A RECENT CREATION EXPLANATION OF THE 3° K BACKGROUND BLACK BODY RADIATION

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We examine the big-bang explanation of the origin of the 3° K background blackbody radiation over billions of years. We find the big-bang explanation self-contradictory and unrealistic. We propose the Heating Model as an explanation of the origin of the 3° K backround radiation consistent with a recent creation.

I. Outline of the Article

The most important evidence for an expanding, billions-of-years-old universe is the 3°K background radiation.[1] The radiation seems to be real. It is a faint "glow" such as a body only 3°K above absolute zero (= –270°C) would emit. The radiation comes uniformly from all regions of the sky.

In Section II of this article we explain the currently accepted evolutionary interpretation fo the 3°K radiation, called the Standard model. In Section III we show that the predictions of the Standard Model are wrong. We show the Standard Model that claims to explain the origin of the 3°K radiation actually predicts no radiation at all. This model is the Corrected Standard Model. In Section IV we outline the evolutionary model that must be used to harmonize the 3°K radiation with the concept of the expanding universe. The model that must be used requires a perfectly reflecting coating over the entire surface of the expanding universe. We show that this coating around the universe is essential to obtain the equations for the temperature and number of photons in the expanding universe. This model is so absurd, even though it is required by the evolutionary theory, that we call it the Artificial Model. A comparison of evolutionary models is made in Section V. We point out that big bang theorists use one model to explain the expanding universe, but use an entirely different, absurd model to perform the calculations.

We present a creationist explanation of the origin of the 3°K radiation in Section VI. We show the interstellar dust and gas in our galaxy has absorbed enough of our galaxy's own light to raise its temperature from zero to 3°K in the 6,000 years allowed by the literal Biblical creation. It is the 3°K dust and gas that radiates the 3°K radiation. This model is called the Heating Model. In Section VII we show the Heating Model is unique. In Section VIII we conclude that the big bang evolutionary explanation of the expanding universe is self-contradictory and absurd. We conclude that a recently created universe offers the most acceptable explanation of the 3°K background blackbody radiation.

The blackbody radiation formulae used in this article are expressed in terms of the Stefan-Boltzman constant $\sigma = 5.67 \times 10^{-8}$ j/m² • sec°K⁴. The blackbody formulae used in this article are as follows:

(1) The radiation flux[2] through a surface of a blackbody at absolute temperature $T°$ K is σT^4 j/sec.m².
(2) The radiation energy density[3] of a blackbody at an absolute temperature $T°$ K is $(4/c)(\sigma T^4)$, where $c = 3 \times 10^8$ m/sec is the speed of light.
(3) The pressure[4] exerted by the radiation of a blackbody with absolute temperature T°K is one third of the energy density of the radiation, or $(4/3c)(\sigma T^4)$.

II. The Standard Model

The Standard Model is the name given to the physics that describes the big bang origin of the universe.[5] The Standard Model asserts that the universe began with all matter and energy concentrated in a relatively small, rapidly expanding sphere. The temperature within the spehere was billions of degrees Kelvin. Within this sphere were particles, antiparticles, radiation, and neutrinos. The matter and radiation freely interacted with one another. Particles and antiparticles interacted to produce photons, and photons interacted to produce particle-antiparticle pairs. Physicists describe an interaction between two states by saying the two states are coupled. The Standard Model describes the beginning as a condition in which radiation was coupled to the rest of the universe. This coupling insured that the temperature of the radiation (i.e. the blackbody temperature) was equal to the thermal temperature of the matter in the universe.

The relatively small, ultra-high temperature sphere exploded, because of the high thermal and blackbody energies. This explosion in the first few seconds of existence of the universe in the Standard Model is the big bang. The temperature of the universe dropped rapidly after the explosion, because the universe was expanding. The temperature of any gas drops under an adiabatic expansion. Within a few seconds the temperature was cool enough (a few billion degrees Kelvin) that photons could no longer produce particle-antiparticle pairs. The low-temperature photons no longer had sufficient energy to create the rest mass necessary for the lightest particles, the electrons and positrons. Within a few more seconds, all of the particle-antiparticle pairs annihilated. These annihilations produces the last of the high temperature photons.

