speed of light has declined over the past 300+ years, that this is a statistically valid conclusion, and that cdk has not been invalidated. Furthermore, to my knowledge this assessment of validity has never been refuted.[5]

5. Blue shift instead of red

It has also been suggested that the Setterfield model predicts a blue shift, while we actually observe a red shift. This can be explained by incomplete understanding or a misunderstanding of the model. One possible reason for such a misunderstanding is the assumption that if the speed of light was faster in the past, then there would have been more energy in the past, due to the equation
$E = mc^2$.

If c is larger, as the models predicts that c actually was in the ancient past, then E or energy would also increase, as per the point above on energy conservation, assuming all other factors remain the same, which is not the case.

The assumption would be that this higher energy would have resulted in higher electron orbital energy, which, due to frequency being proportional to energy according to the equation $E = hf$, in which f represents frequency, E represents energy, and h is Planck's constant, would in turn imply higher frequency (or bluer) light emitted.

Therefore, the reasoning would be that this model, in predicting higher values of c in remote antiquity, would also predict higher energy, which would mean bluer light emitted from electrons in the remote past.

Thus, when looking further out in space, which would be looking further into the remote past, we should be seeing bluer light.

This is not what we see, so goes this line of reasoning, so the model predicting this blue shift is not valid.

However, this line of reasoning itself is not valid to disprove this model since this model predicts energy does *not* increase as we look backwards in time, even with changes in c, because this model predicts compensating changes in m in the equation $E = mc^2$, as we saw in the topic above.

Interestingly, the *opposite* of a blue shift is predicted by this model; this model actually predicts a lower orbital electron energy in the past, even with faster light speed (though not a lower total mass-energy of the entire universe in the early time of the universe after the initial expansion and Planck Particle Pair creation was complete). The explanation of this gets into some extra physics, which I will skip for now, as to why the model predicts a red shift, but the above indicates the model does not predict a blue shift. For the extra physics, see the book by Setterfield, *Cosmology and the Zero Point Energy*.[9]

6. Laser Interferometer Gravitational-Wave Observatory (LIGO)

Much can be said about the recent LIGO (Laser Interferometer Gravitational-Wave Observatory) experimental claim to have detected gravitational waves and about the claim that this discovery proves c has not decayed over time. Indeed, more has been written on reasons to question the LIGO claim alone than could fit in this entire article. So, for space reasons and also since the reasoning is somewhat technical, I will merely provide links to some articles that question the validity of this argument:

http://www.setterfield.org/Gravitational_Wave_Problems.html

[10] Van Flandern TC (1984) *Precision Measurements and Fundamental Constants II*, Taylor BN and Phillips WD (eds.), National Bureau of Standards (U.S.) Special Publication 617, 625-627. <https://archive.org/stream/precisionmeasure617tayl/#page/626/mode/2up> Accessed 2017 Jan 26

http://www.setterfield.org/Gravitational_Wave.html

http://www.hiltonratcliffe.com/discovery-of-gravitational-waves-by-hilton-ratcliffe/

http://www.setterfield.org/Hartnett_response.html

Interestingly, the claim from LIGO depends on the results coming from a merger of actual black holes, which is assumed, with the claim that the pattern from the data matched what would be expected for blackholes merging. However there seems to be reason to question this assumption:

> Indeed, Stuver points out that the stellar-mass black holes that merged in the GW150914 event are themselves surprising. Astronomers previously thought that such stellar-mass binaries would either not form at all or, if they did, they would be too far apart to merge within the age of the universe.[11]

However, from the same article we read the following:

> James Hough from the University of Glasgow in the UK agrees with Stuver, pointing out that LIGO's discovery is also the only direct evidence we have for the existence of any black holes.[11]

So, it seems that the event that is not what was expected for black holes becomes the only direct evidence for their existence. This, with other reasons in the references above, suggest caution with regard to the implications of LIGO claims pertaining cdk.

Suffice it to say the following, however: this claimed experimental detection of gravitational waves is one experimental measurement. We have thousands of experimental measurements that taken in total do show a measurable downward trend in the speed of light over 3 centuries. Why should the 1 experiment trump thousands of others, especially since these thousands of experiments were specifically designed for the expressed purpose of measuring the speed of light and this single LIGO experiment (not thousands of experiments, but a single one) was intended for a totally different purpose?

The same facility making this claim also reported a few years earlier a similar discovery that was later shown to be inaccurate, so why can we trust this second claim?

Summary of Arguments Against the Model

All seeming problems that I have seen so far, and of which I am aware, can be explained and shown to actually *not* be a problem for the Setterfield model. What I suspect is that, in the past, many arguments against the model such as the above did not have the answers we have today, and therefore at the time in the past when there were fewer answers, some may have concluded that the theory was not valid. However, over time, the model has developed, so that now there are answers where once there were none. The model strongly deserves a second look from those who looked at it in the past and who ignore it today. ☙

COMING EVENTS

Thursday, February 9, 7:00 pm, Providence Baptist Church, 6339 Glenwood Ave., Raleigh, Room 207

Considering current divisiveness of race and racism issues, would you like to be able to do a better job on understanding and coping with these issues with family and fellow citizens? If so, please come out and bring family and friends to our TASC meeting. Mark Stephens, MCS, will talk on and discuss with you "Race and Racism: Understanding and Coping."

Mark will address a number of important distinctions between creation and evolution as they relate to man or mankind and our social and moral relations. Our goal will be to better understand and cope appropriately with these troubling issues and be motivated to help others do the same with the challenges we still face to get along as a people, a nation, and the world.

Come out, bring friends and family for us all to reach the above goal!

[11] Commissariat T (2016 Feb 15) New insights emerge from LIGO's gravitational-wave data <http://physicsworld.com/cws/article/news/2016/feb/15/new-insights-emerge-from-ligo-gravitational-wave-data>