COSMOLOGY

2

MATH

NUMLEVL2.WPD October 27, 1998 October 28, 1998

THE BASIC DESIGN INGREDIENTS OF THE COSMOS.

There is an interesting parallel between the discovery of the various kinds of numbers and the increase of human understanding both of the physical world of determinism and of the moral world of choice. This parallelism is not only an affirmation of the role of mathematics as a valid and extensive symbolism for the nature of the world, but also that mathematics can serve as a useful guide on a spiritual path. But Pythagoras understood this many centuries ago and organized communities dedicated to the mathematical path to knowledge and spiritual growth. Over time the fullness of the power of mathematics was ignored, as the doctrines of competing religious institutions prevailed over the philosophy of Pythagoras, relegating mathematics to a purely secular role. But in the present century the extensive implications of the role of mathematics in such realms as aesthetics and ethics are liberating it from its long confinement solely to matters of quantity. It is timely to reopen the qualitative aspects of number, not in the sense of the pseudo science of numerology, but in the sense of seeking deeper interpretations for what the numbers found in nature have to tell us. The grammar of mathematics, after all, underlies the grammars of music and art as well as of physics and biology. It is our best symbolism for representing the cosmos.

This approach to cosmic structure is based on levels of numerical symmetry.

Arithmetic Symmetry

In the first Pythagorean level, the structure's essence is symmetry and balance. The numbers involved are the positive and negative integers. The null or fulcrum of the first level is symbolized by the quantity ***zero***. [$-x \leftarrow 0 \rightarrow +x$] The conservation laws of physics such as conservation of charge, angular momentum, or energy all derive from some basic symmetry. [The relation between symmetry and conservation was pioneered by Emmy Noether]. Symmetry-balance appears in modern game theory in the, "tit for tat" strategy. In the fields of morality and ethics symmetry-balance takes the forms of justice, level playing field, middle way (Madyamika). Many religions have this first level ingredient in their teachings, as for example, in orthodox Judaism, the teaching, "an eye for an eye, a tooth for a tooth". The logic of this level is Aristotelean two value logic based on the law of the excluded middle. The operation involved is negation. This level is cyclic (repetitive) and reversible.

Geometric Symmetry

The second Pythagorean level is based on reciprocity or inversion. The numbers involved are the rational numbers. The null is symbolized by the quantity ***one***. [$x^{-1} \leftarrow 1 \rightarrow x^{+1}$] Inversion in the unit circle or unit sphere maps the exterior in a one to one manner onto the interior (and vice versa).

NEOCOSMOLOGIES

Originally cosmology was the province of theologians. They were the ones who described for us the nature of the world, both its seen and unseen portions. In the sixteenth century this began to change. The likes of Copernicus, Kepler, Galileo, began to take over the office of descriptors of the world. However, it wasn't until the nineteen century after Darwin and revolutionary developments in physics that the theologians lost a place at the cosmological table. Then in the twentieth century for a few decades astronomers and physicists batted cosmology between their respective courts, until finally an alliance was formed and "astro-particle-physicists" became the current custodians and high priests of cosmology.

These hybrids found that they were increasingly beginning to sound like traditional theologians, repeatedly using the concept of "God" or "the Mind of God" in their descriptions of the cosmos. Their traditions required that all descriptions of the cosmos be imbedded in their sacred language of mathematics. Curiously, this too led back to classical theological concepts: A single moment of creation, the Big Bang, reflecting the creation story in Genesis. Grand unified theories (GUTs) and Theories of everything (TOEs) reflecting the Western tradition of monotheism. And with superstring theory's ten dimensional account of the relativistic and quantum aspects of the universe, we see the return of the sacred Tetractys (number ten) of the Pythagoreans. The question is: Do these modern high priests reflect the views of their predecessors because ideas such as monotheism and one time creation are endemic in cultural thinking, or is it that both the ancient and modern priests have glimpsed the same basic truths of the cosmos, but must formulate it in their respective languages; myth ~~and~~ or mathematics.

Just as with myths, the equations of modern physics allow various interpretations. The archetype of a single sacred scripture allowing alternative interpretations has again manifested itself along with the archetypal consequence of the separation of believers into contending sects and cults.

A primary division among the cosmological theologians is over the issue of whether the universe will continue to expand for ever or in time will turn around and begin to contract and end in a Big Crunch. Those cosmologists who have been infected with Eastern cultural traditions, favor a return to the initial singularity and endless repetitions of big bangs and big crunches. But those loyal to Western traditions favor the one time big bang and endless expansion. This is the ancient question of the nature of time in modern dress: Cyclical vs. Linear.

