PYTHAGOREAN COSMOLOGY

PYTHAGORAS'

UNIVERSE

COSMOLOGY

by the

NUMBERS

PYTHUNIV.WP6 October 8, 1995

A PYTHOGOREAN UNIVERSE

I am a Pythagorean. I believe that ultimate reality is not matter, not vibrating waves, not thought, not spirit. The UR essence of the universe is number! Sir James Jeans once said that God is a mathematician. I would say that the Creator is mathematics itself. Underlying all the structure in the world are the attributes of number. The laws of physics, the values of fundamental constants, the multitude of archetypes governing all processes, are what they are because of the properties of number. While in his day Pythagoras restricted cosmography to the natural integers and was devastated by the intrusion of $\sqrt{2}$, today every disciple of Pythagoras is free to adopt with impunity what was once a heresy by including all numbers.

The occurrence of Pythagoreans in history is like the integers, discrete not continuous. There are sometimes gaps of centuries between their appearance: Pythagoras and his school in the sixth century B.C.E., followed by the apostles, Diaphantus, Kepler, Mendeliev, Eddington, Dirac, J.G.Bennett, and many lesser saints, all of whom contributed to Pythagorean Holy Writ by building structures directly on number. But there have also been false prophets who preach various numerologies. As in every discipline there must be criteria for discriminating the valid from the deceptive. The primary test is that more must come out than is put in.

The concern of the present paper is the number basis underlying the structure of the observed astronomical universe. We shall employ a structuralist approach in that we shall look at the relations between entities rather than focusing on what takes place within the entities themselves. Further, we shall consider the synchronic rather than the diachronic aspects of the structure, although in cosmology the synchronic must be inferred from the diachronic.

The structure will be built on the three dimensionless quantities α,μ, and S, being respectively the fine structure constant, the ratio of baryon to lepton mass, and the ratio of coulomb to gravitational force. The fundamental dimensioned constants, c,(velocity of light), G, (Newton's gravitational constant) and h, (Planck's constant) are used as a bridge to the usual observables L,(size), M,(mass), and T (time).

Throughout we shall use more significant figures than may be meaningful in a scientific sense. But in order to test whether results derived from different sources are the same, as much accuracy as is available must be employed. In the case of the fundamental constants, except for the value of G, six or more significant figures may be safely assumed.

FUNC { R SUB P= SQRT { Gh OVER { c SUP 3 } } ,~~~M SUB P= SQRT { hc OVER G }, } FUNC { ~~~T SUB p= SQRT { hc OVER { c SUP 5 } } }

$$R_P = \sqrt{\frac{G\hbar}{c^3}}, \quad M_P = \sqrt{\frac{\hbar c}{G}}, \quad T_P = \sqrt{\frac{\hbar G}{c^5}}$$

n the beginning was the Planck Particle whose extension, mass and time are given by whose values are: 4.050837×10^{-33}cm, 5.456203×10^{-5}g, and 1.351287×10^{-43}sec. The density of the Planck Particle, $\rho_P = c^5/hG^2$, is equal to 5.157×10^{93}g/cm^3.
To display the relational structure of the objects in the universe, we shall need the extension, mass, and density times of various fundamental particles. The values and $\log_{10}$ values for the electron, proton, and hydrogen atom as well as for the Planck particle are given in Table I and Table II.

TABLE I cgs Values

PARTICLE	RADIUS cm	MASS g	ρ-TIME sec
PLANCK (ħ)	1.616050×10^{-33}	2.176710×10^{-5}	3.386989×10^{-43}
PLANCK (h)	4.050837×10^{-33}	5.456203×10^{-5}	8.489922×10^{-43}
ELECTRON	2.817941×10^{-13}	9.109390×10^{-28}	0.120555
PROTON	2.817941×10^{-13}	1.672623×10^{-24}	0.002813
HYDROGEN ATOM	5.291772×10^{-9}	1.673534×10^{-24}	7237.97

TABLE II $\log_{10}$(cgs Values)

PARTICLE	RADIUS cm	MASS g	ρ-TIME sec
PLANCK (ħ)	-32.791545	-4.662199	-42.470186
PLANCK (h)	-32.392455	-4.263110	-42.071096
ELECTRON	-12.550068	-27.040511	-0.918814
PROTON	-12.550068	-23.776602	-2.550769
HYDROGEN ATOM	-8.276399	-23.776366	3.859617

FUNC { tau ~=~2 pi SQRT { { R SUP { 3/2 } } OVER { GM } } }

The ρ-Time, τ, is calculated from the equation, $\tau = 2\pi\sqrt{\frac{R^3}{GM}}$

The log values of the ratio of the Planck Particle(based on h) to the proton are:

RADIUS	MASS	TIME
$19.842387 = k^{-1}S^{1/2}$	$19.513492 = kS^{1/2}$	$39.520327 = k^{-1}S$

S, the ratio of coulomb to gravitational force has the value
$\log_{10}S = 39.355880$
$k = \sqrt{(2\pi/\alpha\mu)}$, where α is the fine structure constant and μ is the proton to electron mass ratio, has the value,
$\log_{10}k = -0.164447$

The following table of $\log_{10}$ S and k values is useful for identifying relationships.

	x 1	x k	x k^{-1}
$S^{1/2}$	19.677940	19.513493	19.842387
S	39.355880	39.191433	39.520327
$S^{3/2}$	59.033820	58.869373	59.198267
S^2	78.711760	78.547313	78.876207

For negative values, change the signs of the exponents of both k and S.

Some other frequently used $\log_{10}$ values:
Planck M(h) -4.263110
Planck R(h) -32.392455 use k
Planck T(h) -42.869276

c 10.476821
G -7.175705
h -26.178744
$\hbar$ -26.976924
α -2.136835
a_o -8.276399
m_p -23.776602
r_e -12.550068
m_e -27.040511
e -9.318469
S 39.355880
μ 3.263909
k -0.164447 = $\sqrt{(2\pi/\alpha\mu)}$

2π 0.798180

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MORE PYTHAGOREAN COSMOLOGY

In the past few years many relations between the age and size of the universe and the properties of the elemental particles and fundamental constants of physics have been found leading some to hold that cosmology has now become a branch of particle physics. But that is a reductionist view. Mach would have it that particle physics should be taken as a branch of cosmology. Maybe it would be best that particle physics-cosmology should be a single discipline postponing for now the question of the direction(s) of causality.

In both particle physics and cosmology the fundamental constants, c,G and h, and the dimensionless numbers α,μ and S appear in many equations. The so called 'Planck Particle' defined by the values of c,G and h when augmented by appropriate powers of α,μ and S appears to determine the dimensions of many other entities in the universe from baryons to stars. Without extensive knowledge of the physical processes that may be occurring in the unfolding of the universe, we can see from the identity of certain numerical values alone that there is a profound interplay between the micro-micro and the macro-macro.

In studying these equations we must drop our historical biases of identifying these constants solely with the relationships in which they were first discovered. For example, the dimensionless constant, S, was first measured as the ratio of coulomb force to gravitational force. But the powers of $\sqrt{S}$ appear in so many non-force relations that S must be considered of far more cosmological importance than being only a particular force ratio.

The Planck Particle

Planck Space

THE KOSMOS ACCORDING TO PYTHAGORAS

I Pythagoras and Planck

Somewhere around 600 B.C.E., at the beginning of the present age, Pythagoras held that the natural integers themselves sufficed as building blocks for constructing the universe. He was set back and dismayed when real numbers like $\sqrt{2}$ intervened. Even before his death the continuum of real numbers began to philosophically intrude and came to dominate physical thought until the beginning of the 20th century. Then at the beginning of the present age, Max Planck found that discreteness must be re-introduced. The continuum, as well as the integers, was found wanting. Pythagoras was somewhat justified when Planck showed that basic physical realtionships were governed by discrete rather than contiuous, quantities. Of course, Pythagoras' misinterpretation was that it was the integers themselves that sufficed, when it was discreteness, one of the properties of the integers that was the essence. Today as digital replaces analog, Pythagoras is firmly back in business.

Sometimes many centuries intervene between the writing of the first sentence of a worldview and the writing of the second, with many by-paths being explored in the while. Today it seems possible to add to what Pythagoras began since there have been several contributions to his approach in recent years. It is quite appropriate to call such modern natural philosophers as Planck, Eddington and Dirac followers of Pythagoras, since parts of their work are clearly "Pythagorean". They have taken number to be the ultimate basis of reality.

II The Planck Particle

Today Pythagoreanism begins with the so-called fundamental constants of physics. It might be said that: In the beginning God created the numbers $\hbar$,G, and c, and from these all else followed. If these constants had had different values, even slightly different values, then the universe would have been quite different. In fact we might not even be here to contribute the feedback consciousness that references the universe. Planck, in addition to re-introducing the discrete, took the fundamental constants, h, G, and c and dimensionaly derived a system of "natural units" with which to describe the universe. When translated into these Planckian units relations between the masses, sizes, and life times of physical entities were seen to reveal symmetries and patterns that bring to mind Pythagoras' earlier patterns of tones and their harmonics.

Physicists have come to feel that the dimensionalities of mass (M), length (L), and time (T) are the basic descriptors of most observed physical phenomena. In terms of M, L, and T, the dimensionalities of the fundamental constants sre,

$$[\hbar] = [ML^2/T], \quad [G] = [L^3/MT^2], \quad [c] = [L/T]$$

When mass, length, and time are expressed explicitly in terms of ħ, G, and c, we find,

$$m_o = \sqrt{\frac{\hbar c}{G}} \qquad l_o = \sqrt{\frac{\hbar G}{c^3}} \qquad t_o = \sqrt{\frac{\hbar G}{c^5}} \qquad e_o = \sqrt{\hbar c}$$

This set of values is taken as the definition of a virtual particle, having the mass m_o, the radius l_o, and the characteristic time t_o, called the "Planck Particle". The $\log_{10}$ cgs values of the fundamental constants and the Planck Particle parameters are given in Table I,

Table I Fundamental Values (cgs)

CONSTANT	symbol	dimensionality	LOG_{10}(VALUE)
Planck's constant	ħ	ML^2/T	-26.9769235
gravitational constant	G	L^3/MT^2	-7.1757050
velocity of light	c	L/T	10.4768207
Planck mass	m_o	M	-4.6621994
Planck length	l_o	L	-32.7915452
Planck time	t_o	T	-43.2683661
fine structure constant	α	1	-2.1368346
proton/electron mass ratio	μ	1	3.2639088
coulomb/gravity force ratio	S	1	39.3558802
proton mass	m_p	M	-23.7766019
electron mass	m_e	M	-27.0405107
electron charge	e	$\sqrt{(ML^3/T^2)}$	-9.3184687
electron radius	r_e	L	-12.5500681
Bohr radius	a_o	L	-8.2763988

My speculative model of the universe agrees with the idea of the big bang and the expansion, but modifies the expansion from being monotone or inflated to being oscillatory. The first bang resulted in expansion, then after a certain amount of cooling, part of the kinetic energy of expansion was 'absorbed' being locked into the 'packaging energy' of fundamental particles. The loss of kinetic energy was sufficient to allow gravity to overcome expansion and contraction began. The contraction continued until a close-packed density of the fundamental particles was reached. At this point the collisions of the particles led to release of the packaging energy of a portion of the particles and a second bang occurred with expansion beginning again. The principal modules at this point were the fundamental particles.

This process was iterated, with successive modules—atoms, molecules, stars, galaxies,,,— being formed at each alteration of expansion and contraction. Each module marks a moment of maximum expansion, while the distributions of the modules are vestiges of the configurations imposed at maximum contraction. There is evidence of a recent contraction in a distribution pattern of galaxy clusters resembling that of close packed polyhedra.

We are now observing an expanding phase in which the largest modules are clusters of galaxies.

Alternate Ideas
1) oscillations as above
2) Co-existing universes occupying the same space

-Ω and ω particles

III, GRAVITATIONAL CLOCKS

A. G. WILSON 06/11/68

The Schwarzschild solution to the field equations of general relativity establishes for all physical bodies the relation

(1) $$R_s\, R_c^2/R^3 = \text{constant}$$ *

between R_s, the Schwarzschild or gravitational radius of the body, R_c, the local radius of curvature of space, and R the physical or metric radius (Ref. 1).

This expression implies the existence of a fundamental time period associated with every physical body. Substituting $2GM/c^2$ for R_s gives,

$$R_c^2/c^2 = kR^3/2GM = T^2$$

This local basic time period, T, is seen to be proportional to the ratio of the local radius of curvature of space to the velocity of light. The universal validity of Equation (1) infers the existence of a local characteristic time period associated with the local curvature of space. This provides a "gravitational clock" which governs the dynamical motions of all cosmic bodies.

If the constant k is taken to be $8\pi^2$, the basic period T becomes equal to the minimum gravitational period, τ, associated with gravitating bodies. This period,

(2) $$\tau^2 = 4\pi^2\, R^3/GM,$$

sometimes called the "Schuster Period", is the well known limiting minimum period for bodies orbiting about a spherical mass M of radius R. Equation (1) also is the limiting rotation period for a gravitating body with dynamic stability.

Although for small distances the effects of gravitational forces are negligible with respect to other forces (Coulomb forces, for example, are 10^{40} times greater than gravitational forces), Is it possible to detect the presence of the gravitational clock of small fundamental masses such as atoms and elementary particles? Certainly it is not possible to detect the gravitational force effects associated with these entities whose structure is overwhelmingly determined by coulomb, strong and weak forces, but it still may be possible to detect the <u>temporal</u> effects of the gravitational clock especially if the basic gravitation periods are markedly different from the coulomb periods associated with the atom.

