A new cosmology, based upon the Hertzian fundamental principle of mechanics

by

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RESUMEN

Con el reciente descubrimiento de la explosión de la «estrella neutrónica», y con la invalidación de la teoría de la relatividad de Einstein por el experimento de Kantor, la cosmología newtoniana adquiere capital importancia. Esta cosmología se basa en el principio fundamental de Mecánica de Hertz: *Todo sistema libre, persiste en su estado de reposo o de movimiento uniforme en el camino más corto.* En consecuencia, el corrimiento hacia el rojo de las rayas espectrales resulta ser debido a una degradación de la energía, degradación que es inherente a la propagación de la luz, y no a un efecto de Doppler, *ad hoc*, como se había admitido. La relación entre dicho corrimiento y la luminosidad, observada en las galaxias lejanas, se deduce de dicho principio y sirve para confirmarlo.

Se demuestra además que la energía que llena todo el espacio y que se atribuye a los neutrinos, es el resultado de reacciones nucleares consistentes en la emisión de partículas beta y del corrimiento hacia el rojo. Esta energía es responsable de las explosiones de las «estrellas neutrónicas». Tales explosiones sirven para recrear hidrógeno virgen a partir de los detritus estelares y para distribuirlo por todo el universo, con lo que hay una creación continua de nuevas estrellas. En consecuencia, aunque el universo fuese infinitamente viejo, no tiene porqué «venirse abajo». Además, la cosmología newtoniana exige que el espacio sea estable, que no se expanda, y que sea homogéneo, euclídeo e infinito.

ABSTRACT

With the recent discovery of «neutron star» explosions, and with the invalidation of Einstein's relativity by Kantor's experiment, the Newtonian cosmology becomes

of first importance. This cosmology is based upon the Hertzian fundamental principle of mechanics: *Every free system persists in its state of rest or of uniform motion in a straightest path.* Under it, the red-shifts are shown to be an energy degradation inherent to the propagation of light, instead of an *ad-hoc* Doppler effect, as heretofore assumed. The observed redshift-luminosity relationship for distant galactic clusters is derived herein from the principle, and serves to confirm it.

It is further shown herein that the so-called neutrino energy which fills all space as a result of nuclear beta-decays and of red-shifting is responsible for the «neutron star» explosions. These explosions serve to recreate virgin hydrogen from dead stellar material and to distribute it as cosmic radiation all over the Universe for the continuous creation of new stars. Thus the Universe, though infinitely old, can never «run down». The Newtonian cosmology further requires that it is stable, non-expanding, homogeneous, Euclidean, and infinite.

Over 250 years ago, Sir Isaac Newton described the Universe to Mr. Bentley at the Palace at Worcester (1) as being stable and infinite in time and space. The Universe which Newton described was ageless, isotropic in Euclidean three-dimensional space, non-expanding, and on the average over great distances, homogeneous as to matter-density, throughout a boundless space. It is now well known that the Newtonian mechanics upon which this stable Universe and the motions of all heavenly bodies can be predicted govern precisely deterministic and reversible phenomena, phenomena that are entirely conservative both of energy and entropy. The fundamental principle involved has been succinctly stated by Heinrich Hertz: *Systema omne liberum perseverare in statu suo quiescendi vel movendi uniformiter in directissimam.* This principle governs the movements of all celestial bodies, without exception, and requires that they behave reversibly. It is therefore to be expected that it will govern the Universe as a whole, and that being composed entirely of celestial components that behave reversibly, the Universe as a whole should behave reversibly. It follows that the Universe as a whole is a conservative system, and thus is in a complete state of thermodynamic equilibrium with its environment, which is infinite space.

With the Hertzian principle as my central theme, I have for the past seven years lectured upon invitation to professional groups on science and astronomy. To account for the fact that the Universe of Newton, though infinitely old, has not yet and will not ever run down, but that its stars continue to shine, I postulated over three

years ago a mechanism whereby continuous creation of new stars from virgin hydrogen would be possible. Hydrogen for creation of new stars would be evolved from dead stellar material by explosions of «neutron stars», so that the Universe could continue to exist throughout eternity, just as we see it today (2).