Among these cosmological cultists having different interpretations of the data and equations are those who subscribe to the "Anthropic Principle". As with religious divisions, such as Northern and Southern Baptists, the Anthropic Principle divides into supporters of the soft version and the hard version.

Anthropic Principle w/ Multiple Universes
⇒ Design [last refuge of chance]

Among more recent cosmic cults is that of Lee Smolin who believes in the evolution of universes through natural selection. Here the thinking of biologists contends for a place at the cosmological table. In Smolin's book "The Life of the Cosmos" he presents the case for black holes being the wombs from which new universes are born.

Next to come will probably be the insistence of psychologists having a seat at the cosmological-table. For them the universe is a vast Rorsach test, telling us about the desires and anxieties of the cosmologists

Templatonics

REDUCTIONISM VS. TEMPLATISM

PATTERNS & CAUSALITY

This code-book could include a universal clock, that provides coherence.

For the past three centuries reductionism has been the philosophical basis of Western science. Reductionism consists, not of *post hoc ergo propter hoc* causality, but of bottom up causality. That is the cause and explanation of phenomena are to be sought and found in their component sub-parts. Biological phenomena are to be explained in terms of chemistry, chemical phenomena, in turn in terms of physics. And each level of physical phenomena to be explained in terms of components. Molecules in terms of atoms, atoms in terms of electrons and baryons, these in terms of quarks, ... It is not certain how far this sequence continuous, whether it ever ends.

Plato's idea

As an alternative to reductionism it is proposed that there exists a 'template' that manifests itself in the same abstract form, but in different observables, at each level of the ontological scala: sub-atomic, atomic, molecular, cellular,... This view would hold that the sub-systems do not determine the properties of a system, but that both the sub-systems and the system derive their properties by being isomorphic at some level of abstraction to a universal template. This template would be a sort of "code book" that is contained in all material systems, from quarks to Hubble universes. Humans being part of the picture would also possess this same code book. This would explain why we find the universe comprehensible, let alone experiencable.

Several instances point to the possible validity of a template type hypothesis. There is, for example, the fact that von Neumann's construction of the essentials of reproduction in cellular automata are isomorphic to those found in the components of bio-reproduction. (von Neumann made his construction a decade before the work of Watson and Crick.) There is also a basic eight-foldedness that occurs on many levels, from sub-atomic symmetry groups through the periodic table of elements, on up to stellar and galactic types. (One could also throw in diatonic musical scales and the I Ching.)

One of the criticisms of reductionism has been its inability to account for emergence. Can templatism do any better? Speculatively, we might answer, yes. Assuming that a portion of the template includes the algorithms for self organization.

As far as determinism goes, templatism would appear to be less deterministic than reductionism. Templatism has both deterministic and open ended aspects. The interface may vary with each level of manifestation.

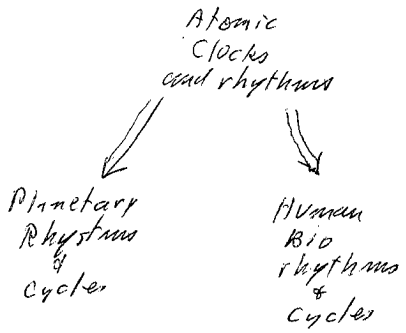
Templatism would have less demand on temporal sequences of evolution or emergence. Development could be occurring simultaneously on several levels, it not being required that all the bricks be available before construction of the building begins. The universal code book would assure in advance that the bricks and the building would merge in a totally compatable way.

Template to its manifestations
~ Archetype to its manifestations
i.e. ∃ a template that is the archetype for a cosmos.
or cosmoses?

REDUTEMP.WPG 96/10/18

ref. Poundstone, "The Recursive Universe"
See p20 on reductionism
p22. on Szilardo 'two edged sword'

The form of causality implicit in templatism is like braiding.



Astrologers postulate an untenable
causal connection horizontally
between planets and human events.