* $T = \frac{GM}{c^3}$ = the Schwarzschild time

$t = \frac{R}{c}$ = the radial time

$\tau^2 = \frac{R^3}{GM}$ = the space curvature time

$\frac{\tau^2 T}{t^3} = 1$

(or $\tau = 2\pi\sigma$)

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SEQUENCES, NETS, GRIDS

3 measures
contiguity
contiguity = extension
contiguity
gaps
combined

4.9 Equipartition of Energy
4.10 Traffic - Node - Link

THE WEEK

THE GRAVITATIONAL POTENTIAL BOUNDS

The general theory of relativity states that there exists a bound on the gravitational potential, Mass/Radius, of all gravitating bodies. This bound, known as the Schwarzschild Limit, is the locus of those bodies and particles for which the metric radius, R, is equal to the gravitational radius, GM/c^2, where G is the gravitational constant, M the mass of the body, and c the velocity of light. For bodies and particles consisting of uncollapsed matter, the bound states that:

(1) $$\frac{GM}{c^2R} \leq 1$$

When gravitation collapses an object the Schwarzschild Limit is violated and matter leaves the visible universe entering the realm of black holes.

In addition to the Schwarzschild Limit there is also a second paralleling potential limit bounding all normal matter--electrically neutral atoms, molecules, and bodies composed of such matter, such as planets, main sequence stars, etc. The expression for the bound in this case is:

(2) $$\frac{GM}{c^2R} \leq \alpha^2$$

Where α is the fine structure constant. This second limit is an observed limit governing all cosmic bodies composed of ordinary matter. No electrically neutral atom or composite body made of such atoms exceeds this limit. The zone between the two limits is occupied by white dwarf and neutron stars, and objects and particles of nuclear density.

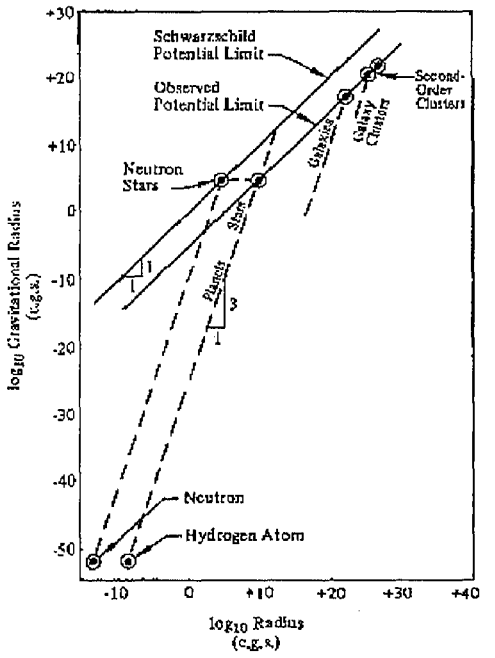

Figure 1 Mass and Size Relations Between Atomic and Cosmic Bodies

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A PYTHAGOREAN COSMOLOGY

The relatavistic potential bound dividing "ordinary" matter from the nether world of black holes, known as the Schwarzschild Limit is given by,

(1) $$\frac{GM}{Rc^2} \leq 1$$

where M is mass, R is extension, G is the Newtonian constant, and c is the velocity of light. This boundary marks the value at which the gravitational energy of a body, GM^2/R, is equal to its total energy, Mc^2; and where the gravitational radius, GM/c^2, is equal to the metric radius, R. Equation (1) says that the gravitational energy is always less than or equal to the total energy. However, on the 'black hole side' of the boundary we have the paradox that the gravitational energy can exceed the total energy. This 'paradox' results from the somewhat chauvinistic use of the term total, rather than from the physics itself. If in the early stages of the evolution of the universe the ambient conditions are on the high potential side of equation(1), then the principle of conservation of energy would properly refer to the conservation of gravitational energy, GM^2/R, rather than to the conservation of total energy, Mc^2.

The following scenario is based on the principle of the conservation of gravitational energy:
Step 1. Postulate the initial condition of the existence of a single particle, Ω, having a mass, M_Ω, and a spatial extension R_Ω.
Step 2. The Ω particle fragments into N_1 Planck particles while conserving gravitational energy.
Step 3 Each of the N_1 planck particles fragments into N_2 baryons, again conserving gravitational energy.
The resulting $N_1 x N_2$ baryons constitutes the matter in the present Hubble universe.

In the following all numbers are the $\log_{10}$ values.
We proceed by running the scenario backwards. The Hubble universe is assumed (with Eddington) to have a mass equivalent to that of S^2 or 78.711760 baryons = 54.935158 grams. This provides us with the end value,

(2) $$N_1 \times N_2 = S^2$$

The gravitational energy of a Planck particle is 16.690530 ergs; the gravitational energy of a proton is -42.178435 ergs. If

$k = 0.684\,782\,853$ 746
$\log_{10} k = -0.165\,447\,123$

gravitational energy is conserved, then one Planck particle can fragment into N_2 = 58.868965 (= 7.401538×10^{58}) baryons. Knowing N_2 we can now calculate N_1 from equation (2), $N_1 = S^2/N_2$, which gives N_1 = 19.842387 (= 6.9561×10^{19}) baryons. We note that $N_1 = k^{-1}S^{1/2}$ and $N_2 = kS^{3/2}$, where $k = \sqrt{(2\pi/\alpha\mu)}$.
Continuing backwards in time, we next follow the metamorphosis of a Planck particle into baryons. A single Planck particle under conservation of gravitational energy becomes 58.869373 baryons, each with a mass of -23.776604 grams. The total mass of all the baryons created will be 35.092718 grams. Converting to solar masses, [1 solar mass = 33.288 grams], this value is equal to $10^{1.805}$ or 63.8 solar masses, which is closely the maximum observed value for the mass of stars. We may hence conclude that each Planck particle metamorphizes into a proto-star, and that there can then be at least N_1 or 19.842387 stars in the universe.

Since we have already determined the value of N_1, we can now go to step 1) and derive the properties of the Ω particle. The gravitational energy of a single Planck particle is 16.690530 ergs, hence the total gravitational energy of N_1 Planck particles is 36.532880 ergs. This is the value of GM_Ω^2/R_Ω. However, a second condition is needed to isolate the values of M_Ω and R_Ω. Here we can make some choices: For one, suppose we invoke symmetry. A Planck particle in metamorphizing to baryons goes from the Schwarzschild Limit, $M/R = c^2/G$ = 28.129308 to m_p/r_e = -11.226536; a total shift in potential of 39.355881, which is numerically equal to S. If we assume that the shift in potential from the Ω particle to the Planck particle is also equal to S, this would give M_Ω/R_Ω = 67.485226 for the Ω particle. We now have the two equations,

(3) $$\frac{GM^2}{R} = g \qquad \text{and} \qquad \frac{M}{R} = p$$

where g = 36.532917 and p = 67.485226, whose solutions are,

(4) $$M = \frac{g}{Gp} \qquad \text{and} \qquad R = \frac{g}{Gp^2}$$

giving M_Ω = -23.776604 grams and R_Ω = -91.261830 cm. We note that the Ω particle has the same mass as the proton!

Recapitulating: In stage 1) the Ω particle of mass -23.776604 g metamorphizes under conservation of gravitational energy to N_1 = 19.842387 Planck particles, with a total mass of 15.579239 grams. In stage 2) each of the 19.842387 Planck

DARK MATTER?

$GR_\Omega = -98.437535$
$\lambda_0^3 = -98.374635$
$\delta = 0.062900$

particles of mass -4.263125 grams, metamorphizes under conservation of gravitational energy to N_2 = 58.869322 baryons which is equal to a stellar mass of 35.092718 grams or 63⊙. This leads to the present Hubble universe of N_1xN_2 = 78.711686 baryons with a total mass of 54.935082 grams.

The first method of designating an Ω particle derived from the proportion,

(5) $$\frac{\left(\frac{M}{R}\right)_{\Omega}}{\left(\frac{M}{R}\right)_{PL}} = \frac{\left(\frac{M}{R}\right)_{PL}}{\left(\frac{M}{R}\right)_{p}} = S$$

This approach led to the values $M_\Omega = m_p$ = -23.776604 grams and R_Ω = -91.261830 cm.

A second approach to the designation of Ω, which we will here designate with the symbol, ω, derives from equating the value of MR to that of GM^2/R. This gives us the equations,

(6) $$MR = \frac{GM^2}{R} = 36.532880$$

from which we derive R_ω = 9.785738 and M_ω = 26.747142

The scenarios for both the particle Ω, or the particle ω, have first, metamorphizing into $N_1 = k^{-1}S^{1/2}$ Planck particles. Each Planck particle then metamorphizes into $N_2 = kS^{3/2}$ baryons. The end result is a universe of $N_1N_2 = S^2$ baryons. It is to be noted that $kS^{3/2}$ baryons is the maximum stellar mass and that the mass of Ω is the same as that of a baryon. The gravitational energy of the Ω particle and the ω particle is in both cases 36.532917 which is symmetric to the gravitational energies of the Planck particle = -36.655565 = h/c and the proton = -36.326672 = k^{-2}h/c.

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A PYTHAGOREAN AGE OF THE UNIVERSE

An alternate approach to determining the age of the Hubble universe is to assume that certain parameters that are functions of the fundamental constants may vary with time. Let us focus on extension. Beginning with the Planck particle, let us ask how long it might take the Planck particle to metamorphize into a baryon, e.g. for the Planck length $\sqrt{(Gh/c^3)}$ to expand to the proton radius, r_e.

The Heisenberg uncertainty principle provides us with the inequality,

$$\frac{ML^2}{T} \geq \hbar \qquad (1)$$

which places a lower bound on all action. The left member is equivalent to,

$$\frac{M}{L}\frac{L^3}{T} = \frac{M}{L}\frac{V}{T} \geq \hbar \qquad (2)$$

where V is volume.

$$\frac{M}{L} \leq \frac{c^2}{G}$$

The Schwarzschild inequality $GM/c^2R \leq 1$, when substituted in equation (2) gives,

$$\hbar \simeq \frac{M}{L}\frac{V}{T} \leq \frac{c^2}{G}\cdot\frac{V}{T}$$

$$\frac{c^2}{G}\frac{V}{T} \geq \frac{M}{L}\frac{V}{T} \geq \hbar \qquad (3)$$

$$\frac{V}{T} \geq \frac{G\hbar}{c^2}$$

This says that the volume rate of expansion V/T is greater than Gh/c^2 whose $\log_{10}$ value is -55.106271 cm^3/sec. For convenience we shall label this value Ψ.

If we assume a uniform rate of expansion so that $V/T=\Delta V/\Delta T$ is constant, then $\Delta T \leq \Delta V/\Psi$. Now $\Delta V = (PL_R^3 - r_e^3)$, but PL_R,-32.392, is negligible compared to r_e, -12.550, therefore $\Delta T = r_e^3/\Psi$, giving, $\Delta T \doteq 9.057$ billion years.

~~$r_e^3 = -37.456067$~~

$r_e^3 = -37.650204$

$\Psi = -55.106271$

$\Delta T = 17.456067$ seconds

7.499095

$10^{9.956972}$ years or 9.056742 Billion Years ~ $H = 107.98585$

$X\frac{2}{3} = 71.990569 = H_o$

According to the current cosmological model, the Hubble age of the universe calculated from the value of the Hubble constant is 3/2 greater than the actual age. [That is at the critical density of matter that closes the universe ($\Omega = 1$), the Hubble Time is 3/2 the time elapsed since the big bang.] Observations made on cepheids by Wendy Friedman and associates of the Carnegie Institution, reported in the June 1996 Carnegie publication, Spectra, lead to a value of the Hubble constant of 73 with a 15% uncertainty. This gives a Hubble time of 13.40 billion years or a time since the big bang of 8.93 billion years. Sandage, also of the Carnegie Institution, reports in the same issue, a value of 57 km/sec/mpc with an uncertainty of 7%, based on type Ia supernovae. This corresponds to a Hubble age of 17.16 billion years or a time from the big bang of 11.44 billion years. When compared with the age of stars in globular clusters of 15 billion years, we have the problem of "being older than your mother", stars whose age is greater than that of the universe.

The following table compares the Pythagorean age with that calculated from cepheids and from type Ia supernove.

	PYTHAGORAS	CEPHEIDS	SUPERNOVAE
HUBBLE CONSTANT	71.96 k/s/mpc	73 k/s/mpc	57 k/s/mpc
HUBBLE AGE	13.59 B.Y	13.40 B.Y.	17.16 B.Y.
TIME FROM BIG BANG	9.057 B.Y	8.93 B.Y.	11.44 B.Y.
UNCERTAINTY	< 1 %	15 %	7 %

Now 1999 value from Cepheids 71 ± 7

UNIVERSE AND ANIVERSE

The choice of mode of pairing energies leads to different totals:

1) Pairing [E with H] and [N with V] leads to a value for ϵ_o^4 of 65.165768 ergs if [E,H] and [N,V] have the same sign and to a value of zero if of opposite sign. This pairing places objects on the Schwartzschild boundary.
2) A second mode of pairing, [E with N] and [H with V] produces other values for ϵ_o^4.

In the first mode, we find $NV/EH = (GM/c^2R)^3\epsilon_o^4$ (see Varieties of Energy, 2000 #2).
In the second mode we have,

$$\frac{EN}{HV} = \frac{GM^3c^2}{R} * \frac{R^2}{\hbar^2c^2} \quad \text{leading to} \quad M^3R = \frac{\hbar^2}{G}$$

The Planck particle values satisfy this last equation, $m_o^3 l_o = \hbar^2/G$.