Here is what I wrote to Professor Herbert Dingle on August 12, 1960:

«Perhaps you can offer some suggestions on the following problem, which I consider the most basic of our time. Recently, galaxies 6.000 million light-years away have been photographed by our largest telescope. The light from these is so degraded by red-shifting that the ultra-violet lines appear in the middle of the green spectrum. What is the ultimate disposition of the energy that disappears during red-shifting? Similarly, the detectable radiation from our Sun and from every star accounts for only about 5/8ths of its total radiation. Fully 3/8ths of the energy that is generated disappears in the form of neutrinos into space itself. What is the ultimate disposition of this energy? Finally, when a white dwarf star has radiated the last dregs of its energy and reaches the ultimate stage of collapse, which is a neutron star, is this the end, or a new beginning? It is inconceivable to me that Providence could be so wasteful of energy and of matter as to allow such destructive processes to occur spontaneously with no purpose whatsoever. It seems to me that these three processes must be connected by some natural law, so that the red-shift energy and the neutrino energy can regenerate neutron stars into the original hydrogen gas.»

Prior to giving this broad hint, I had already postulated just such a natural law. I presented it before the Richmond Rotary Club at their May 20, 1960 meeting.

Formation of a neutron star

Here roughly, is how Nature handles her problem of dead stellar material. Stars «live» by thermo-nuclear fusion reactions (3), whereby hydrogen is first converted to helium and later is «cooked» in hot stellar interiors into the heavier elements. A normal star like our sun will «live» for around 10 billion years in this fashion, before it exhausts its nuclear fuel. Once its useful life is ended however,

the star grows cooler, and becomes compressed by gravitational contraction into a «white dwarf», about 5.000 times as dense as lead, weighing 10 to 20 tons or more per cubic inch. At such great densities, most of the electrons are stripped from their shells surrounding the different atomic nucleii, and float to the surface of the white dwarf, forming a thick blanket. The star will continue to cool and shrink slowly over a period of a billion or more years, shining feebly as it cools, until it reaches a state of incipient collapse into what is now called a «neutron star», though as we shall later see, a neutron star would have only a momentary existence. Such a collapse of a white dwarf was first observed and reported on March 5, 1959 by Dr. W. J. Luyten of the Minnesota Observatory.

I postulate a critical, or ground-state density for stellar material, which when attained, due to gravitational pressure at the center of a dwarf star, triggers the mechanism of ultimate collapse into a «neutron star». At this critical density, the matter at the center of the star becomes resonant to the vast sea of neutrinos in intersellar space that have accumulated from stellar thermo-nuclear fusions and from inter-galactic red-shifting of light. This great flux of neutrinos converts protons at the center of the star into neutrons, according to:

$$p + \nu = n + \beta^{+} \qquad [1]$$

which signifies that a proton from a nucleus plus a neutrino from space form a neutron plus a positron. The positron that is formed is attracted by the electron blanket at the surface of the star, and travels there almost with the speed of light. At the surface, it annihilates with an electron, with the emission of 1.02 MeV gamma-rays:

$$\beta^{-} + \beta^{+} = 2\gamma \qquad [2]$$

Because of the density of the star, the annihilation radiation cannot penetrate it, but can only bounce outward, so that its «kick», or the radiation pressure against the surface of the star compresses and aids in the gravitational collapse of the star; thus all of the protons in the normal atomic nucleii composing the star are converted into neutrons. This chain reaction, with each proton furnishing a positron to increase the radiation compression, continues until all of the pro-

tons are used up. The star is now in its ultimate state of collapse, a neutron star, but this is an unstable state resembling an egg about to be hatched. It has a density of more than 100 million tons per cubic inch.