THE UNIVERSE IN NATURAL UNITS

The Universe in Natural Units shows some very special relations between the Earth and the Cosmic Constants:

1) The size of the earth and the E.M. spectrum (See the chart on the wall in the LA County Science Museum)
2) The "coincidence" of the 24 hour rotation period of the earth and the Schuster Period of the carbon atom. (CHON)
3) The equality of the ratios (escape velocity of the earth)/(the earth's Schuster period) and ($\alpha^2 c$/(the Hydrogen Schuster period)
4) 2π times (the time taken for light to travel from the sun to the earth)/(the earth's Schuster period) = φ
5) The rotation period of the earth is exactly 17 times the earth's Schuster period.

Reality is not perceivable without the presence of a figure and a ground. Without both, Eddington's criteria of non-existence holds. Figures and Grounds can take many forms. All systems require a temporal figure and ground. For example, the telegraph and train for a railroad, the radio and the airplane for an airline, and the slow and the fast universes, emphasized by Jesse Greenstein, for the visible universe.

Another possible example of figure and ground may be in the large and the small dimensionless constants of physics. These two values may in some way be basic to the definition of physical reality. The two constants are the fine structure constant and the Coulomb/Gravitational force ratio. The former has the inverse value of approximately 137, the latter, has a value of nearly 10 to the 40th power.

If E is the inverse of the fine structure constant and S is the force ratio, then

$$2^E/2\pi = 4\pi S$$

to within 4 parts in 100,000, which is of the order of the experimental uncertainty in the values.

$\log(S) = 39.355990205$ and $\log(2^E/8\pi^2) = 39.354553361$, $\delta = 0.00144$

UNATU3.WP5 DISK: COSNUMBERS 12/02/87

THE UNIVERSE IN NATURAL UNITS

The world is changing, an inhibitor has been removed. Genes that have been locked have been released and new emergence is possible. (cf the metaphoric slab in 2001) We can now gain a more profound insight into who we are, what we can become and a glimpse of the role of the Earth in cosmic destiny.

The Universe in Natural Units shows a very special relation between the Earth and the Cosmic Constants:

1) The size of the earth and the E.M. spectrum (See the chart on the wall in the LA County Science Museum)
2) The "coincidence" of the 24 hour rotation period of the earth and the Schuster Period of the carbon atom. (CHON)
3) The equality of the ratio Vx /Psh and the ratio c/PshH.

also photon ovoid soh

The perception of a reality derives from the selection of a figure and a ground. Without both a figure and a ground, Eddington's criteria of non-existence holds.

Figures and Grounds can take many forms. All systems require a temporal figure and ground. The slow and the fast universes, emphasized by Jesse Greenstein, are an example for the visible universe. The telegraph and train for a railroad, the radio and the airplane for an airline, etc.

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$$2^{E}/2 = 4\ S^{2}$$

to within 4 parts in 100,000, which is of the order of the experimental uncertainty in the values.

$\log(S) = 39.355\overset{880}{\cancel{990205}}$ and $\log(2^{E}/8\ ) = 39.354553361$?

$\ln(3S^{3/2}) = E$

Using $S = 39.355880 \rightarrow \ln S = 90.620263$

$Ln(3\ S^{3/2}) = 137.0290$ vs. 137.0360

$e^{E} = 3\ S^{3/2}$ using 137.0360

$\log_{10}(e^{E}) = 59.514369$

" $- \log 3 = 59.036858 \rightarrow 39.357905$ vs. 39.355880

fractal dimensions?

$2^{E} = 5E$

$41.29194 = E \log_{10} 2$ $\log_{10} E + \log_{10} S = 41.492715$

$\sqrt{3}\,2^{E} \rightarrow 41.49050$ best

$\sqrt{\pi}\,2^{E} \rightarrow 41.501$

PROJECT 77

UNATU2.WS4 DISK: ~~CODEX~~ 11/22/87

THE UNIVERSE IN NATURAL UNITS

Each realm of experience has an optimum set of units for its measure. The world of everyday experience is best measured by the units which traditionally arose from the size and weight of everyday objects, including ourselves, and from the terrestially imposed units of time and their subdivisions. The development of the so-called metric system was a step forward in orderliness and in the relating of units to the base of our number system, but a step backwards in its actual choice of its fundamental units. But it has served as a useful bridge to exploring the micro universe of the molecule and atom. However, in the exploration of the micro universe, units natural to that universe were discovered. It might prove insightful to look at our meso universe and at the astronomer's macro universe in terms of these units.