When $R = (\alpha\mu S)^{3/2} l_o = 27.932888$ cm, the value of the radius of the universe,
we find that $M = -24.903677$ gm or $-20{,}241478$ Planck units of mass $= (\alpha\mu S)^{-½} m_o$.
And $M = m_p/\alpha\mu$, that is -23.776602 - 1.127075. Hence

$$R_U (m_p/\alpha\mu)^3 = \hbar^2/G$$

A functional relation between the values of the universe and those of the baryon.

When $M = (\alpha\mu S)^{3/2} m_o = 56.062232$ gm, the value of the mass of the universe,
we find that $R = -214.964839$ cm, or -182.173294 Planck units of length $= (\alpha\mu S)^{-5/2} l_o$.
This singular body will be termed an "aniverse".

If $M = (S/\alpha\mu)^{3/2} m_o = 52.681010$ gm, as the value of the mass of the universe,
then R =

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THE FOUR PHYSICAL COSMOLOGICAL QUADRANTS

PART I

The Heisenberg inequality, $ML \geq \hbar/c$, and the Schwarzschild inequality, $M/L \leq c^2/G$, define four quadrants: In the first quadrant both of these inequalities hold and the result is the familiar universe of direct observation consisting of planets, stars, galaxies, clusters, etc. In the second quadrant the Schwarzschild inequality is reversed. This is the domain of black holes. In the third quadrant both the Schwarzschild and the Heisenberg inequalities are reversed, a possible domain of dark matter. In the fourth quadrant only the Heisenberg inequality is reversed. Inhabitants of this domain could have unlimited size but only minimal mass.

In the diagram the Schwarzschild and Heisenberg axes mark the divisions into the four quadrants. The intersection of the two axes marks the position of the Planck particle, a virtual particle whose mass, size, and characteristic time are determined by the values of the three fundamental dimensional constants of physics, the velocity of light c, Newton's gravitational constant G, and Planck's constant ħ.

$M/L > c^2/G$, $ML > \hbar/c$	$M/L < c^2/G$, $ML > \hbar/c$
Mass > 10^-4.662 gm	Size > 10^-32.791 cm
No size bounds	No mass bounds
DOMAIN OF BLACK HOLES	UNIVERSE OF STARS, GALAXIES
No atoms, no molecules	
$M/L > c^2/G$, $ML < \hbar/c$	$M/L < c^2/G$, $ML < \hbar/c$
Size < 10^-32.791 cm	Mass < 10^-4.662 gm
No mass bounds	No size bounds
DOMAIN OF DARK MATTER?	LOW MASS ENTITIES OF ANY SIZE?
No atoms, no molecules	photons, gravitons ?

If the inequalities hold for all particles and all aggregates, then there can be no atoms to the left of the Schwarzschild Limit. What is the relation of the particles of the Standard Model to these quadrants?

See Also
1997 #58,60 1998 #60

COSQUAD2.WP6 August 15, 1997

THE FOUR PHYSICAL COSMOLOGICAL QUADRANTS

PART 2.

As shown in Part 1. the Heisenberg inequality, $ML \geq \hbar/c$, and the Schwarzschild inequality, $M/L \leq c^2/G$, define four quadrants. In Part 2 the values of energy, force, and pressure in these four quadrants are investigated.

Pressure is defined as force/unit area, which is dimensionally equivalent to energy/unit volume.

$$P = \frac{Force}{unit\ area} = \frac{Energy}{unit\ volume} = \frac{M}{LT^2}$$

$$P = \frac{ML}{T^2}\cdot\frac{1}{L^2} = \frac{ML^2}{T^2}\cdot\frac{1}{L^3} = \frac{M}{LT^2}$$

The <u>total energy</u> of a mass M is equal to Mc^2, and the negative or outward pressure resulting from the total energy will be

$$P_T = \frac{Mc^2}{L^3} = \rho c^2$$

where ρ is the mass density. The <u>gravitational energy</u> of a mass M with size L is equal to GM^2/L, and the positive or inward pressure resulting from the gravitational energy will be

$$P_G = \frac{GM^2}{L^2}\cdot\frac{1}{L^2} = \frac{GM^2}{L^4} = G\rho^2L^2$$

The ratio of the gravitational pressure to the total pressure is

$$\frac{P_G}{P_T} = \frac{\frac{GM^2}{L^4}}{\frac{Mc^2}{L^3}} = \frac{GM}{c^2L}$$

Since $GM/c^2L = 1$ on the Schwarzschild Limit, P_G will equal P_T on this boundary. In the first quadrant, (the observable universe), the outward pressure P_T will be greater than the inward pressure P_G. The net effect will thus be expansion. In the second quadrant, (realm of black holes), inward pressure P_G will be greater and the net effect will be contraction or collapse.

In quad #1 All stable objects lie on the Sch. Lim.

or on such limits as $\frac{GM}{c^2 L} = \alpha^2$

But Brahma Breathes

COSQUAD3.WP6 August 15, 1997

THE FOUR PHYSICAL COSMOLOGICAL QUADRANTS

PART 3.

As shown in Part II, in the first quadrant the total energy exceeds all other energies including the gravitational energy, this assures that P_T, the outward or expansive pressure will dominate. It is consequently expected that all first quadrant bodies should expand. However, the question immediately arises: what makes it at all possible for entities in the first quadrant such as, planets, stars, galaxies,..to be stable, not to expand, even to exist at all?

When Einstein applied his general theory to cosmology, he was disturbed that his equations implied that the universe was either expanding or contracting. (This was before Hubble and Humason had detected that the local universe was actually expanding.) He instituted a "fudge factor", Λ, the so-called cosmological constant, to stabilize the universe. The sign of Λ was chosen to neutralize either expansion or contraction. This factor was later seen to be unnecessary and Einstein called it the greatest blunder of his theory. But was it?

The equations of Part II lead to the same results as Einstein's equations in general relativity. In the first quadrant everything must expand unless countered by some other factor. What then allows astromomical bodies to exist? What is Einstein's fudge factor, Λ ?

Possible answers to this question include:

- Primordial high density "seeds" created local regions where gravity dominated the overall expansive force. (dark matter?)
- Total energy is expended or consumed in some manner, (rotation, radiation,..?) reducing the expansive component to less than the pull of gravity.
- The action of other forces, particularly coulomb forces, create additional "Schwarzschild Boundaries" within the first quadrant, for example the $GM/c^2L \leq \alpha^2$ boundary governing 'normal' matter.

The various stages of stellar evolution, expansion through the red giant stage, novae, supernovae, collapse to dwarf stage, neutron star, etc. may result from alternating local dominance of P_T and P_g all contained within the first quadrant.

The conventional choice of sign for gravitational force has been the minus sign. Most likely this convention derived from the earth centered view that gravity acts to bring objects to a lower elevation, and since down has been traditionally associated with minus and up with plus, gravitational force received the minus sign. But this seems to be the wrong choice when the earth centered view is abandoned. It is more in accord with the equations to posit expansion as negative and contraction (gravity) as positive. To see this, consider the two first quadrant equations $F_x=Mc^2/R$, the expansive force, and $F_g=Gm^2/R^2$, the contractive gravitational force. If M/R in the expansion equation is taken as negative then M^2/R^2 in the contraction equation becomes positive. The usual assumption of contraction as negative precludes use of this mathematical convention.

Extending the convention of contraction as postitive and expansion as negative, we might consider coulomb forces as "orthogonal" to gravitational forces and could consistently write for positive and negative charge, ie and -ie respectively. Then the interaction of like charges would give:

$ie \times ie = -e^2$ repulsion or expansion

and $-ie \times -ie = -e^2$ again repulsion

while unlike charges give:

$ie \times -ie = +e^2$ attraction or contraction

Energy in non-bonded form expands P-SPACE
Energy in bonded form (i.e. matter) contracts P-SPACE

Matter is energy bonded by one or more of the 4 forces

How does energy → matter, i.e. become bonded?
How does matter → energy, i.e. become un-bonded?

COSQUAD4.WPD December 30, 1998

THE COSMOLOGICAL QUADRANTS— PART IV

The four quadrants are both local and non-local. They apply to all positions and scales from fundamental particles to the universe. Wherever the total energy is locally greater than the gravitational energy, expansion results. Wherever the gravitational energy locally dominates, contraction results. The resulting behavior in any domain is the result of the averaged net energy over that domain. The universe, for example, will expand or contract according as to whether,

$$\frac{GM^2}{R} < Mc^2 \quad \text{or} \quad \frac{GM^2}{R} > Mc^2$$

For a constant mass, it follows that if R is increasing (expansion) that GM^2/R will decrease and expansion will indefinitely continue. For expansion to cease, mass must be created at a greater rate than R increases and for a length of time sufficient for M/R to become greater then c^2/G. Only in domains where mass is rapidly coming into existence will there be contraction and hence the formation of material bodies. Without the operation of forces other than gravity, all existing objects would persist only when $M/R = c^2/G$. Otherwise they would either expand indefinitely or become black holes.

A second first-quadrant condition is that the product time x energy be greater than ħ. This condition in the case of gravitational energy or contraction is,

$$\frac{tGM^2}{R} > \hbar$$

If R is increasing then either the time period **t** or the mass must increase to preserve the inequality. A second way to view this is to note that a time related to density (rather than motion) must also slow with expansion. Density time or τ time is given by,

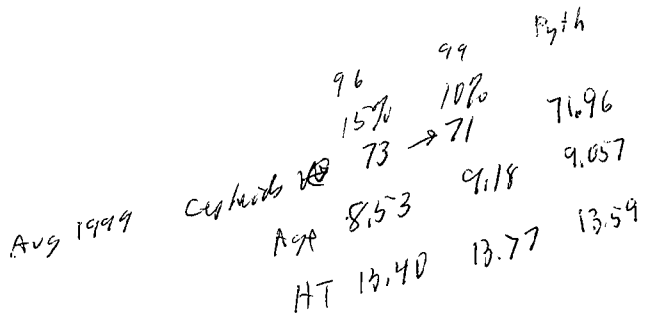
$$\tau = \sqrt{\frac{4\pi R^3}{GM}} \quad \text{or} \quad \tau \propto \rho^{-\frac{1}{2}}$$

A constant mass with R increasing effects a decrease in density which in turn demands that τ increase. This means that the tick of the clock slows down. In an expanding universe the rate at which physical processes operate will be slowing unless there is a large rate of increase in mass. This effect could well explain why the age of stars in high density regions appears to be older than the age of the universe. That is, local clocks could run at different rates at different epochs. Another aspect involving two kinds of time is that with the uniform rate "proper" time, **t**, preferred by cosmologists, inflation or an increase in dR/dt, would take the form of a constant $dR/d\tau$, where τ is decreasing in rate because of expansion.

In accord with the concept that the four quadrants are non-local, applying to all domains whatever their size, the expansion rates and times may be congruent. We may thus calculate these rates and times for first quadrant entities such as expansion from a Planck particle (corresponding to the big bang) to a baryon (corresponding to the present) and expect the same times to be reflected in other domains including the universe itself. Indeed the expansion time calculated for planck particle to baryon is 9.057 billion years[1] . This corresponds to a Hubble age of 13.59 billion years and a value of the Hubble parameter of 71.96 kilometers/ second per megaparsec. [Freedman et al based on observations of Cepheids find a time from the big bang of 8.53 billion years and a Hubble time of 13.40 billion years derived from a value of the Hubble parameter of 73 kilometers per second per megaparsec , with an uncertainty of 15%.][2]

Another question confronting present day cosmology is the apparent or real value of curvature being close to zero. That is, why is space-time flat? What physical (or mathematical) principle sustains the universe holding to flatness? At this stage we can only note that in flat spaces alone are shape and size independent. In other spaces with positive or negative curvatures change the size and the shape changes. Is there some trade-off relation between information and and energy content? implied here

Other scraps in this series include:
Part I 1997 #55, Part II 1997 #58, Part III 1997 #60



[1] See items 1995 No. 82 and 1996 No. 27

[2]Spectra, Publication of the Carnegie Institution of Washington, June 1996

THE HUBBLE PARAMETER AND FUNDAMENTAL CONSTANTS

It has been shown[1] that a joint implication of the Heisenberg and Schwarzschild inequalities is that the average rate, $\Delta V / \Delta T$, in increase of volume of an expanding mass system is greater than or equal to $\psi = G\hbar/c^2$. That is,

1) $$\Delta T \leq \frac{\Delta V}{\Psi} = \frac{V_f - V_o}{\Psi}$$

where $\mathbf{V_f}$ is the final volume and $\mathbf{V_o}$ is the initial volume. Interpretating ΔT as the time elapsed since the volume was equal to the initial value $\mathbf{V_o}$, a bound on the maximum age of the system is given by equation 1).

First, consider the case of the initial volume being that of the Planck particle,

$$V_o = \left(\frac{G\hbar}{c^3}\right)^{\frac{3}{2}}$$

which has the $\log_{10}$ value of -98.374635, and the final volume being that of a baryon,

$$V_f = r_e^3$$

which has the $\log_{10}$ value of -37.650204. $\mathbf{V_o}$ is negligible with respect to $\mathbf{V_f}$, hence,

$$\Delta T \leq \frac{r_e^3}{\Psi}$$

Using the $\log_{10}$ value, -55.106271, for ψ, gives $\log_{10} \Delta T = 17.456057$ seconds as the maximum time or age since the expansion of the system. This is equivalent to 9.056387 billion years.