After the big bang, interactions between high temperature radiation and matter ceased. Whatever high temperature radiation was there, was all there would ever be. As far as the high temperature photons

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were concerned, the matter in the universe had suddenly become transparent; there was no mechanism for photon-matter interactions. Physicists describe this absence of photon-matter interactions by saying the photons were decoupled from the rest of the universe. From this time on, the Standard Model asserts that the photons expanded freely with ever decreasing photon temperature (blackbody temperature) quite different from the temperature of the matter in the rest of the expanding universe. The temperature T of this background photon radiation decreased as the universe expanded. The Standard Model equations yield[6] $T \propto 1/R$. R is the radius of the universe. Over the past 20 billion years, the universe has expanded so much that the temperature of these background photons has decreased to only a few degrees above absolute zero. The Nobel Prize in Physics was awarded to Penzias and Wilson[7] for experimentally detecting this background radiation in 1965. The detection of the background radiation at the predicted temperature seemed to prove the big bang theory of the origin of the universe.

This article seeks to show the predictions of the Standard Model are wrong. The Standard Model actually should predict there should be *no background radiation at all.* Therefore, the detection of a back-radiation disproves the Standard Model and the big bang theory of the origin of the universe.

III. The Corrected Standard Model

The Standard Model as presented in the last section is consistent with the laws of physics until the point at which the photons and the matter in the expanding universe decouple. When photon-matter interactions cease, the entire universe becomes transparent to photons. What happens to the photons then?

After the decoupling event, the universe is a very simple place for the high temperature photons. The universe is transparent. As far as the photons are concerned, the matter in the universe has vanished. All of these photons would continue to travel in a straight line at the speed of light forever. In a matter of only a few years all of these high temperature photons would have escaped the expanding universe. After that, there would be no background photons at all inside the expanding universe, ever. All of the original photons would be far past the outer boundary of the expanding universe. They would never return. Thus, the *correct* prediction of the Standard Model is that there should be *no* background radiation at all now.

An advocate of the Standard Model might object that the universe is possible infinite. In that event, the original high temperature background photons could not escape from the universe. They should still be inside the universe. The advocate would be correct, but it would do him no good. If the original high temperature photons in an infinite universe were still around, they would still be at the original high temperature of billions of degrees Kelvin. They would have to remain at this high temperature, because they are decoupled from the rest of the universe.

A final attempt to salvage the Standard Model might be to allow some small unknown interaction between the original high temperature photons and the rest of the universe. Whatever interaction this would be would keep the photon temperature and the temperature of the rest of the universe the same. Allowing interactions with the rest of the universe would result in a background photon temperature that is far in excess of the 3 degree Kelvin temperature that is actually observed.

The correct Standard Model predicts no background radiation at all. How have astrophysicists derived their key equation $T \propto 1/R$ for the temperature of the background radiation and the radius of the expanding universe? This is the equation that predicts the blackbody temperature of the background radiation has decreased to 3° as the radius of the universe has increased to billions of light years. The answer: astrophysical calculations are not done on the Standard Model, but on an artificial model.

IV. The Artificial Model

The Artificial Model is the same as the Standard Model, but with one addition. The inner surface of the expanding spherical universe is completely coated with a perfectly reflecting substance. The background radiation still does not interact with the matter inside the universe. No background radiation ever gets out of the universe. The total number of blackbody photons should remain the same. The total energy of the blackbody radiation remains the same, except for the work done by the radiation on the ficticious reflective coating of the boundary of the universe. These two conservation laws will be examined.

The perfectly reflective coating of the inner boundary of the universe is the artificial part of the model for cosmogony. No one believes that at the boundary of the universe there is a perfectly reflecting substance that completely coats the universe and holds its blackbody energy in.