The half-life of neutrons is only about 12 minutes, and by beta decay they form hydrogen and neutrinos, viz:

$$n = \beta^- + H^+ + \nu \qquad [3]$$

But since the density of the neutron star is greatly in excess of the critical density necessary for neutrino absorption, this neutrino and electron flux is absorbed as fast as it occurs. Within half an hour, as postulated in 1952 by George Gamow with regard to neutron cosmology, the energy absorbed becomes sufficient to blow up the star, and to scatter nascent hydrogen all over the Universe, with velocities ranging up to a billion times the speed of light. This process of continuous creation of virgin hydrogen accounts both for the «steady-state» condition of the Universe we see at present and for cosmic radiation.

I shall leave the ultimate refinement of this proposed mechanism to those who specialize in nuclear research, as they should be more familiar with the complex problems involved than I. Herein, I shall emphasize only that Nature is simple and does nothing pompously or in vain. Regardless of what the ultimate mechanism turns out to be, the fact remains that «neutron stars» serve the function of scattering virgin hydrogen all over the Universe for the continuous creations of new stars, and for this purpose, Nature has decreed that they must explode immediately upon formation. *As a result, the law of conservation of energy can now be extended into a law of conservation of entropy for the Universe as a whole.* Because «neutron star» explosions reverse the process of beta decay, the energy of the Universe is able to run uphill and to compensate in every way for the degradation of energy due to spontaneous processes that obey the second law of thermodynamics and that occur in the normal sequence of events.

Red-shifting of intergalactic light

While it is clear from the above that the Universe itself is a conservative system in that it stores the availability of the energy that is seemingly lost during beta decay and during the redshifting of light in intergalactic space, the nature of beta decay and of red-shifting is not so clear. The following explanation of red-shifting is consistent with the Hertzian fundamental principle of mechanics and with classical thermodynamics. It requires that the propagation of light, in common with all other naturally occurring thermodynamical processes, is non-conservative of energy and dissipates it over very great distances with a consequent degradation of frequency along the path of the ray.

Regardless of the microscopic mechanisms involved in the emission and absorption of electromagnetic radiation, it must be recognized that the propagation of light in space, through a vacuum, is a spontaneous process, i. e. one that occurs without external interference. As such, it must obey the second law of thermodynamics. A spontaneous process takes place at a finite rate, and is therefore irreversible, since all reversible thermodynamic processes, by definition, are required to occur at an infinitesimal rate. Thus, over very great distances the energy of a light ray must inevitably run down hill and its availability, as exhibited by the frequency of the beam, must decrease. Moreover, the first law of thermodynamics must also be obeyed, for this law unlike the second law, allows no exceptions whatsoever. Energy as a whole must be conserved, independently of whether the phenomenon under consideration behaves reversibly or irreversibly. As the frequency decreases along the path of the ray, the luminosity per oscillator must increase, and for the end states of the ray the fact emerges that,