What is of interest here is that this is remarkably close to the age of the universe from the big bang to the present. From determinations of the Hubble parameter using cepheids, Wendy Freedman et al find for the age since the big bang a value of 9.18 billion years (± 10%)[2]. Kirshner using type II supernovae derives a value of 8.93 billion years.[3]

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[1]See Scraps 1995 #82 and 1996 #27

[2]Physics Today, August 1999, p20

[3]Physics Today, May 1996, p19

The following table compares the Cepheid, Type II supernova, and "Heisenberg-Schwarzshild" values:

	CEPHEIDS	II SUPERNOVAE	"H-S"
AGE OF SYSTEM	9.18×10^9 years	8.93×10^9 years	9.056387×10^9 years
HUBBLE TIME	13.77×10^9 years	13.40×10^9 years	13.58×10^9 years
HUBBLE CONSTANT	71±7 km/s/mpc	73±7 km/s/mpc	71.977 km/s/mpc
UNCERTAINTY	10%	15%	< 1%

It must be repeated here that the H-S determination is for a hypothetical universe, the others for the "Hubble Universe".

The H-S derivation led to a value of $\log_{10}\Delta T = 17.456067$ seconds. Converting from seconds to Planck time units, t_o, ($\log_{10} t_o = -43.268366$ seconds) gives $\log \Delta T = 60.724433$, which is a dimensionless quantity. One third of this value is 20.241477 which is equal to $\log_{10}\sqrt{(\alpha\mu S)}$. Where α is the fine structure constant, μ is the ratio of proton to electron mass, and S is the ratio of coulomb to gravitational force. We conclude:

$$\Delta T = (\alpha\mu S)^{3/2}\, t_o \text{ seconds}$$

Is this a fractal invariant, isomorphic between different scales, or a just a highly improbable numerical coincidence? It raises many questions!

THE UNIVERSE ACCORDING TO PYTHAGORAS

I. The Planck-Baryon Mutuality.
- Inputs: c, G, ħ, r_e, m_p
- The 1,2,and 3 dimensional entities: Dark Matter, Stars, Universes, α_M, S
- Other mutualities: particle~wave, matter~energy, MATTER-SPACE

II. Quadrants and Octants
- Inputs: The Schwarzschild and Heisenberg bounds plus the Planck particle

III. Time
- Species of time, time and dimensions of space
- Ages of the Universe, The Hubble Parameter
- "Older than your mother"

IV. Frequencies and Resonance ENERGIES
- Dimensional frequencies, [p,q] matrices
- Multilevel "channels"
- Harmonics [Octaves] "Music of the Spheres"
- Serpentine curves
- Resonance vs Equilibrium
- Tuning and detuning

V. Symmetries
- Universes, Aniverses, Iniverses, Antiverses, contraverses
- Creation ex nihilo

VI. Interpretations and Alternatives
- Multiple bangs, multiple times
- FDMA, TDMA, SDMA
- Species of "parallel" universes
- Reversal of ex nihilo matter, energy –>nothingness

VII ~~COSMIC GROUP~~, FRACTAL DIMENSION

$\mathfrak{L} \longleftrightarrow \mathfrak{B}$

COSTOP01.WPD FEBRUARY 9, 2001 update FEBRUARY 16, 2001

COSMOLOGY TOPICS FEBRUARY 2001

DISTANCE
NUCLEUS POINT
CELL EXTENSION
SEPARATION

- Symmetries and Mutualities
  - Mutual Containments
    - Planck Particle and Proton, 1,2,3 dimensions
    - cell-nucleus Ratio: Plank, universe, =1, baryon =S
- Species of Time: Motion and Change, Density, NO time [Barbour] and Gödel
  - Frequencies: resonances and modulations
  - {sets of frequencies as primary}; [OM]; {Manifestations at different levels
  - Frequencies as genes
  - Time and Logic
    - Species of time: duration, interval
    - Past, Present, Future
    - Width of Now, Exposure times
    - ROF: Rate of Flow, Slow motion, time lapse ; strobe
      - Time travel vs ROF travel
      - Subjective and Objective ROFs, Brain rates, Meditation
      - Slow, Normal, Fast, Discreteness and eigen values
      - Strobes, FDMA, TDMA
      - ZONES: Parmenides, Herkleidos ; Determined, Open
  - Time and Probability
- Species of Space: Extension, Separation
  - The Mosaic of Space ADMA TEXTURE
  - Field and resolving power, SDMA
  - Departure and Return frequencies, FDMA, TDMA
- Species of mass: M, $c^2/G \times R$, etc. h/cR
- Fulcrums, Verges, and Watersheds
  - Schwarzschild Bound as unstable equilibrium
  - Music: Observer's fulcrum
  - {frequencies} registrations —> note patterns, form

P as stem cell

Current Files: Codices 2001: HUBLCONV
PBMUTL2
PBMUTL3
PENTUNIV
PYTHUNIV

SPACE, MATTER, AND FREQUENCY

Space and matter breathe, they are vibratory. Both oscillate at many frequencies and interact by resonating, interfering, and modulating. Space oscillates between expansion and contraction [expansion and contraction may even include changes in the number of dimensions]. Matter oscillates between fragmenting and merging; and space and matter together oscillate between existence and non-existence. Minkowski joined space with time to create "space-time". Einstein then showed that the existence of space-time depended on the existence of matter. Space-time is an attribute of matter and matter is an attribute of space-time, they are mutually causal. And an empty space-time would not exist.

The relations between the Planck particle and the baryon give us an example of interactions between space-time and matter. We shall here assume that the Planck particle, whose mass, m_o = –4.662199 gm, and whose size. l_o = –32.791545 cm , fragments into a baryon and three other particles. We take the mass of the proton to be m_b = –23.776602 gm; and the
Radius to be r_e = –12.550068 cm (All values are $\log_{10}$ values)

TABLE I

Particle	mass gm	size cm	M x R cgs	M/R cgs
[1] baryon	–23.776602	–12.550068	–36.326670	–11.226534
[2] mini black hole ?	+15.579276	–51.905964	–36.326670	+67.485240
[3]	–23.776602	–51.905964	–75.682566	+28.129362
[4]	+15.579276	–12.550068	+3.029208	+28.129344

TABLE II

Particle	MxR Planck values	M/R Planck values	Quadrant
[1] baryon	$\alpha\mu\hbar/c$	$S^{-1}\ c^2/G$	1°
[2] mini black hole ?	$\alpha\mu\hbar/c$	$S\ c^2/G$	2°
[3]	$S^{-1}\ \alpha\mu\hbar/c$	c^2/G	On S.B. 3°–4°
[4]	$S\ \alpha\mu\hbar/c$	c^2/G	On S.B 1°–2°.

Where, $\hbar$ is Planck's constant, = –26.976924 cgs units; α is the fine structure constant, = –2.136835; μ is the proton/electron mass ratio = 3.263909; and S is the coulomb/gravitational force ratio = +39.355878. α, μ, and S are dimensionless constants.
S.B. = the Schwarzschild Boundary, where M/R = c^2/G = +28.129362 cgs

FOUR QUADRANTS

The cosmos may be divided into four quadrants according to the following rules:

	S.B.	H.B.	
First quadrant:	$M/R < c^2/G$;	$MR > \hbar/c$	(Normal matter, atoms, stars, etc)
Second quadrant:	$M/R > c^2/G$;	$MR > \hbar/c$	(Black holes)
Third quadrant:	$M/R > c^2/G$;	$MR < \hbar/c$	?
Fourth quadrant:	$M/R < c^2/G$;	$MR < \hbar/c$	(photons, etc.)

H.B. = the Heisenberg Boundary, where $\hbar/c = -37.453745$ cgs.

Baryons reside in the first quadrant, where those such as protons are relatively stable. Particle 2 resides in the second or black hole quadrant where it is relatively stable. However particle 3 and particle 4 lie <u>on</u> the Schwarzschild boundary, an unstable watershed, where a perturbation into the first quadrant would result in expansion or into the second quadrant resulting in contraction.

ENERGY

TABLE IIIa The Mc^2 or Mass Energy [1,0]

Particle	Mc^2 cgs	Mc^2 Planck units	Mc^2 Planck values
[1] baryon	–2.822960	–19.114402	$(\alpha\mu/S)^{1/2}$
[2] mini black hole	+36.532916	+20.241474	$(\alpha\mu S)^{1/2}$
[3]	–2.822960	–19.114402	$(\alpha\mu/S)^{1/2}$
[4]	+36.532916	+20.241474	$(\alpha\mu S)^{1/2}$
sum of values	+67.419912	+ 2.254144	$(\alpha\mu)^2$

$c^2 = 20.953642$ cgs units The brackets [p,q] refer to the exponents M^p and R^q

TABLE IIIb The $\hbar c/R$ or Space Energy [0,–1]

Particle	$\hbar c/R$ cgs	$\hbar c/R$ Planck units	$\hbar c/R$ Planck values
[1] baryon	–3.950034	–20.241474	$(\alpha\mu S)^{-1/2}$
[2] mini black hole	+35.405862	+19.114402	$(S/\alpha\mu)^{1/2}$
[3]	+35.405862	+19.114402	$(S/\alpha\mu)^{1/2}$
[4]	–3.950034	–20.241474	$(\alpha\mu S)^{-1/2}$
sum of values	+62.911656	–2.254144	$(\alpha\mu)^{-2}$

$\hbar c = -16.500102$ cgs units

TABLE IIIc The $\hbar c^3/GM$ Energy [–1,0]

Particle	$\hbar c^3/GM$ cgs	$\hbar c^3/GM$ Planck units	$\hbar c^3/GM$ Planckvalues
[1] baryon	+35.405862	+19.114402	$(S/\alpha\mu)^{1/2}$
[2] mini black hole	–3.950034	–20.241474	$(\alpha\mu S)^{-1/2}$
[3]	+35.405862	+19.114402	$(S/\alpha\mu)^{1/2}$
[4]	–3.950034	–20.241474	$(\alpha\mu S)^{-1/2}$
sum of values	+62.911656	–2.254144	$(\alpha\mu)^{-2}$

$\hbar c^3/G$ = + 11.629246 cgs units

TABLE IIId The c^4R/G Energy [0.1]

Particle	c^4R/G cgs	c^4R/G Planck units	c^4R/G Planckvalues
[1] baryon	36.532921	+20.241474	$(\alpha\mu S)^{1/2}$
[2] mini black hole	–2.822975	–19.114402	$(\alpha\mu/S)^{1/2}$
[3]	–2.822975	–19.114402	$(\alpha\mu/S)^{1/2}$
[4]	36.532921	+20.241474	$(\alpha\mu S)^{1/2}$
sum of values	67.419892	2.254144	$(\alpha\mu)^2$

c^4/G = 49.082989 cgs units

From the above four tables, we have the first order energy sums for the four particles:

Mc^2 or [1,0] energy = $(\alpha\mu)^2$; $\hbar c/R$ or [0,–1] energy = $(\alpha\mu)^{-2}$;

$\hbar c^3/GM$ or [–1,0] energy = $(\alpha\mu)^{-2}$; c^4R/G or [0,1] energy = $(\alpha\mu)^2$

The total of these four energies = 0; and since the total energies of the Planck particle are zero, we conclude that in the decay of the Planck particle into a baryon and particles [2], [3], and [4], energy has been conserved.

However, there are numerous 'higher order' energies, $\hbar\nu$, corresponding to all allowable frequencies, ν, that involve additional integral and fractional exponents [p,q], M^p and R^q . From symmetry considerations, all of these may be paired, [p,q] with [-p,-q] , so that the energies sum to zero. Thus the decay of the Planck particle into the four above described particles obeys the first law of thermodynamics for all energies. An additional example showing paired energies is given in TABLE IIIe [2,-1], and in TABLE IIIf [-2,1].

Example of [p,q] energy symmetry:

TABLE IIIe The GM^2/R or Gravitational Energy [2,–1]

Particle	GM^2/R cgs	GM^2/R Planck units	GM^2/R Planck values
[1] baryon	–42.178842	–58.470284	$(\alpha\mu S)^{-3/2}\,(\alpha\mu)^2$
[2] mini black hole	+75.888810	+59.597368	$(\alpha\mu S)^{3/2}/(\alpha\mu)^{-1}$
[3]	–2.822960	–19.114402	$(\alpha\mu/S)^{½}$
[4]	+36.532916	+20.241474	$(\alpha\mu S)^{½}$
sum of values	+67.419912	+ 2.254144	$(\alpha\mu)^2$

G = –7.175706 cgs units

TABLE IIIf The $c^5\hbar R/G^2M^2$ Energy [–2.1]

Particle	$c^5\hbar R/G^2M^2$ cgs	$c^5\hbar R/G^2M^2$ Planck	$c^5\hbar R/G^2M^2$ values
[1] baryon	+74.761729	+58.470286	$(\alpha\mu S)^{3/2}\,(\alpha\mu)^{-2}$
[2] mini black hole	–43.305931	–59.597375	$(\alpha\mu S)^{-3/2}/(\alpha\mu)$
[3]	+35.405833	+19.114389	$(\alpha\mu/S)^{-1/2}$
[4]	–3.950035	–20.241479	$(\alpha\mu S)^{-1/2}$
sum of values	+62.911596	–2.254144	$(\alpha\mu)^{-2}$

$c^5\hbar/G^2$ = 39.758593 cgs units

$[2,-1] + [-2,1] = (\alpha\mu)^2 + (\alpha\mu)^{-2} = 0$

In the interplay of space and matter, either can be exchanged for the other within certain limits. In the foregoing example: Planck particle to baryon Space was increased (-32 to -12) at the expense of decrease of mass (-4 to -23), but with the side effect of the creation of a mini-black hole and two symmetric particles [3] and [4] residing on the Schwarzschild boundary.