Actually we have available several systems of units:

I. The Planck System based on c,G and h
II. The Planck System based on c,G and h/2 pi
III. The Baryon System based on a_0, m_p, and $2\pi a_0/c$
IV. The Baryon System based on a_0, m_p, and P_{SHp} where P_{SHp} is the Schuster period of the proton
V. The Lepton System based on r_e, m_e, and $2\pi r_e/c$
VI. The Gaia System based on $R_\oplus$, $M_\oplus$, and $P_{SH\oplus}$ where $P_{SH\oplus}$ is the Schuster period of the earth
VII. The Cosmic System based on R_U, M_U, and $2\pi R_U/c$

Several other systems based on stars, galaxies, waves, etc may also be considered.

Whenever a uniform system of units is used, relations hitherto unrecognized are sometimes revealed.

THE GARDEN OF EDDN
THE EDDINGTON-DIRAC DIMENSIONLESS NUMBERS

In honor of Eddington the reciprocal of the fine structure constant, whose value is 137.03559, will be called E, and in honor of Dirac the ratio of Coulomb to gravitational forces, whose value is 2.269239 x 10^39 will be called D.

NOTATION:
The following notation will be used for exponents and hyper-exponents:

a^b will be written a^b. a^{b^c} will be written a^(b^c)

Instead of having to write parentheses, an alternate notation for hyper-exponents can be used:

a^(b^c) can be written a~b^c or a~b~c

In general ^ is calculated left to right and ~ from right to left.

Examples:

a^a^a^a^a = a~a^4 and a~a~a~a = a^(a^(a^a))

A short hand for a^a^a^a^a will be a"^5 and for a~a~a~a will be a"~4

Some formulae:

n~n~n = n"^(n+1) (n^n)^(n^n) = n"^(n+2)

Exercise:

If H = 4~4^4^4 find x for H = 4"^x.

METACOSMOLOGY

Metacosmology is to cosmology what mathematics is to science. Metacosmology is concerned with the set of possible universes while cosmology is concerned with which of the possible universes do we live in, just as mathematics is concerned with the totality of self consistent constructs while science is concerned with which of those constructs best describe observable phenomena. Metacosmology and mathematics require a different kind of thinking than do cosmology and science. It is a kind of thinking that ever seeks generalizations and the set of possible alternatives to those that are known or have been established. In particular, the study of the Cosmic Numbers, or EDDN--Eddington-Dirac dimensionless numbers as they are called here, require a new epistemological approach not restricted to physical or astrophysical causes. Different types of explanation are required in metacosmology than those based on predictability which have been the vogue since Newton's day.

TABLES

METACOSMOLOGY
THE EDDINGTON-DIRAC NUMBERS

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METACOSMOLOGY

What mathematics is to science, metacosmology is to cosmology. Mathematics is concerned with the totality of self consistent logical systems. Similarly, metacosmology is concerned with the total set of possible universes. In contrast, science is concerned with the selection of those particular systems which best describe observable phenomena, and cosmology is concerned with the selection of the particular universe which appears to be the one we live in. Both mathematics and metacosmology require a different kind of thinking from that employed by science and cosmology. It is the kind of thinking that seeks generalizations and the generation of alternatives to what is already known or established. It is synthetic thinking, reasoning from specifics to new encompassing principles as contrasted to the more common analytical or 'top down' thinking, reasoning from axioms. The goal is ever to formulate what is known as a special case of what may be.

A universe is characterized by the fundamental physical constants associated with it. Indeed, the structural and evolutionary limits of a universe, are quite possibly determined by its set of fundamental physical constants. This is suggested by the sensitivity of the contents and structure of our universe to the present values of the fundamental constants. Hence the metacosmological question, 'whence the fundamental constants?' becomes the underlying one. But in addition there are such important metacosmological questions as: May the fundamental constants take on any values or are they restricted to some special set of values? In what universes are the fundamental constants rigidly constant? In what universes may they vary? Knowing answers to these questions, the construction of universes corresponding to the values of possible fundamental constants becomes the ultimate metacosmological task.

The Eddington-Dirac dimensionless numbers offer an intriguing bridge between the fundamental physical constants and an encompassing meta-structure governing all possible cosmologies. While the E-D numbers were first derived from the fundamental physical constants, the paradoxes associated with their near equality to certain independently determined cosmological quantities, such as the 'size' and 'age' of the universe, make them take on the appearance of a key to answers to some of the above metacosmological questions. Indeed, the E-D numbers may serve as a bridge between number theoretic laws and the values of the physical and cosmological constants. Whatever, the study of the E-D numbers requires a new approach, one not restricted to known physical and astrophysical principles.