If the Artificial Model were not expanding, the total blackbody energy $(4\ \sigma\ T^4/c)\ (4\pi\ R^3/3)$ within the universe would remain constant. No photon energy is radiated through the surface, due to the perfectly reflecting internal coating on the surface. No energy is added to or subtracted from the blackbody radiation energy within the universe, because the blackbody radiation and the masses are assumed to be completely decoupled. Therefore, the blackbody radiation temperature T would remain constant.

What happens when the Artificial Model expands? The blackbody radiation energy $(4\ \sigma\ T^4/c)\ (4\pi\ R^3/3)$ would decrease, because the pressure $P = 4\sigma T^4/3c$ of the blackbody radiation does work PdV against the expanding perfectly reflecting surface. The work done is $(4\sigma T^4/3c)d\ (4\pi R^3/3) = (16\pi\sigma T^4R^2/c)dR$.

This energy equation has for initial temperature T_i and initial radius R_i, the solution $T = (T_iR_i)/R$. Blackbody temperature is inversely proportional to the radius of the expanding reflectively coated universe. This proportionality is claimed to be a prediction of the Standard Model. Actually, it is the prediction of the Artificial Model.

A curious feature of the artificial model is its conservation of photon number. The Planck distribution law gives the energy density du for radiation with wavelengths between λ and $\lambda + d\lambda$ as[8]

$$du = \frac{8\pi chd\lambda}{\lambda^5(e^{\frac{hc}{\lambda kt}} - 1)} \tag{1}$$

The energy of each photon of wavelength λ is $E = hf = hc/\lambda$. Thus, the number of density dn of photons with wavelength between λ and $\lambda + d\lambda$ is $dn = du/E$, or

$$dn = \frac{8\pi d\lambda}{\lambda^4(e^{\frac{hc}{\lambda kt}} - 1)} \tag{2}$$

The total number density of photons of all energies is

$$n = \int_{\lambda=0}^{\infty} dn = 8\pi \int_0^{\infty} \frac{d\lambda}{\lambda^5(e^{\frac{hc}{\lambda kt}} - 1)} \tag{3}$$

When a change of variable is made from λ to the dimensionless parameter $\chi = hc/\lambda kT$,

$$n = 8\pi \left(\frac{kT}{hc}\right)^3 \int_0^{\infty} \frac{x^2\,dx}{e^x - 1} \tag{4}$$

The integral can be evaluated numerically to give $.n = 60.42198(kT/hc)$.[3] The numerical factors are not important. The important feature is that the number density of photons is directly proportional to the cube of the absolute blackbody radiation temperature, $n \propto T^3$. As shown above the blackbody temperature T is inversely proportional to the radius of the sphere, so that the number density is inversely proportional to R^3, or $N = (\text{constant})/V$. Thus, the total number of photons within the spherical universe, $N = nV$, is always constant as the sphere expands.

V. Comparison of Models

The big bang description of the origin of the universe confuses the Standard Model with the Artificial Model. Big bang cosmologists describe the expanding universe as a blackbody radiation field decoupled from and expanding with the matter of the universe. However, the equations used to predict the 3 °K background radiation left over from the big bang are equations that fit the Artificial Model of an expanding universe whose outer boundary is completely coated with a perfectly reflecting substance. One model is used to give a convincing physical description, but a very different model is used to derive formulae. The descriptive model should be the same as the computational model. The big bang calculations have been done for the wrong model. The 3 °K background radiation, too, is the result of the wrong model, the Artificial Model. There should be *no* 3 °K background radiation left over from an expanding universe that starts with a big bang.