If we consider the dimension *length* as consisting of two species, space, R, as being a "separation" and matter, M, as being an "extension", we may write,

$f = c/R$ where f is a frequency associated with space or separation and

$\nu = c^3/GM$ where ν is a frequency associated with mass or extension.

Here, c is the velocity of light and G is Newton's gravitational constant. It is to be noted that when the values of R and M are such that the entity is on the Schwarzschild boundary, then

$f = \nu$

In particular for the Planck particle, (which is on the Schwarzschild boundary), each of these frequencies is equal, $f_o = \nu_o =$ 43.268364 hertz, However for a baryon, $f_b = c/r_e = 23.026889$ hertz, [0,1]; and $\nu_b = c^3/Gm_b = 62.382770$ hertz, [1,0]; Where $r_e = -12.550068$ cm and $m_b = -23.776602$ gm. Baryons lie well within the first quadrant quite removed from the S.B. (All values are $\log_{10}$).

$\frac{f_b}{\nu_b} = S^{-1}$ $\frac{f_o}{f_b} = \sqrt{\alpha_M S}$ $\frac{\nu_o}{\nu_b} = \sqrt{\frac{S}{\alpha_M}}$

THE PYTHAGOREAN UNIVERSE

FORCE EQUILIBRIA

I. We consider four basic meso or macro forces, leaving thermal and micro forces for later.

Gravitation	GM^2/R^2	attraction (+)
Centrifugal	Mv^2/R	repulsion (–)
Electric	$\hbar c/R^2$	both (+,–)
Planck	c^4/G	(?)

Assuming the Planck force to be repulsion, with the repulsion case of the electric force, we have:

TABLE I

	Gravitation	Centrifugal	Electric	Planck
Gravitation	-----	< Schwarzschild	–>Planck mass	M/R = R/M *
Centrifugal	$M/R=v^2/G<c^2/G$	-----	–> ∞	–> ∞
Electric	$M^2=\hbar c/G=m_o^2$	both repel	-----	–> ∞
Planck	$M/R=\pm c^2/G$	both repel	both repel	-----

Under the Table I assumptions, the interactions of the four forces lead to:
Grav-Cent –> a value of M/R < the value of the Schwarzschild bound.
Grav-Elec –> the planck particle mass = m_o
*Grav-Planck –> a "dual" Schwarzschild boundary, with the properties:
$G^2M^2 = c^4R^2$; $GM/c^2R = c^2R/GM$; or in planck units: $M/R = R/M$, $\pm M = \pm R$
The other combinations do not lead to equilibria, but to continual expansion.

Assuming the Planck force to be repulsion, but taking the attraction case of the electric force, we have:

TABLE II

	Gravitation	Centrifugal	Electric	Planck
Gravitation	-----	< Schwarzschild	–> 0	M/R = R/M *
Centrifugal	$M/R=v^2/G$	-----	> Heisenberg	–> ∞
Electric	both attract	$MR=\hbar c/v^2>\hbar/c$	-----	–> Planck size
Planck	$M/R=\pm c^2/G$	both repel	$R^2=G\hbar/c^3=l_o^2$	-----

Under the assumptions of Table II, the changes from Table I are:
Grav-Elec –> both contractive –> 0
Cent-Elec –> equilibrium above $\hbar/c$, the value of the Heisenberg bound
Planck-Elec –> the planck particle size = l_o

Assuming the Planck force to be attraction, taking the repulsion case of the electric force, we have:

TABLE III

	Gravitation	Centrifugal	Electric	Planck
Gravitation	-----	< Schwarzschild	–> Planck mass	–> 0
Centrifugal	$M/R=v^2/G<c^2/G$	-----	–> ∞	> Schwarzschild
Electric	$M^2=\hbar c/G=m_o^2$	both repel	-----	Planck size
Planck	both attract	$GM/c^2R=c^2/v^2>1$	$R^2=G\hbar/c^3=l_o^2$	-----

A contradiction is introduced under the assumptions of Table III, in the system being placed on both sides of the Schwarzschild boundary.

Assuming the Planck force to be attraction, taking the attraction case of the electric force, we have:

TABLE IV

	Gravitation	Centrifugal	Electric	Planck
Gravitation	-----	< Schwarzschild	–> 0	–> 0
Centrifugal	$M/R=v^2/G<c^2/G$	-----	> Heisenberg	> Schwarzschild
Electric	both attract	$MR=\hbar c/v^2>\hbar/c$	-----	–> 0
Planck	both attract	$GM/c^2R=c^2/v^2>1$	both attract	-----

The same contradiction occurs in Table IV as in Table III

We conclude that the Planck force, c^4/G, is a repulsion force. This force may be the Λ force of general relativity. [Its ($\log_{10}$) cgs value is 49.082989 dynes.] From Tables I and II we infer that the inequalities, $M/R < c^2/G$ [< Schwarzschild] and $MR > \hbar/c$ [>Heisenberg] place all equilibria resulting from these four forces in the first quadrant. The first quadrant is the quadrant in which unlimited expansion can take place.

COSMOLOGY IN THE TRADITION OF PYTHAGORAS

According to Pythagoras, behind astronomy, behind physics, even behind mathematics, lies number. The structures and processes of nature take their forms, directions and values ultimately from the properties of numbers. If this be so, then the properties of numbers create a *template* that both enables and delimits what exists and what happens. Such a template would govern both what *may* occur and what *must* occur: the domains of choice and necessity. Further, such a template would explain our questions regarding why mathematics allows us so well to describe the physical world, and permits that we both discover and invent mathematics.

Legend tells us that the Pythagoreans were dismayed at the discovery of $\sqrt{2}$. Such a number violated their belief in the absolute sovereignty of the natural numbers, that is of 1,2,3,... But since negative, rational, irrational, complex and other numbers all trace their ancestry to the natural numbers, the Pythagoreans should not have despaired. While the positive integers may not be the sovereigns, they are the undisputed ancestors of all other numbers. We may accordingly assert, without tracing all the mathematical genealogy of the intervening centuries, that Pythagoras is the legitimate ancestor of an approach to cosmology that is based on numbers and their properties. However, we begin, not with 1,2,3... but with the fundamental constants of physics. These are indeed numbers and for the present purpose will also be assumed to be constants.

Seven of the fundamental physical constants turn out to play a significant role in the cosmic template. These are: **c**, the velocity of light; **G**, the gravitational constant; $\hbar$, Planck's constant; α, the fine structure constant; μ, the proton/electron mass ratio; $\mathbf{m}_b$, the proton mass; and $\mathbf{r}_e$, the electron radius. These constants provide a system of units, the Planck system, that unlike the SI, cgs, or English systems, is not an arbitrary fabrication, but takes its values directly from the natural order. The three constants **c**, **G**, and $\hbar$, can be put together to make units of mass, length, and frequency as follows:[1]

$$\sqrt{\frac{ch}{G}} = \mathbf{m}_o \qquad \sqrt{\frac{Gh}{c^3}} = \mathbf{l}_o \qquad \sqrt{\frac{c^5}{Gh}} = \nu_o$$

These values may be considered to be the mass, size, and frequency of a virtual particle, called the Planck particle. This "particle" might be said to have the same relation to the cosmos that a stem cell has to a living organism. The Planck particle is a "cell" from which the cosmos and its sub–structures can be derived. It is also usefully taken as the origin in all of the coordinate systems that constitute the cosmic template.

---

[1]The $\log_{10}$ cgs values are: $\mathbf{m}_o$ = –4.662199 grams; $\mathbf{l}_o$ = –32.791545 centimeters; ν_o = +43.268366 hertz

Start with the importance of alternatives
& converging onto a dogma

The Movravieff Quote on ~~monkey~~

Genesis v III p 16

Pythagoras and Planck

Back at the beginning of the present age around 600 B.C.E. Pythagoras felt that the natural integers themselves should suffice for constructing the universe. He was set back and dismayed when real numbers like $\sqrt{2}$ intervened. Even before his death the continuum of real numbers began to take over and prevailed until the beginning of the 20th century. Then at the beginning of the present age, Max Planck found that discreteness must be re-introduced. The continuum had failed. Pythagoras was justified when Planck showed that basic physical realtionships were governed by discrete, not contiuous, quantities. Of course, Pythagoras' misinterpretation was that it was the integers themselves that sufficed, when it was discreteness, one of the properties of the integers that was the essence. Today as digital replaces analog, Pythagoras is firmly back in business.

Sometimes many centuries intervene between the writing of the first sentence in a worldview and the writing of the second, with many by-paths being explored in the while. Today it might be possible to add to what Pythagoras began since there have been several contributions to his approach in recent years. It is fair to call such modern natural philosophers as Planck, Eddington and Dirac followers of Pythagoras, since parts of their work are clearly "Pythagorean". The have taken number to be the starting place of ultimate reality.

Today's Pythagoreanism begins with the so-called fundamental constants of physics. We might say that in the beginning God created the numbers $\hbar$,G,and c, and from them all else follows. If the constants had had different values, then our universe would have been different. In fact we might not have even been here to contribute the consciousness feedback that gives the universe one of its modes of existence. In addition to re-introduction of the discrete, Planck took the fundamental constants, h,G, and c and using dimensional analysis derived a system of "natural units" with which to describe the universe. When translated into these units relations between the masses, sizes, and life times of physical entities were seen to reveal symmetries and patterns that bring to mind Pythagoras' own constructions of musical tones and their harmonics.

The dimensionalities that physicists feel best describe most phenomena are mass M, length L, and time T. Each of the fundamental constants possesses a dimensionality built up from these factors:

$$[h] = [ML^2/T],\ [G] = [L^3/(MT^2)],\ [c] = [L/T].$$

By suitably combining the fundamental constants, Planck defined units of mass, length, and time. In terms of cgs units the logarithms to base ten of these values are:

Planck mass = -4.263110 grams
Planck length = -32.392455 centimeters
Planck time = -42.869276 seconds

In Planck units, the values of h, G, and c are each 1.

there are h not $\hbar$

revise value

SLICES01.WPD 2002-06--221

THE UNIVERSE MODELED AS A ~~MATRIX~~ GRID

Consider the universe to be an N-dimensional ~~matrix~~ GRID. In this matrix, an entry, $M_{i,j,...k}$, may represent an **event**; a column may represent a particular type of **entity**, [e.g. an atom], a row may represent a different type of entity [e.g. a photon]. a planar slice may represent a more complex **entity** [e.g. a virus]. Every linear and planar slice represents some simple or complex entity. Thus an **entity** is a particular way of organizing a set of **events**. Even a human being would be a way of organizing a set of events. Further, an **archetype** is a pattern of events that are organized differently from entity type organization, but whose organization has a measure of ubiquity that leads to repetitions.

What we call a world view is a package of slices. This package is not a picture of the whole, but only a *partial* picture of a *part* of the whole. However, we tend to take a particular package of slices as a surrogate for the whole. [e.g. the scientific world view]. Further, as our experience extends the size and dimensions of the matrix, we also tend to restrict the slices. This is an indication that there exist limits to our information processing capacity. Unless we can design some strategy for coordinating multiple world views, our understanding of the universe and of our selves is forever limited.

There are two basic epistemological strategies:

First Enlarging the Matrix. Previous examples include:

- Flat earth to spherical earth as a result of extensions in distance.
- Relativity as a result of extensions in velocity.
- Quantum physics as a result of extensions to non-locality.
- Chaos theory as a result of extensions to non-linearity.
- Complexity as a result of extensions to non-equilibrium.

Yet to be extended:

- Economics 101, extensions beyond self interest
- Aristotelean logic, extensions beyond the law of the excluded middle.
- Randomness, extensions beyond probability theory.
- Theology, extensions beyond anthropocentrism
- Time, extensions beyond past-to-future causality.
- Truth, extensions to beyond one ontology.
- And others

Second, Making Alternate Slices

- Slices that are events
- Slices that are entities
- Slices that are linkages
- Slices that are archetypes
- Slices that are forms
- Slices that are locations

Yet to be fathomed:

- Slices that are essential
- Slices that are choices
- Slices that are selections
- Slices that are creations

TEMPLATE

COSMOLOGY

- THE LAWS OF PHYSICS REST ULTIMATELY ON THE PROPERTIES OF NUMBER

- The Planck Particle is the only entity in the universe, for which a theory of everything is possible 01/02/02

- No theory of everything is possible, because of the countless variations on Brahman's Theme. The theory would be as extensive as the universe itself.

- Superposition of states ~ both true and false
  i.e. ∃ linear and non-linear

Questions & Surmises

A stemcell produces what already exists
Does it have the power to reproduce the novel?

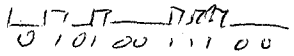
- Does the photon > Space or Space > the photon?
  Take all paths or ? is all paths?

- The parameters M, R, T may not always be orthogonal as treated in dimensional analysis

- Some scalars may be vectors, magnitude and orientation

- Function ⟷ Form ⟷ Context
  Movement ⟷ curvature ⟷ mass is mass content or context?
  Does space > mass or does mass > space
  1° qual 2° qual
  Energy ⟷ Information ⟷ Material

  P-SPACE ⟷ H-SPACE ⟷ B-SPACE IS $\frac{M}{R} \approx$ information?
  Position Form Force Links linear density
  Movement



- Should Fractional dimensions be considered?

- Is the fundamental unifying principle = resonance?

- All matter, including hydrogen created in stars
  "0 generation" stars → H, ~~He~~
  1° " He, Li ...
  2° " C, N, ...
  .... Fe

Questions

1) Is there a meaningful isomorphism?
like invariance of c
we have invariance of ΔT

2) Is H_0 a frequency permeating all fractal levels
Does this frequency change with time?
redshift ⇒ past f lower
so f ↑ with time

3) Again, are the constants really constant?
or is some combination invariant?