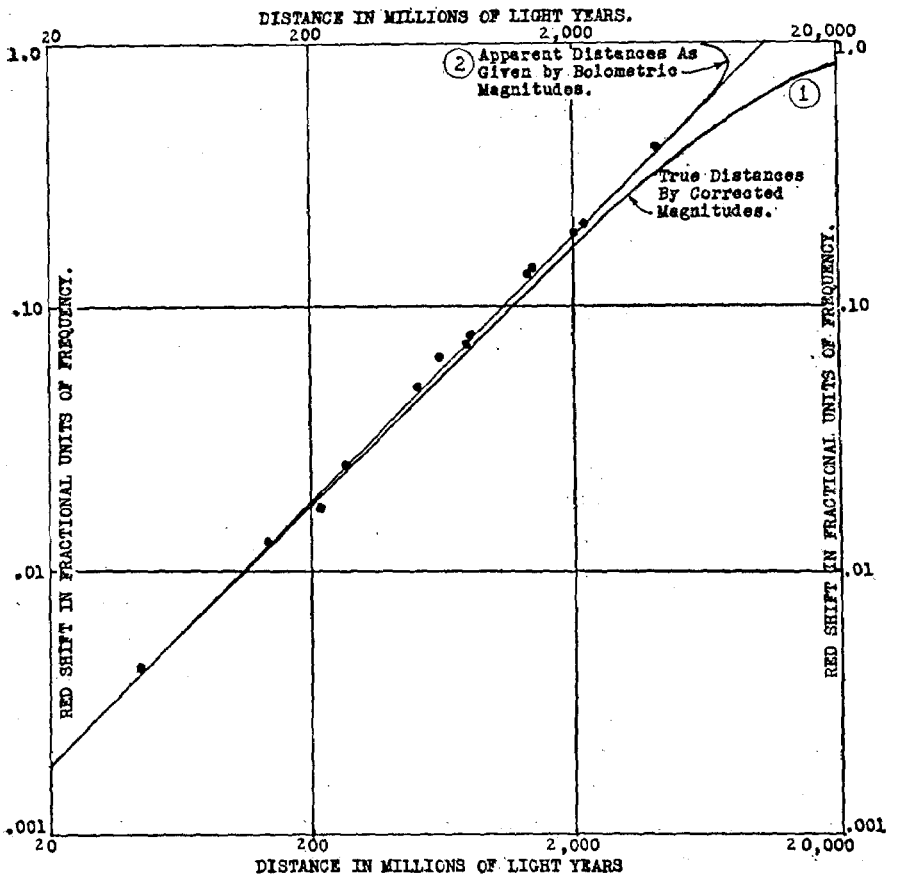
$$I_0 \nu_0 = I_1 \nu_1 \qquad [4]$$

is invariant for the process of propagation of the light beam, since the total energy under consideration is proportional to the product of these two variables, the first being an extensive factor and the

second an intensive factor necessary for a thermodynamic description of light.

Fig. 1.

GALACTIC RED-SHIFTS VS. DISTANCE



The line curving to the right is for a three-dimensional Euclidean Universe, wherein the red-shifted light conserves its energy, but not its entropy.

The line curving to the left is the theoretical line for apparent distances in this same steady-state Universe. It is identical with the observed line.

The red-shifting of light from distant galaxies, together with an anomalous increase in apparent luminosity, is therefore required under the laws of thermodynamics and one does not need to make any *ad hoc* assumptions to explain it. Nevertheless, the fad in cosmology

in recent years has been to put rationality aside and to postulate weird non-conservative models of the Universe, based upon Einstein's (4) purely *an hoc* assumption that red-shifting of light is due to Doppler effects. Aside from the absurdities that this assumption leads to, recent observations have demonstrated that the distant galaxies are not receding from us, but are stationary in space, so that Einstein's assumption, together with its impossible consequences must now be abandoned. Further discussion and conclusions that can be drawn from these recent observations appear in the Appendix. The inescapable conclusion is that red-shifting is a form of energy degradation for light rays that is governed by the second law of thermodynamics.

Universal red-shifting

A sufficient condition for a system like the Universe to satisfy in order to be conservative is given by La Place's equation:

$$\nabla^2 \phi (r^n) = 0 \qquad [5]$$

Two solutions for the exponent n are possible. The first solution ($n = -1$), is the familiar one for a conservative central field, and governs the planetary motions. It requires a concentration of matter about some sort of center, with the concentration falling off to zero at the boundaries of the system; however, because the Universe is observed to be homogeneous as to matter density, which infers that it is boundless, the first solution is ruled out, except for purely local fields. The remaining solution ($n = 0$), requires that ϕ, the Universal gravitational potential, is independent of position and is constant, as is only to be expected for a boundless and infinite Universe.