VI. The Heating Model

The 3 °K background radiation did not come from the big bang. Where did it come from? The 3 °K background radiation is produced by absorption and reradiation of starlight by interstellar gas and dust. The following simple model provides some numerical estimates. Our Galaxy consists of stars and dust. The stars are intense sources of radiant energy. The temperature of interstellar dust must slowly increase as the interstellar dust and gas (including individual atoms and molecules) absorbs a fraction of this stellar energy. The warm interstellar dust of our Galaxy absorbing and reradiating radiation is therefore a blackbody radiator. The temperature T of the blackbody radiation is the same as the temperature of that part of the interstellar dust with which it is in equilibrium. There is no reflecting layer around our galaxy, so the warm interstellar dust and gas will lose some of its energy as it glows (i.e. as it radiates blackbody radiation into intergalactic space).

One should not be misled by descriptive terms like "warm" or "glowing". These terms usually describe objects at or above room temperature, 300 °K. The interstellar dust is not really warm in that sense at all. It is only at a temperature of about 3 °K. Therefore, it does not glow very much, and the output is mostly not visible light. All of the effects are small. However, all of the effects are real.

Our galaxy can be approximated by a dust cloud in which are imbedded N stars of average luminosity L_{ave} each. Most of the light from each star escapes our galaxy. We know this fact because we can observe other galaxies quite well.

However, the galactic dust absorbs a fraction f of the energy produced by the N stars embedded within the galactic dust. The specific heat of the galactic dust and gas has an average value of c_d. The change in the thermal and blackbody energy associated with the galactic dust $\Delta(c_d M_d T + (4/c)\sigma T^4 V)$ equals the energy absorbed by the galactic dust from the stars in time Δt, which is $NL_{ave}f\Delta t$, minus the blackbody energy radiated into intergalactic space during time Δt *which is*,$\sigma T^4 A \Delta t$. If V is the volume of the galaxy and A is the surface area of the galaxy, then $(d/dt)(c_d M_d T + (4/c)\sigma T^4 V) = NL_{ave}f - \sigma A T^4$. This equation can be solved; but two approximation simplify the calculus. As long as the galactic dust and gas is no warmer than a few degrees above absolute zero, the blackbody power $\sigma A T^4$ radiated into intergalactic space is negligible compared to the power $NL_{ave}f$ absorbed from the stars. The gas and dust in interstellar space in our galaxy is so thin that its 3 °K blackbody energy is insignificant compared to its 3 °K blackbody radiant energy. An order-of-magnitude calculation will make these relative values clear.

There are about 0.25 gas atoms per cm^3 averaged over the plane of the galaxy.[9] The thermal energy density of these gas atoms would be $(0.25 \times 10^6\ \text{atoms}/m^3)(3/2)\ (1.38 \times 10^{-23} J/°K)(3\,°K) = 1.6 \times 10^{-17} j/m^3$ They are not all at this low temperature, so the actual 3 °K thermal energy density of interstellar gas would be a smaller number. We will use the figure of $1.6 \times 10^{-17} j/m^3$, because it will give a conservative estimate.

The energy density of the 3 °K blackbody background radiation is found from the Stefan-Boltzmann law to be $(4/c)(\sigma T^4)$ or $(4/3 \times 10^8 m/sec)(5.67 \times 10^{-8} j/m^2 sec\,°K^4)(3\,°K)^4$ The background blackbody radiation energy $4\sigma T^4/c$ is several orders of magnitude larger than the thermal energy $3nkT/2$ of the 3 °K gas, so the thermal energy of 3 °K gas will be neglected.

Interstellar dust is even less of a factor (in energy storing), because it is only 1/100th as abundant by mass as is gas.[10] Thermal energy within the dust at 3 °K would be given by the Debye T^3 law,[11] and would be negligible at 3 °K.