4) Question of resonance and beats
When f takes on certain values with respect to f_0 (Planck freq)
Reality exists when interference occurs [Holographs] eg
say between t and τ, f and ν, $\frac{f}{\nu}$

12)

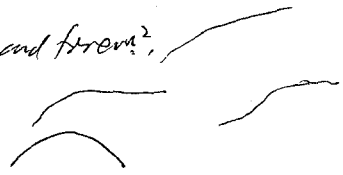
~~5) Modulation?~~

6) Discriminate extension and separation $\overleftarrow{p_1}$ $\overrightarrow{p_0}$ and 
Everything natural [extension] and separation expand
Only separation expand
Only λ of light expands (or contracts)

$f = \frac{c}{\lambda}$ if f ↑, λ ↓ , λ being smaller makes distances appear greater

"tired light" Really no expansion

7) H_0 is "fractally" invariant, for each fractal cycle
why $P \to b$ ~ Expanding Hubble Universe

8) Does part of the universe expand forever?
part equilibrate? or
part collapse? or 

$E = \begin{matrix} +4/3 \\ -26 \\ 17 \end{matrix}$

9) Stability ∪ — ∩

10) H_0 in anyway related to 29% retrievable energy? $\frac{h\nu}{h\nu_0}$
a universal value $\frac{17}{60} = 28\frac{1}{3}\%$

11) ρ and additional dimension

$\Delta T = (\alpha \mu S)^{3/2} t_0$ for $P \to b$

	L cm	M gm	T sec	τ	E	$\frac{GM^2}{R}$
P	−32	−4	−43	−43	+16	+16
X	−12	+16	−23	−46	+36	+37
b	−12	−23	−23	$-3\frac{1}{3}$	−3	−41
☆	+8	+36	−3	−3	+56	+57
U	+28	+56	+17	33	+76	+78

	$\frac{GM^2}{R}$		Mc^2
P	+16	$\sqrt{s}^0$	+16
	$\sqrt{s}^3$		$\sqrt{s}^1$
b	−41	$\sqrt{s}^2$	−3

	$\frac{GM^2}{R}$		Mc^2
P	+16	$\sqrt{s}^0$	+16
	$\sqrt{s}$		$\sqrt{s}$
X	+36	$\sqrt{s}^0$	+36

	$\frac{GM^2}{R}$		Mc^2
P	+16	$\sqrt{s}^0$	+16
	$\sqrt{s}^2$		$\sqrt{s}^2$
☆	+56	$\sqrt{s}^0$	+56

	$\frac{GM^2}{R}$		Mc^2
P	+16	$\sqrt{s}^0$	+16
	$\sqrt{s}^3$		$\sqrt{s}^3$
U	+77	$\sqrt{s}^0$	+77

	T		τ
P	−43	$\sqrt{s}^0$	−43
	$\sqrt{s}$		$\sqrt{s}^3$
b	−23	"	−8

NOTE

Resonances !!

P	$T = \tau$
X	$T = \frac{1}{2}\tau$
b	$T = \frac{3}{2}\tau$
☆	$T = \tau$
U	$T = \frac{1}{2}\tau$

refine values

05-04-08 Combine with SPMAFREQ.WPD

MAR 9, 2001

THE MANIFESTATIONS OF ENERGY

1) as matter $M = \frac{E}{c^2}$

2) as vibration $\nu = \frac{E}{h}$

3) as space $R = \frac{E}{c^4/G} = \frac{E}{E\ force} = \frac{GM^2}{E}$

$R = \frac{EG}{c^4} = \frac{E}{F}$

Note: $\frac{GM^2}{hc} = [R]$ $\frac{h}{Mc^2} = [T]$

Gravitational Energy $\frac{GM^2}{R}$

See PYTHCOM.WPD 1995

For $\frac{GM^2}{R} < Mc^2$

$\frac{GM}{c^2} < R$

$\rho = \frac{c^{10}}{G^3 E^2}$

or $L = \frac{EL^2}{GM^2}$

$L = \frac{GM^2}{E}$

$P \rightarrow B$

$E_{B_T} \cdot E_{B_R} = E_P^2$

$E_{B_M} \cdot E_{D_M} = E_P^2$

$S \propto M \sim Space / l_o$

$\frac{\partial}{\partial M} \sim Mass / m_o$

$f(s, \alpha, \mu) t_o \sim Time$

$\frac{Power}{Density} = \frac{R^5}{T^3}$

$\frac{P}{c^2 \rho} = \frac{Volume}{Time}$

$P = \frac{c^5}{G}$, $\rho = \frac{c^{10}}{G^3 E^2}$

$\frac{V}{T} = \frac{G^2 E^2}{c^7}$

$\frac{G^2}{c^7} = -87.689157$

$E^2 = 32,582884$

$\frac{V}{T} = -58,106273$

THERMAL ENERGY =

CHARGE ENERGY =

ROTATIONAL ENERGY =

$E_P = 16.291442$

$E_P^2 = 32.582884$

$m_B = -23.276602$

$c^2 = \underline{20.953642}$

$E_{B_m} = c^2 m_B = -2.822960$

$E_{B_D} \cdot E_{B_L} = h\nu_B \cdot \frac{r_e c^4}{G} = E_P^2$ $\frac{r_e}{t_B} = c$

$\nu_B = 23.026889$

$h = \underline{-26.976924}$

$E_{B_D} = h\nu_B = -3.950035$

$E_{B_M} \cdot E_? = E_P^2$

$E_? = \frac{E_P^2}{E_{B_M}} = 35.405844 = c^2(14.452202) = M_D c^2 = E_{D_M}$

$r_e = -12.550065$

$\frac{c^4}{G} = \underline{49.082989}$

$\frac{r_e c^4}{G} = 36.532921$

E_{B_L}

$\therefore E_{B_M} \cdot E_{D_M} = E_P^2$

$(S/2M)^{3/2} m_0$ $= (4SM)^{-3/2}$

Universe $M_U = 52.681010$ $\nu_u = -17.456065$

$E_{U_M} = 73.634632 = M_U c^2$

$E_{U_\nu} = -44.432989 = h\nu_u$ wh $\nu_u = -17.456065$

E_{U_L}

73.684632
41.051767
32582865 $= M^2$

$E_{U_M} \cdot E_{U_\nu} = 29.201643$

use $T = \frac{GM}{c^3} \rightarrow 17.456065$

If $M_U = (\alpha M S)^{3/2} m_0$

56.062232
c^2 20.953642
77.015874
44.432989
33.582885 $= E_L^2$

or if $\nu_u = -14.074843$
-26.976924
-41.051767

then $E_{U_M} \cdot E_{U_\nu} = E_L^2$

~~What ? of 17. ... ≈ 13.567 By~~
~~Mass~~

FF both M and ν use $\left(\frac{S}{\alpha M}\right)^{3/2}$

or both use ~~α~~ $(\alpha M S)^{3/2}$

then $E_{U_\nu} \cdot E_{U_M} = E_L^2$

$T = \frac{GM}{c^3}$, $\nu = \frac{GM}{} \frac{c^3}{GM}$

$E_M = M c^2$, $E_f = \frac{\hbar GM}{} \frac{\hbar c^3}{GM}$

$E_M \cdot E_f = \frac{\hbar c^5}{G} = E_C^2$

Rotational Energy

ADDED NOTES

JULY 2005

PYTHOLOGY

THE COSMOS ~~BYCES~~ THE NUMBERS

PHILOSOPHY

APPROACHES
ALTERNATIVES
EXISTENCE,
SETS
INTERSECTS

QUESTIONS
PRINCIPLES
LIMITS
BOUNDS
WATERSHEDS

SPECULATIONS
SURMISES
TEMPLATES
THEORIES

VOCABULARY – TERMS
GROUND(S)

SYMMETRIES

QUADRANTS
PLANK PARTICLE
FULCRUMS

SIX NUMBERS APPROACH

UNITS

TIMES & FREQUENCIES

H_0^2, Rate of clock ticking.
Different Drummers
VREMS
OLDER THAN YOUR MOTHER

MUTUALITIES, WIDTH OF NOW
CONSEQUENCES AS CAUSES, LOOPS
TEMPORAL TURBULENCE
PRE-ADAPTATIONS

DIMENSIONAL ANALYSES: TABLES

ENERGIES
FORCES $\left(\frac{M}{R}\right)^X$
MASSES
FREQUENCIES

A TEMPLATE COSMOLOGY

NUMBERS

CURIOSITIES

REFERENCES

Think of space as separation, symbol R
Think of mass as extensive, symbol M

2 L's

Schwarzschild length $\frac{GM}{c^2} = [R]$

So [R] consists of two species R and $\frac{GM}{c^2}$

And time [T] may be viewed as consisting of period, duration and interval

z t Age = ? 3 T's

$z^2 = \frac{GM}{R}$ $\frac{GM}{c^3} = z$ $t = \frac{R}{c}$

$z^2 = \frac{R^3}{GM}$ $z^2 z = t^3$

PLANCK PARTICLE

PLANCK SPACE

PLANCK PARTICLE
and
PLANCK SPACE

$$\frac{C^4}{G} = \frac{GM^3}{L^2} \Rightarrow \frac{M}{L} = \frac{C^3}{G}$$

Forces $\frac{C^4}{G}$, $\frac{GM^2}{L^2}$, $\frac{\hbar C}{L^2}$

$$GM^2 = \hbar c \Rightarrow M = \alpha^i \mu^j s^k m_0$$

$$\frac{C^4}{G} = \frac{\hbar c}{L^2} \Rightarrow L = \alpha^i \mu^j s^k l_0$$

dimensionally correct

$$\boxed{\frac{M}{L} = \alpha^i \mu^j s^k \frac{m_0}{l_0}}$$

Frequencies, Species of Time

M-R Matrix

$$T\tau^2 = t^3$$

AVOGADRO

LCH and ORX BRM

Brahma may have designed the world
so that many pieces could fit together
in different ways [cf tile and tessalations] multiplicity
and some in but one way [cf jig-saw puzzle] diversity

We must discover which pieces fit in only one way,
which can fit in several, alternative ways.

e.g. The above fit LCH, ORX and BRM at least 3 topics

Is a topic a picture?
or is a picture = a {topics}?

Or a topic ~ a dimension - a parameter is a data bar
no, a topic is the intersect of several parameters

Organizing Devices all Metaphors	SPACES ≈	DATABASES ≈	TESSALATIONS ≈ a picture is the union Or	Language propositions
	dimensions	parameters	~~Patterns~~, Tile . Tiles [shapes + colours]	
elements	x, y, z, ... values ẋ, ẏ, ż values ẍ etc	e.g. data time	e.g. square and hexagon ⋮	words
Rules	Algebra etc	VENN Logic	AESTHETICS Ethics Morality	Grammar

~~parameter sequences~~ 06-02-15

5 elements

OPTICS ~ COMPUTERS
photons bits

SOME PYTH NOTES

05-08-13

CONSERVATION OF MASS: $\sqrt{\frac{ct}{G}} = \text{const}$

CONSERVATION OF ENERGY $\sqrt{\frac{c^5 t}{G}} = \text{const}$

All conservations ~ $f(G, c, \hbar) = \text{const}$

cf. Nöether's symmetries

TRADE-OFFS and Conservation

$M \cdot \frac{L}{R} = \frac{c^2}{G}$ Mass × Curvature

$M \cdot \frac{1}{T} = \frac{c^3}{G}$ Mass ↑, Frequency ↓ at M_0, $f_0 = 10^{43}$ hertz; at M_0 $f_0 = 10^{-17}$ hertz

Force $M \cdot \frac{R}{T^2} = F = \frac{c^4}{G}$ Mass × acceleration

Power $\frac{MR^2}{T^3} = P = \frac{c^5}{G}$ Energy × Frequency

---

R_s $R_s = \frac{GM}{c^2}$, $R_q = \sqrt{\frac{R^3}{R_s}}$

3 kinds of time and extension

t	ct	R_t
T	cT	R_s
τ	$c\tau$	R_q

~~Or just 2 R_s~~

Hypothesis: A force exists when clocks are ticking at different rates [or forces balance when $T = t$ etc.

e.g. $T > t \Rightarrow$?

$\frac{GM}{c^3} > \frac{R}{c}$, $\frac{GM}{c^2} > R$, i.e. $R_{sch} > R_{metric}$

$T < t \Rightarrow R_{sch} < R_{met}$

$\Rightarrow$ a force exists wherever an object is not on the Schwartzschild bound,

$T > t$ $R_s > R$ ↓

$\tau > t$ $R_s < R$ ↑

$\tau > T$ $R > R_s$ ↑

$\tau^2 > t^2 \Rightarrow$?

$\frac{R^3}{GM} > \frac{R^2}{c^2}$, $\frac{c^2}{GM} > \frac{1}{R}$ or $\frac{GM}{c^2} < R$ $R_{sch} < R_{met}$

$\tau^2 > T^2 \Rightarrow$?