For a light ray traveling radially in this Universe with a dissipative force Q per mass-unit of energy being present, the Lagrangian equation of motion is:

$$\frac{d}{dt}\frac{h\nu}{c} - \frac{h\nu}{c^2}\frac{d\phi}{dr}(r^0) = \frac{-h\nu}{c^2}Q$$

Now $\frac{d\phi}{dr}(r^0) = 0$, and for radial motion of the light with respect to the observer, $dt = dr/c$, so that,

$$\frac{d\nu}{dr} = -\nu Q/c^2$$

The solution for v is exp. $(-Kr)$, which can be expanded as a power series, so that K can be evaluated empirically, viz:

$$v = v_0 \exp.(-Kr) = v_0 (1 - Kr + K^2 r^2/2! - K^3 r^3/3! + \ldots) \qquad [6]$$

The approximate relationship, $v_0 (1 - Kr)$, obtained by retaining only the first two terms of the expansion, turns out to be Hubble's law of the red-shifts, with K set equal to Hubble's constant in suitable units. The true distance versus red-shift relationship given by [6] is plotted as Curve 1 (fig. 1). This curve becomes asymptotic at a fractional red-shift of unity, indicating that the distances to such galaxies as would possess this shift are infinite. The straight line through the points representing actual galactic clusters is Hubble's law of the red-shifts. Apparent (virtual) distances to galatic clusters, as plotted here, are obtained indirectly from measurements of bolometric magnitudes by assuming an inverse-square luminosity-distance relationship. To obtain them from [6], one must use the luminosity versus red-shift relationship given by [4] along with the inverse-square law; thereby, distant galaxies appear somewhat brighter than one would expect from the inverse-square relationship taken alone. Curve 2, which becomes asymptotic to the left and which relates the red-shifts to bolometric magnitudes, results and is completely confirmed by observation, since the galactic points lie directly on it. In sharp contrast to this prediction of Newtonian cosmology, the predictions for relativistic cosmologies are all curves lying well to the right of the observed points. As a result, one frequently hears it said that «galaxies used to be brighter than they are now», or that «radio-galaxies used to be noisier than they are now». Perhaps Nature rebels at being asked to obey a mathematics which she does not understand; or perhaps she is as she is, and not as cosmologists would like her to be.

The property of intergalactic space that causes the red-shifting and the anomalous increase in luminosity (5) of the light from distant galaxies confirmed above is certainly not characteristic of a void. Neither are the velocity-dependent coefficients of permittivity and permeability of free space developed in an earlier paper (6) characteristic of a void. Free space possesses definite physical properties, such as the ability to propagate light, to polarize, and to store potential energy, which can be subjected to direct physical measurement.

Under the Hertzian fundamental principle, the only properties of space with which we need concern ourselves are those of complete physical continuity and of perfectly elastic coupling. The Universe behaves as though all points therein are elastically coupled to all other points. Events are coherent, and are governed by the principle of causality; this is the true meaning of the Hertzian variational principle and of the gravitational sort of aether that both Hertz and Newton proposed. Other properties than those mentioned above would seem to be superfluous. For example, the property of rigidity belonging to the classical aether, whereby such an aether can later be identified with a preferred coordinate system, has not been demonstrated by experiment, despite many efforts, is not required to explain the general phenomena, and therefore under the first rule of philosophical reasoning must be regarded as superfluous. Perhaps the modern view on the aether has been most clearly stated by Rabi (7):

«It was very fashionable at the turn of the century to talk of an aether; Maxwell was attracted to the idea and Kelvin apparently was convinced of the existence of the luminiferous aether. However, this went out of fashion with the introduction of Einstein's special theory of relativity, because there was no real need for an aether. Yet now we find that space has some strange properties. The annihilation of electron pairs and the materialization of matter would seem to endow space with rather substantial properties. This, in fact, is one of the consequences of quantum electrodynamics; we refer to the polarization of the vacuum, which means the polarization of the aether; not the aether envisioned by Maxwell or by Kelvin, which had complete rigidity and yet was completely permeable, but a very remarkable kind, of which we are just beginning to learn the properties.»