The energy equation now appears in the approximate form:

$$\frac{d}{dt}\left(\frac{4\sigma T^4 V}{c}\right) = NL_{ave}f \qquad (5)$$

The solution with initial temperature T_i is:

$$T = \left(T_i^4 + \frac{cNL_{ave}ft}{4\sigma V}\right)^{1/4} \qquad (6)$$

The time t for the galactic blackbody radiation to rise from T_i to T *is* $t=(4\sigma V)(T^4 - T_i^4)/(cNL_{ave}f)$. The time t cannot be calculated, because the initial temperature T_i is not known. However, an upper limit can be calculated. The maximum time t_{max} for the galactic blackbody radiation to increase to temperature T is the time to heat from *zero* initial temperature, or $t_{max} = (4\sigma VT^4)/(cNL_{ave}f)$. This expression provides an upper limit for the age of our galaxy. The interstellar dust and gas in the vicinity of the galactic equator attenuates visible light at about one order of magnitude per kiloparsec.[12] This means that visible light is attenuated by a factor of $10^{0 \cdot 4} - 1$ or 1.5 in a distance of 3,200 light years by interstellar absorption. The galactic disk is only 1/4th of a kilo-parsec thick from its center to its top or bottom. The total visible attenuation occuring within the disk would be a factor of $10^{0 \cdot 1} - 1$ or 0.26 or 26% if all of the stars of the galaxy were in the galactic plane. Many of the stars of the galaxy do not lie in the galactic plane. A larger fraction of the light from those stars escapes the galaxy, because it passes through less interstellar dust and gas. We will use a figure of 0.20 or 20% for f, the average fraction of the galaxy's luminosity absorbed by our own galaxy.

Our star, the sun, has a nearest neighbor, Alpha Centauri, at a distance of 4.40×10^{16} meters (approximately four light years). Thus for our sun, $V/NL_{ave} = (4\pi/3)(4.04 \times 10^{16})^3/(1 \times 3 \bullet 9 \times 10^{26}) = 7 \bullet 1 \times 10^{23} \mathrm{m^3 sec/j}$ Our sun is a typical star, so the value of V/NL_{ave} for the entire galaxy should be approximately the same, 7.1×10^{23} $\mathrm{m^3/j}$ The maximum age of our galaxy is then $t_{max} = (4\sigma VT^4)/(cfNL_{ave})$. When the numbers mentioned above are inserted, this gives for $t_{max} 2 \bullet 1 \times 10^{11}$ seconds = 6,800 years. In view of the order of magnitude approximations made, the time 6,800 years must be considered only as an order of magnitude estimate to the actual age of the galaxy. We are dealing with maximum time here. Therefore, the result is that an upper limit for the age of the universe is roughly ten thousand years. That is the time required for the background blackbody radiation to heat from zero to its observed value of 3 °K.

VII. Uniqueness

Is there any way to decide whether a 3 °K blackbody radiation spectrum has come from an expanded high temperature radiation or from the heating of a substance from zero to 3 °? Yes, there are two ways. The first test is valid in principle, but impossible in practice, because of the time required. An expanding contained radiation field at 3 °K is *decreasing* in temperature. A 3 °K heated dusted is *increasing* in temperature. If one could wait for thousands or millions of years, he could see if the radiation temperature increased or decreased. Then he would know the cause of the 3 ° radiation.

The second test is a practical one. It is a known fact that there is dust absorbing a fraction of the galaxy's light. Therefore, this dust must be heating up. If the galaxy really is billions of years old, our galaxy's dust would be pretty hot by now, approximately 100 °K. It would emit a 100 °K blackbody radiation spectrum many orders of magnitude more intese than a 3 °K blackbody spectrum. The 100 ° spectrum certainly would be there. If the 3 °K radiation is a left over from the big bang, say, 10 billion years ago, then the galaxy would contain two superimposed blackbody spectra. The spectrum from the big bang would be centered at 3 °K, and the spectrum from galactic dust heating would be centered at 100 °K.

Since there is only one measured blackbody spectrum as far as we know, and since galactic gas and dust heating does occur, the one spectrum must be due to galactic dust and gas—the spectrum consistent with a recent creation.

VIII. Conclusions

A recently created universe offers the most reasonable and consistent explanation of the origin of the 3 °K background radiation. The evolutionary big bang models used to explain the 3 °K background radiation are self-contradictory. They involve unrealistic assumptions.

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