$\frac{R^3}{GM} > \left(\frac{GM}{c^3}\right)^2$, $R > \frac{GM}{c^2} = R_{sch}$

when $R_{met} = R_{sch}$

$t = T = \tau$

If $R < R_{sch}$ $R \downarrow$ → BLACK HOLE

$R > R_{sch}$ $R \uparrow$ EXPANDS

$\left[\frac{MR}{T^2}\right] = \frac{c^4}{G}$

Force $\left[\frac{MR}{T^2}\right]$ ∃ 3 $[T]$'s
4 $[R]$'s

$\frac{MR}{t^2}$ T^2 t^2
tt tT tT

Mix T's

Tt	T^2	
Tt	tt	
tt	t^2	

G $[T^2]$'s

$G \times 4 = 24$ Forces

existence of the balances of Force or T's equal

$\frac{GM}{c^2} = \frac{cRT^3}{R}$

$R_s \cdot R = (cT)^2$

$cT = \sqrt{R_s R}$

$ct = R$

05 - 08 - 14

$b = [T]$

$\frac{MR_s}{b_1^2} = \frac{c^4}{G}$

$\frac{GM}{c^2} = \frac{c^2 b_1^3}{R_s}$

$R_s^2 = (c b_1)^3$

$b_1 = \frac{R_s}{c} = \frac{GM}{c^3} = T$

$\boxed{cT = R_s}$

$\boxed{ct = R}$

$\frac{MR_x}{\tau^2} = \frac{c^4}{G}$, $\tau^2 = \frac{R^3}{GM}$

$\frac{GM^2 R_x}{R^3} = \frac{c^4}{G}$

$\frac{G^2M^2}{c^4} = \frac{R^3}{R_x} = R_s^2$

$R_x R_s^2 = R^3$

$\frac{R_x}{c} = \frac{R^3}{cR_s^2} = \frac{c^2R^3}{c^3R_s^2} = \frac{t^3}{T^2}$

but $T\tau^2 = t^3$

$c\frac{\tau^2}{T} = R_x$

$\tau^2 = \frac{R_x T}{c}$

$\tau = \sqrt{\frac{R_x T}{c}}$, $c\tau = \sqrt{cR_x T}$

$c\tau = \sqrt{R_x \cdot R_s} = \sqrt{\frac{R^3}{R_s}}$

$\boxed{c\tau = \sqrt{\frac{R^3}{R_s}}}$

call $\sqrt{\frac{R^3}{R_s}} = R_q$

$c\tau = R_q$

---

4 $[R]$'s

metric $R = ct$

Schwarzschild $R_s = cT = \frac{GM}{c^2}$

$R_x = \frac{R^3}{R_s^2}$

$R_q = \sqrt{R_s \cdot R_x}$

$\frac{R^3}{R_s^2} = R_x$

$\frac{R^3}{R_s} = R_q^2$

$R_q^2 = R_s R_x$

$R^3 = R_x R_s^2$

DIMENSIONALITY GAMES

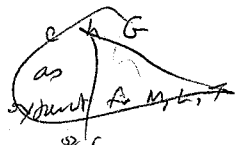
$\gamma = 0$

M L T as exponents for $c \hbar G$ to

1 parameter T with only L

$[T] \quad c^{-4} \hbar G L^{-1}$

$\frac{G\hbar}{Lc^4}$ $\quad \frac{G\hbar}{c^3}\frac{c}{L}$



$\frac{8G}{17}$ $\quad G9$

$\frac{\hbar}{c}$ $\quad M+L$

$\frac{6_0^2}{t}$

$hc \quad M+3L-2T \quad \pm e^2$

$c^4 G^{-1}$

$4L - 4T + M - 3L + 2T$

$\frac{M\hbar}{T^2}$

$\frac{\hbar G}{c^5} = -2T$

$\frac{G}{\hbar c} \quad -2m + L - T$

$\hbar G = 5L - 3T$

$\hbar G c = 5L - 4T$

$\hbar G c^6 = 11L + T$

$\frac{\hbar G c^6}{L^{11}} = T$

$\hbar G \quad 5L - 3T$

$-3c \quad 2L$

$hGc^{-3} = 2L$

$b = -2$

$a = 1$

ML^{-2}

$\frac{\hbar G}{c^3} = L^2$

$\frac{\hbar G}{c^5} = T^2$

$\frac{M\hbar G}{L^3 c^3} \quad [M]$

$M^a L^b T^\gamma h^{M+2L-T} c^{L-T} G^{-M+3L-2T}$

$h^{a+2b-\gamma} c^{b-\gamma} G^{-a+3b-2\gamma}$

$hcG = Gb - 4\gamma$

$\frac{L^6}{T^4} = L^2 c^4$

$\frac{\hbar G}{c^3} = L^2 = l_0^2$

-43.268

-86.536

17.456

-103.992

101.206

2.786

$\frac{103.992}{43.268}$

$2.4034 = \frac{(\alpha M S)^{3L}}{t_0^3} = \frac{t_0^3}{t_U}$

$\frac{t_U}{(\alpha M S)^{3L}} = t_0$

	T				F			
	M	$\hbar$	c	G	M	L	$\hbar$	c G
Electric Π	$\frac{1}{2}$	$\frac{3}{2}$	$-\frac{1}{2}$	$-\frac{1}{2}$ 0				
					0	-2	1	1 0
Gravity χ	$-\frac{1}{2}+\frac{3}{2}$		0	0 $-\frac{1}{2}$	2	-2	0	0 1
φ	1	2	-1	0 0	-1	-3	2	0 0
t	0	1	0	-1 0	1	-1	0	2 0
S	-2	1	1	0 -1	+5	-1	-2	0 +2 DARK?
ψ	$\frac{1}{2}$	$\frac{1}{2}$	0	-2 $\frac{1}{2}$	0	0	0	+4 -1
T	1	0	0	-3 1	-1	+1	0	+6 -2 STRONG?

Trebuchet effect

Forces $\Rightarrow$ DARK MATTER

Ω step rocket

$\sim$ fractals

$$M^a L^b \hbar^x c^y G^z = T^1$$

$$M L \hbar^{\frac{1}{2}M+2L-T} c^{L-T} G^{-M+L^3-T^3}$$

$$\hbar c G \quad M^0 L^6 T^{-4}$$

$$F \quad \frac{ML}{T^2}$$

$M+L$

$$M^{a+b+g} L^{1} T^{} \hbar^{M+2L-T} c^{L-T} G^{-M+3L-2T}$$

$a=0 \quad b=-6 \quad \gamma=5$

$$M^0 L^{-6} T^5 \hbar c G = T$$

$$M T^2 L^{-5} \hbar c G = F$$

$T \to F$

$F \quad \frac{ML}{T^2}$

M	0	$\to 1$
L	-6	$\to -5$
T	5	$\to 2$

$5L-3T$

$2L$

$$\hbar^{-2} \hbar^2 G c^{-3} = M$$

T

$M^a L^b$

F

$M^{1-2a} L^{1-2b}$

$q \quad 1-2a = -2$

$1-2b = +2$

$y \quad 1-2q = 4$

$1-2b = -4$

$\frac{ML}{M^a L^b}$

$\frac{M^3}{L^3}$

$\frac{\hbar^2 G}{c^3 L^2} = M$

To get M w3 2 1

$\sqrt{\frac{\hbar c}{G}}$

$\frac{M^a L^4 L^3 T^3}{L^3 M T^2}$

$M^{} L^{4}$

LT

$L^b T^{10} \hbar^2 G c^{-3}$

FORCE MATRIX III

$\div \frac{c^4}{G}$ simplified Pure numbers

	−1	$-\frac{1}{2}$	0	$+1/2$	1	$3/2$	+2
3 destinations • Schwartzschild bound $\frac{M}{L}=\frac{c^2}{G}$ when $h=0$ • P $m_0 l_0$ $G=0$ • I	+1			$\frac{M}{L}=\frac{c^2}{G}$		$\frac{m_0 l_0}{ML}$		$\frac{m_0}{M}\frac{l_0^3}{L^3}$
	$+\frac{1}{2}$				I		$\frac{l_0^2}{L^2}$	
	0	$\frac{ML^3}{m_0 l_0^3}$ E		P I		$\frac{M}{L}=\frac{c^3}{G}$		
	$-\frac{1}{2}$		$\frac{(ML)^2}{(m_0 l_0)^2}$		$\frac{M^2}{m_0^2}$		$\frac{M^2}{L^2}=\frac{c^4}{G^2}$	
	−1			$\frac{GM^3L}{h^2}$ I K		$\frac{M^3}{m_0^3}\frac{R}{L}$ W		$\frac{M^3}{L^3}=\frac{c^6}{G^3}$
	$-\frac{3}{2}$							
	−2				$\frac{M^4}{L^2}$	$\frac{M^4}{m_0^4}\frac{R}{L}$ S		

$G=0$

$h=0$

$R=\frac{GM}{c^2}$

$\frac{m_0}{l_0}=\frac{c^3}{G}$

K is a pure number

W is a pure number

$\frac{M^4}{m_0^4}\frac{R}{L}$

TIME MATRIX

Symbol	M	L	$\hbar$	c	G
T	+1	0	0	-3	1
ζ	+1	+1	$-\frac{1}{2}$	$-\frac{3}{2}$	$\frac{1}{2}$
φ	+1	2	-1	0	0
ψ	$\frac{1}{2}$	$\frac{1}{2}$	0	-2	$\frac{1}{2}$
Electric π	$\frac{1}{2}$	$\frac{3}{2}$	$-\frac{1}{2}$	$-\frac{1}{2}$	0
Z	0	-1	1	-4	1
t_0	0	0	$\frac{1}{2}$	$-\frac{5}{2}$	$\frac{1}{2}$
t	0	1	0	-1	0
γ	$-\frac{1}{2}$	$-\frac{1}{2}$	1	-3	$\frac{1}{2}$
σ	$-\frac{1}{2}$	$+\frac{1}{2}$	$\frac{1}{2}$	$-\frac{3}{2}$	0
Gravity τ	$-\frac{1}{2}$	$+\frac{3}{2}$	0	0	$-\frac{1}{2}$
K	-1	0	1	-2	0
ω	-1	+1	$\frac{1}{2}$	$-\frac{1}{2}$	$-\frac{1}{2}$
λ	-1	+2	0	1	-1
δ	-2	+1	1	0	-1
η	$\frac{3}{2}$	$-\frac{1}{2}$	0	-4	$+\frac{3}{2}$
γ	-3	$\frac{5}{2}$	0	2	$-\frac{3}{2}$

FORCE MATRIX

	M	L	$\hbar$	c	G
T	-1	+1	0	+6	-2
ζ	-1	-1	+1	+3	-1
φ	-1	-3	+2	0	0
ψ	0	0	0	+4	-1
π	0	-2	1	1	0
Z	1	3	-2	+8	-2
t_0	1	+1	-1	5	-1
t	1	-1	0	2	0
γ	2	2	-2	+6	-1
σ	2	0	-1	+3	0
τ	2	-2	0	0	1
K	3	+1	-2	+4	0
ω	3	-1	-1	+1	+1
λ	3	-3	0	-2	+2
δ	+5	-1	-2	0	+2
η	-2	+2	0	8	-3
γ	4	-4	0	-4	+3

T → F Multiply $\hbar, c, G$ by -2

$M^a \rightarrow M^{1-2a}$

$L^b \rightarrow L^{1-2b}$

(T) $M^a L^b \hbar^x c^y G^z$

(F) $M^{1-2a} L^{1-2b} \hbar^{-2x} c^{-2y} G^{-2z}$

DIMENSIONALITIES

FORCE MATRIX II

FORCE $\frac{I}{\frac{C^4}{G}}$ Pure Numbers

	-1	$-\frac{1}{2}$	0	$+\frac{1}{2}$	1	$\frac{3}{2}$	2
1			$\frac{L}{M}\frac{C^3}{G}$ T		$\frac{\hbar}{cML}$		$\frac{G\hbar^2}{ML^3C^4}$
$\frac{1}{2}$				1		$\frac{G\hbar}{L^2C^3}$ TT	
0	$\frac{C^4}{G}\frac{ML^3}{\hbar^2}$ Z		1 E		$\frac{MG}{LC^2}$		
$-\frac{1}{2}$		$\frac{M^2L^2C^3}{\hbar^2}$		$\frac{M^2}{m_0^2}$		$\left(\frac{M}{L}\frac{G}{C^2}\right)^2$ C	
-1			$\frac{GM^3L}{\hbar^2}$ K		$\frac{G^2M^3}{L\hbar C^3}$ W		$\frac{G^2M^3}{\hbar C^5}$ λ
$-\frac{3}{2}$							
-2				$\frac{G^3M^4}{L\hbar C^4}$	$\frac{G^3M^5}{L\hbar^2C^4}\delta$		

$G=0$

$\frac{G^3M^3}{C^6L^3}$ $\hbar=0$

Not pure Numbers

FORCE MATRIX

t = conventional time (centrifugal force) M \ L	−3	−2	−1	0	+1	+2	+3
τ = Kepler Time T = Mass Time			$\frac{G^2M^5}{L\hbar^2}$ DARK δ δ				
ψ time is Force invariant with M, L y $\frac{G^3M^4}{c^\omega L^4}$ DARK +4							
+3	$\frac{G^2M^3}{c^2L^3}$ DARK χ λ		$\frac{GM^3}{L\hbar}\frac{c}{\omega}$ ω		$\frac{M^3Lc^4}{\hbar^2}$ η κ		
+2		$\frac{GM^2}{L^2}$ GRAV τ		$\frac{M^2c^3}{\hbar}$ σ		$\frac{M^2L^2c^6}{G\hbar^2}\gamma$ γ	
+1			$\frac{M}{L}\frac{L^2}{t}$ Centrifugal		$\frac{c^4}{G}$ t_0		$\frac{ML^3c^8}{G^2\hbar^3}$ z
0		$\frac{\hbar c}{L^3}$ ELEC π		$\frac{c^4}{G}$ PLANCK ψ		?	
−1	$\frac{\hbar^2}{ML^3}$ φ		$\frac{\hbar c^3}{GML}$ ξ		$\frac{L}{M}\frac{c^6}{G^2}$ STRONG τ		
GALAXY −2						$\frac{L^2c^8}{M^2G^3}$ STRONG? backup ϕ q	