In view of the overthrow of Einstein's theory of relativity by Kantor (8), who invalidated its postulates, the gravitational aether of Newton not only becomes a necessity; it emerges now as the sole vehicle of reality, a single entity of which all things, visible and invisible are composed. Mathematically, all forms of energy become mere singularities, or poles, in this all inclusive medium, expressible as orthogonal functions, such as Fourier series or integrals. In this strange new kind of aether, which can be directly identified with space itself, only the singularities, or «holes» are observable, and the propagation of all effects must take place isotropically with respect to their sources. Most important, this new aether provides the

mechanism for red-shifting inter-galactic light and for storing the availability of this energy and the neutrino energy that seems to disappear as a result of beta decays. Finally, it provides the inexhaustible reservoir of available energy that is necessary for the rebirth of virgin hydrogen from dead stellar matter which occurs steadily by explosions of «neutron stars» throughout an infinite and eternal Universe.

Appendix I

The Doppler Interpretation of the Red-Shifts.

According to Einstein (9), the Doppler effect from a source of light moving radially away from the observer is:

$$\nu = \nu_0 (1 - V^2/c^2)^{\frac{1}{2}} / (1 + V/c) \qquad [7]$$

where V is the relative velocity and where ν is measured Doppler frequency of a ray from an oscillator that would have the rate ν_0 when stationary with respect to the observer. Elsewhere in the same paper, Einstein stresses that the motion is purely relative, and so we have no alternative but to accept his pronouncement that the velocity V is of a purely relative nature.

In [7] the denominator is the classical Doppler effect for a wave propagated at c velocity. The numerator, however, does not appear in the classical expression and is explained by Einstein as dilatation of the time, whereby a moving clock runs slower than one fixed in the observer's frame. Let this be so. Then for the time dilation, which is independent of the angle of viewing:

$$\nu' = \nu_0 (1 - V^2/c^2)^{\frac{1}{2}}$$

so that,

$$d t' = d t/(1 - V^2/c^2)^{\frac{1}{2}} \qquad [8]$$

If the Universe is expanding in accordance with these Doppler effects as Einstein claimed (4), this slowing down of time must occur

within every galaxy that is receding from us, and the further away that galaxy is, the more slowly must its clocks run. Let this be so.

Under the expanding Universe hypothesis, regardless of whether the Universe began with a «big-bang», or is in steady-state, the galaxies continue to move apart with unchangeable velocities. They are unaccelerated, since observations out to 6 thousand-million light years show that there is no slowing down of the expansion. At this great distance, the red-shift is $\frac{1}{2} v_0$, and from (8) the time intervals are related as:

$$d t' = \frac{5}{4} d t$$

so that clocks 6 billion light years away lose 15 minutes per hour that they run.

Now it follows unequivocally from the principle of relativity, since no accelerations are involved and all the reference frames are inertial, that all of the reference frames, or galaxies, are equivalent and no one of them is in any way different from the others. We are free to place an observer on any galaxy anywhere in the Universe that we choose, and when we do this, that observer will notice that all the other galaxies are running away from him and that all of their clocks are running slower than his own.

Thus, under Einstein's hypotheses, every clock in the Universe runs permanently slower than every other clock, and no *legerdemain* with the clock hands, such as modern mathematicians like to perform (11), can possibly correct this contradiction.

The assumption that the red-shifts of distant galaxies are Doppler effects leads to an impossible consequence, and must itself, along with the various relativistic cosmologies, be rejected as impossible. Therefore, the red-shifts cannot be Doppler effects and must be assigned a more logical cause. Finally, one is led to wonder if those who believe in expanding or exploding Universes because of the above hypotheses have ever stopped to consider the following definition of mathematics:

«Mathematics is that exact science whereby, starting with a faulty premise, we reason through a series of rigorously logical steps to an insane conclusión.»