NOC

NOG

NO $\hbar$

SOLID ZONE t

KEPLER ZONE τ

OUTER ZONE ψ

$V = \frac{r\theta}{t} = r\omega$

$\frac{c^6}{G^3} = 77.211516$

$\frac{c^4}{G^{DARK}} = 52.670226$

$\therefore$ T is stronger

TIME MATRIX
[FREQUENCY]

			−1	−0.5	0	+0,5	+1	+1,5	+2
t no G, no h	0, +1	+1			$\frac{GM}{c^3}$ T		$\sqrt{\frac{GM^2L^2}{\hbar^3c^3}}$		$\frac{ML^2}{\hbar\phi}$
x no c, no h	$-\frac{1}{2}$, $+\frac{1}{2}$	+0.5				$\sqrt{\frac{GML}{c^4}}$ ψ		$\sqrt{\frac{ML^3}{\hbar c}}$ π	
φ no c, no G	+1, +2	0	$\frac{G\hbar}{Lc^4}$ Z		$\frac{e}{t_0}\sqrt{\frac{G\hbar}{c^5}}$		L/c E		
π No G	0.5, 1.5	−0.5		$\sqrt{\frac{G\hbar^2}{MLc^6}}$ γ		$\sqrt{\frac{L\hbar}{Mc^3}}$ σ		$\sqrt{L^3/GM}$ α	
λ no $\hbar$	−1, +2	−1.0			$\frac{\hbar}{Mc^2}$ K		$\sqrt{\frac{L^2\hbar}{BM^2c}}$ w		$\frac{L^2c}{\lambda GH}$
δ no c	−2, +1	−1.5							
		−2					$\frac{L\hbar}{GM^2}$ δ		

C=0

G=0

h=0

THE TEXTURE OF THE COSMOS

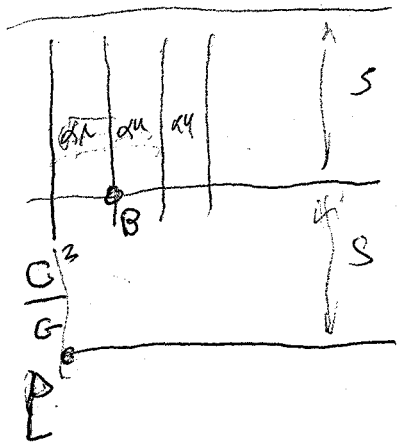
The M Grid $\sqrt{\frac{S}{\alpha\mu}}$ or $\frac{1}{4}$

The L Grid $\sqrt{\alpha\mu S}$

The ML Grid S

The $\frac{M}{L}$ Grid $\frac{1}{\alpha\mu}$

	ML	M/L
V_0	$\frac{\eta}{c} S^3$ ✓	$\frac{c^2}{G}(\alpha\mu)^{-3}$
5	$\frac{\hbar}{c} S^{5/2}$	$(\alpha\mu)^{-5/2}$
4	$\frac{\hbar}{c} S^2$	$\frac{c^2}{G}(\alpha\mu)^{-2}$
3	$\frac{\hbar}{c} S^{3/2}$	$\frac{c^2}{G}(\alpha\mu)^{-3/2}$ ✓
2	$\frac{\hbar}{c} S$	$\frac{c^2}{c}(\alpha\mu)^{-1}$
		$-1/2$
		0
$\frac{\hbar}{c}$		$(\alpha\mu S)^{1/2} = 20.$
		10



60.935
-37.454
23.481

118.016
-37.454
80.612

28.128
-37,
√-11
-4,612 M_0

98.033
-37.454
21.579 ✓

$S^{3/2}\frac{\hbar}{c}$ 21.579

Vect

$F = \frac{ML}{T^2}$

M^θ

$P = \frac{\eta L^2}{T}$

28.129
- 1.690
26.439 ✓

P B

$S = \frac{\hbar c}{R^2} \Big/ \frac{G m_p m_e}{R} = 39.350$ 10

F- MATRIX

T- MATRIX

Pure # MATRIX

η μ $\left(\frac{M}{L}\right)^{-2}\frac{c^8}{G^3}$

this union was born the Minotaur, a monster half-human, half-bull.

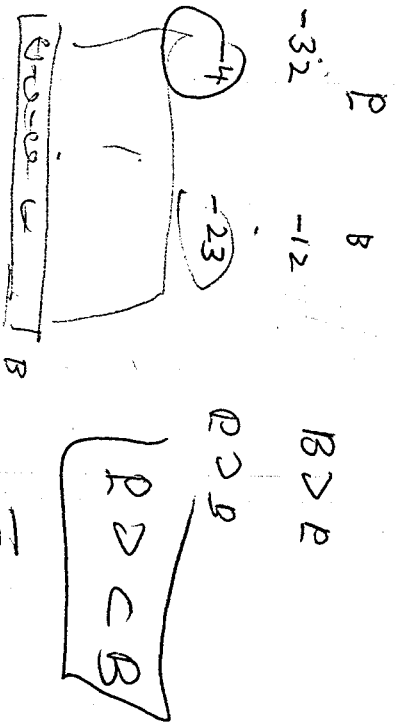
The Athenians had killed the son of Minos, Androgeus, and in consequence Minos laid siege to Athens. Previously he had besieged Megara and vanquished the king Nisus, thanks to the treason of Scylla, Nisus' daughter. Scylla was in love with Minos and had therefore cut a golden lock of hair — on which the safety of the city depended — from her father's head. Minos took advantage of this treacherous act, but punished its author. He had the infatuated Scylla drowned in the Saronic Sea, where she was changed into a lark. Before Athens, however, Minos was less successful. The siege dragged on. Minos implored the aid of Zeus who visited Athens with a plague. To rid themselves of this plague the Athenians consented to send Minos an annual tribute of seven youths and seven maidens who were to be fed to the Minotaur. We have already seen how Theseus freed his city from this wretched servitude.

The Minotaur, who fed exclusively on human flesh, had been enclosed by Minos in an amazing palace from which no one could find an exit: the Labyrinth. The La-

byrinth had been constr
distinguished for his ing
was ascribed the i
he, they said, who
the shapeless primitive
nephew who was a riv
with Minos. Daedalus
Theseus the precious b
hero to find his way out
treachery Minos had Da
up in the Labyrinth for
means of an ingenious
devised. In the course of
enough to approach too
his wings were attached
the sea which henceforth
Daedalus landed in Cum
where he gained the fav
Minos pursuing Daedal
refused to hand over h
Minos in a bath. Such
arch whose tomb was, r

From the third century B.C. *the Greek and Roman gods were equated and the Greek usage has made familiar. It may, therefore, be useful to give a list of such names in both t*

CRONUS	*SATURN*	HERMES	*MERCURY*	DE
GAEA	*TELLUS*	ARES	*MARS*	DIC
ZEUS	*JUPITER*	HEPHAESTUS	*VULCAN*	ASC
HERA	*JUNO*	APHRODITE	*VENUS*	M
ATHENE	*MINERVA*	EROS	*CUPID*	
ARTEMIS	*DIANA*	CHARITES	*GRATIAE (GRACES)*	PERSE
APOLLO	*APOLLO*	POSEIDON	*NEPTUNE*	ERI
SELENE	*LUNA*	HESTIA	*VESTA*	HE



DAEDALUS AND ICARUS. Antique bas-relief. Villa Al
Rome. *Alinari.*

SPECULATIONS
[PRE-HYPOTHESES]

05-04-04

- What is the relation between rate of clock and redshift?
- What is the implication of non-locality for time?
- $f = \frac{1}{t} \rightarrow f = \frac{q}{t}$ when $q = g(\rho)$

$f = \sqrt{G\rho} = g(\rho)$ $\quad f = \frac{\sqrt{G\rho}}{t}$?

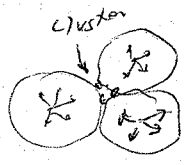
not $f = \frac{1}{t}$

- Integers: Discrete, no contiguity, gaps, no 0, no ∞ with rationals etc. – continuity $\exists$ 0, ∞ Pythagoras had no zero

- Solid wheel rotation
  Kepler rotation
  Beyond: ? oort clouds, kuiper belts

- Clusters are held together by G^4/E, Planck's force

DISCRETE SOURCE EXPANSION



No need for dark matter

Planks from basic origin everywhere can expand from every point (center, CB Bang)

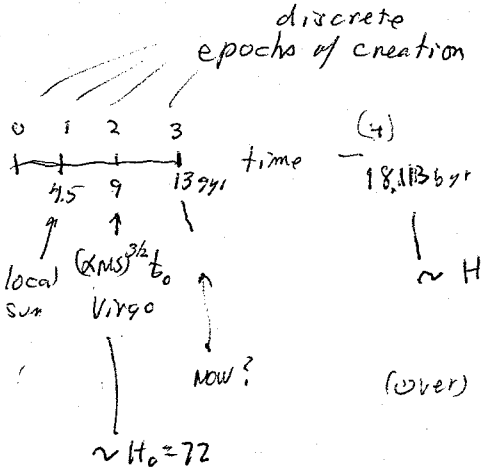
- How is Matter "attached" to space? , locked,? floating? space an extension of matter?
  There may exist degrees of bonding, e.g. as function of mass
  "Planck Bubbles" as space modules
  Non contiguous space having modules ~ foam of bubbles

- B
- P
- D
- ☆
- $(\alpha MS)^{3/2}$ ○ U

$(\alpha MS)^{3/2} t_0 \cong$ 17.456065 sec ~ 9.0563874 byr ~ virgo

$\frac{1}{2}$ (4.528194 byr ~ ⊙ 17.155033 sec

$\frac{3}{2}$ 13.584581 byr ~ latest 17.632154 sec



(over)

VALUES FOR H_0

ALLEN p 653

Type Ia	$H_0 = 58 \pm 8$	Freedman et al VIRGO Cepheid 1999 71 ± 4
II	$H_0 = 73 \pm 9$	
Grav Lens	$H_0 = 64 \pm 13$	
S-Zeld	$H_0 = 55 \pm 17$	

LANG VOL II p 62

Sandage-Tammen	1995	55 ± 7
Van den Bos	1992	76 ± 9

Hubble 1936 $H_0 = 530$ km/sec / mpc $\sim$ 1.84 B.yr

4.5 28 BY $\sim$ 2.16 H_0

$$H_0 = \frac{978}{B.Y.}$$

log sec	Billions of Years		H_0		
17.456067	9.056387	$2T_0$	108	$2^2 3^3$	local
17.632154	13,584581	$3T_0$	72	$2^3 3^2$	virgo el Freedman 1999 71 ± 7
17.757093	18.112608	$4T_0$	54	$2 \cdot 3^3$	Ia Supernova 57 ± 4 Sandage 1996 distant

$T_0 = 4.528194$ B.Y. (age of $\odot, \oplus$)

TEMPLATE

$\log \delta = 0.176067 \sim 1.5$

$$t_\delta = \frac{17.456067 - 43.268361}{60.724433} = (\delta\mu S)^{3/2}$$

H_0 km/sec/mpc

Hubble Time = $\frac{977.8}{H_0}$ BY

$\log_{10}$ sec

$\log$ BY → sec + 9 + 7.49912

05-04

11-30-10

		H_0	J	BY	$\log_{10}$ sec
K		216.0025	J	4.5268	17.154 903
K/2	$\frac{D}{T}$ <	108.0012	2J	9.0536	17.455 933
K/3	$\frac{3}{2}$ <	72.0008	3J	13.5804	17.632 025
K/4	$\frac{4}{3}$ <	54.0006	4J =	18.1072	17.756 963

$\log 2/1$

$\log 3/2$

$\log 4/3$

$(\alpha_{MS})^{3/2} t_0$ — 60.723 818 − 43.268 162

Planck Time

17.-- $(\alpha_{MS})^{3/2} + t_0$

$(\alpha_{MS})^{3/2}$ =		H
	60.423 065	216
	60.723 818	108
	60.900 187	72
	61.025 125	54

Creation when $(\alpha_{MS})^{3/2} t_0$?

Discrete Epoch of Creation

A	BB	6.7	13.5	20.1	27.3
	0	1	2	3	4
T GYR		4.5	9.1	13.6	18.1
Ho		216	108	72	54
A					

$(\alpha_{MS})^{3/2} t_0$ — VIRGO Cepheids — TypeIa

BB

Age ≈ T = Hubble Time

$A = \frac{3}{2} T$

4.5 GYR cycle of YALPA

4.5 T 9.1 13.6

A 13.6

Ho 72

see $(\alpha_{MS})^{3/2} t_0$

Measurements of H_0

1999	Virgo cluster Cepheids	Friedman et al	71 ± 7 → 72
1996	TypeIa Supernova	Sandage	57 ± 4 → 54
			73 ± 7
3	Type II		
1936	Hubble		530 ⇒ 1.849 Y

8 Tars

0 gen	H
1 gen	He, Li --
2 gen	C, N, -- Fe

> Fe not stellar

DISCRETE EPOCHS ≠ CONTINUOUS CREATION

NEC obtains United States patent by *BIOTECH Patent News*

More results

Dictionary/thesaurus browser ?

entertainment allowance
entertainment center
entertainment deduction
entertainment industry
entertainment world
Entertake
Entertissued
enthalpy
Entheal
Entheasm
Entheastic
Entheat
Enthelmintha
entheomania
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