Appendix II

Experimental Verification That the Red-Shifts Are Not Doppler Effects.

Kantor's experiment (8) shows conclusively that the speed of light depends upon the purely relative speed of the Hertzian free system containing its source, viz:

$$\bar{w} = \bar{c} + \bar{u} \qquad [9]$$

wherein $\bar{u}$ is limited strictly to uniform rectilinear motion (not gravitationally induced). It follows from this test that the constant of annual aberration of light from a stellar system having a recessional component of motion $\bar{u}$ with regard to the solar system is:

$$\tan \Theta = v/(c - u) \qquad [10]$$

where v is the orbital speed of the earth. This formula, as suggested originally by Dingle (12), offers a means for testing the nature of the red-shifts. If these are truly Doppler effects, the there will exist a differential annual aberration between nearby stars and very distant galaxies possessing large red-shifts. On the other hand, if in accordance with Newtonian physics, these red-shifts are due to progressive degradation of the light rays as they move through vast regions of space, then the galaxies possessing these large red-shifts are simply very remote from us, but are stationary in space. The aberrational constant will be the same for them as for nearby stars possessing no red-shifts. Thus, a clear decision between the Einsteinian and the Newtonian cosmologies is made possible by measuring the differential aberration.

Careful measurements of differential annual aberration between stars and nebulae possessing large red-shifts have recently been made at Dingle's request and have been reported by O. Heckman (10). They give unambiguous null results for the differential aberration.

On this basis, the distant galaxies are practically stationary in space insofar as radial velocities are concerned, and therefore it is

certain that the red-shifts are not Doppler effects, and must be assigned a different cause.

Appendix III

Proof that Hertzian Mechanics Predicts Null DeSitter Effects. Kantor's experimental results (8) show under the above restrictions that the speed of light is vectorially additive with the speed of its source, thus invalidating the Einstein composition of velocities and the principle of Lorentz covariance. On this basis alone, the relativistic cosmologies must be abandoned. Nevertheless, the Einsteinists are questioning Kantor's experimental results because of DeSitter's binary star argument, under which the speed of light is independent of the motion of its source. Needless to say, to question experimental results on the basis of sheer hypothesis is completely unscientific; what should be questioned here is DeSitter's logic, wherein he violated the four philosophical rules of reasoning.

According to W. Pauli (13), DeSitter came to the following conclusion: «If the velocity of light were not assumed constant, then for circular orbits of spectroscopic twin stars the time dependence of the Doppler effect would correspond to that of an eccentric orbit. Since the actual orbits have very small eccentricity, this leads one to conclude that the velocity of light is, to a large degree, independent of the velocity v of the twin star... It can then be safely said that the postulate of the constancy of the velocity of light has been proved to be correct.»

De Sitter's argument proves nothing, because he neglected the effect on the speed of light of the gravitational field that causes the orbital velocity v of the twin star in tne first place. Let us see what actually happens when the field is taken into account:

The Newtonian law of universal gravitation governs all natural phenomena in proportion to the masses, and light has the mass, $m = h\nu/c^2$. Let us assume that a ray of light is emitted from a twin star, orbiting about the stellar center of mass at r_0, in a perfect circle. We select polar coordinates to describe the motion. The ray is detected at r_1 in the solar system, which is moving at the relative speed u with respect to the binary stellar system. The actual path of the ray will be of finite width, and the wavelets, in order to be

detected at r_1 after traversing all the paths immediately adjacent to the most direct one, must all arrive in phase. In other words, for constructive interference at r_1, the number of waves along the path, r_0 to r_1, must be independent of small variations in the path. The action integral, $\int_{r_0}^{r_1} d\,s/\lambda$, must be of stationary value, and the Hertzian variational principle yields for this condition,

$$\delta \int_{r_0}^{r_1} d\,s/\lambda = 0$$

Now it is shown in the textbooks on mechanics that a sufficient condition for extremalizing this integral is that,

$$\frac{d}{d\,t}\left(\frac{\partial\,L}{\partial\,\dot{q}\,i}\right) - \frac{\partial\,L}{\partial\,q\,i} \equiv 0$$

In polar coordinates, the Lagrangian equations for the motion of the light ray are

$$\frac{d}{d\,t}(m\,\dot{r}) - m\,r\,\dot{\Theta}^2 + \frac{d\,\phi}{d\,r}(r) = 0 \qquad (11)$$

and

$$\frac{d}{d\,t}(m\,r^2\,\dot{\Theta}) = 0 \qquad [13]$$

The second equation may be integrated immediately: $m\,r^2\,\dot{\Theta} = = \text{constant}$. This is simply the law of conservation of angular momentum. The constant value equals $m\,V_0\,r_0$, where V_0 and r_0 are the orbital speed and orbital radius, respectively, of the twin star. The product, $V\,r$, is therefore a constant, and so when the light ray reaches r_1, an almost infinite distance from the binary system, conserving its angular momentum as it travels, its component of motion, V, corresponding to the orbital velocity vanishes.

In [11], the centrifugal force acting on the light at the point of emission, $m\,r_0\,\Theta_0^2$, due to the star's orbit, is exactly counterbalanced

by the centripetal force of gravity, $\frac{d\phi}{dr}(r)$, since spectroscopic binary orbits are almost perfect circles. By canceling these equal terms in [11]:

$$\frac{d}{dt}(m\dot{r}) = 0 \qquad [13]$$

so that with respect to the center of mass of the binary system, r is a constant. We can immediately identify $\dot{r}$ with the measured speed of light, c. Thus, relative to the center of mass of the binary system, the light ray will follow a curved trajectory, being emitted with the velocity, $\bar{c} + V$, and losing the component V, as it travels, so that its terminal velocity outside of the gravitational field is always c. With respect to the solar system, however, this light ray will travel with the velocity,

$$\bar{c} + \bar{u},$$

where $\bar{u}$ is the relative velocity of the binary stellar system, and this speed will be the same whether the twin star was approaching or receding in its orbit at the instant of emission.

It is thus seen that De Sitter's argument which supposedly supports Einstein's second postulate is based upon mistaken reasoning and fails in fact to tell us anything about how light is propagated.

Under Hertzian mechanics, then, the time-dependence of the Doppler effects from spectroscopic binaries will correspond to circular orbits and will not exhibit the spurious eccentricities that De Sitter claimed. The Doppler effects themselves, however, will depend upon the orbital velocities of the twin stars, because from the Hertzian fundamental principle we have already seen (14) that:

$$\lambda = \lambda_0 \left(\sqrt{1 + V^2/c^2} - \frac{V}{c}\cos\phi\right), \qquad [14]$$

where V is the purely relative motion between us and the twin star, and where λ is the Doppler effect that is *observed* at the angle ϕ to the relative motion.

Summary

Over 250 years ago, Newton described the Universe as stable, infinite, and three-dimensional. With the recent discovery of «neutron star» explosions, the Newtonian cosmology becomes of first importance. Herein, it is shown that «neutrino» energy which fills space as a result of nuclear beta-decays and the degradation of light-rays known as red-shifting, causes the «neutron star» explosions. These explosions serve to create virgin hydrogen from dead stellar material and to distribute it as cosmic radiation all over the Universe for the continuous creation of new stars. Thus, the Universe is eternal and will never «run down».

The Newtonian cosmology is based upon the Hertzian fundamental principle of mechanics: *Every free system persists in its state of rest or of uniform motion in a straightest path.* As applied herein to the Universe, this law predicts the red-shift-luminosity relationship for distant galactic clusters that has actually been observed. The red-shifts turn out to be energy degradations inherent to the propagation of light, and certainly are not related to Doppler effects as claimed by others. They demonstrate that the Universe is stable and non-expanding, homogeneous, infinite, and eternal.

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