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also The E-D's are dimensionless i.e. closer to fundamental

$\frac{h}{mc^2} = \lambda$

what time does the density of the earth translate to?

$\frac{c^2 m}{h} = \nu$

$\rho_\oplus \propto \rho_\oplus$

$\frac{h\nu}{c^2} = m_\oplus$

$\theta = 10^{99}$ ~ ? time

if 3 no mass, $\rho = 0$?
photons etc.

$\nu_\oplus = 10^{75}$
of $\frac{1}{\tau_\oplus}$ from §

$\frac{h\nu}{c^2}$ = virtual mass

$10^{55} \times 10^{21} = 10^{76+26} = 10^{102}$

$\nu_U = 10^{102}$ hz

space: time
Balance means c = 1

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As human experience moves beyond old frontiers into broader interaction with the physical world, we find that our traditional units of measure based on centimeters (or inches), grams (or ounces), and seconds of time display a 'skewness' or 'bias' with respect to the natural order. Take, for example, designs of highly miniature integrated circuits where the velocity of light enters as a design constraint. In order to get operations that can be performed in a nanosecond, the length of the circuits can be but a few centimeters, so a cm/nanosecond unit for velocity conforms better than the cm/second unit when considering miniaturized computer circuits. On the other hand, present and anticipated operations in cislunar space lead us to the consideration of systems whose locations are best described in terms of distances measured in light-seconds rather than in thousands of kilometers. For example, 24 hour satellites are located at a distance of about 0.125 light-second above the earth and the transmission times involved are of the order of a fourth of a second. Thus as we extend our domain of operations we must increasingly adjust our units to the basic structure of the natural order.

Humans operate primarily in the mechanical/acoustical (or inertial/gravitational) facet of the universe rather than in the much faster electromagnetic/radiative facet. This situation is at the root of the bias in how we perceive, describe and measure the world. Evidence for this bias may be seen in the units we use for measuring the velocity of light. If we participated in a 'balanced' manner in both the e/r and m/a universes, the natural unit for the velocity of light would be a few space units per time unit. Instead, in terms of our common spatial unit of the centimeter and common temporal unit of the second, the velocity of light turns out to be nearly 30,000,000,000 cm/sec (3×10^{10} cm/sec), indicating a bias toward the spatially small and/or temporally large with respect to the e/r universe. In addition, when we measure the universe itself we find that its observable limits are something like 10^{27} cm and its age is something like 10^{10} years or 10^{17} seconds, again the ratio of units, space to time, is of the order of 10^{10}.

Our history dominated by the mechanical/acoustical has thus resulted in a bias that may be represented by a very much spatially elongated ellipsoid in space-time. However this very bias in our space-time description of our region of experience may be just the circumstance that has permitted us an awareness of the very large and very small, the very brief and the long enduring in the universe. Had we been creatures whose biology was more in balance between the m/a and e/r universes, then our perception of the universe might have been more scalewise and timewise limited to the immediate neighborhood of our units. But this awareness is also the source of the pain of the "human predicament", the frustration of finite and mortal creatures experiencing reach beyond their grasp.

The units we use to measure the universe of our experience have been derived from our own biological structure: from the length of our fingers, our feet and our arms, and from the rates of our pulse, our breathing and our eye movement. This makes good sense because we wish to relate what we see and experience to that with which we are most familiar--ourselves. We have located ourselves in space and time and related ourselves to the world by comparing the dimensions of our bodies with the dimensions of the objects and phenomena about us, and as our experience extends we multiply and divide our units to give new ones of more

convenience.

However, the measure of the world in inches or centimeters and seconds has shown that the portion of the world we first experienced is spatially and temporally biased with respect to the totality of the natural order. Our units are quite satisfactory for measuring things on our own scale, but when we consider systems much smaller than the scale of our bodies, our temporal units become too large, and when we consider systems larger than our scale, our temporal units become too small.

Just as spatially, there must be figure and ground, so temporally there must be figure and ground. In temporal patterns this is achieved by a fast time system and a slow time system. In the human body, for example, the fast time system is the nervous system and the slow system is the motor system. In a railroad the fast system is the telegraph system, the slow system is the train system. In an airline the fast system is the radio- radar communication system and the slow system is the aircraft transportation system. The two systems are linked by schedules and time-tables. In the physical universe the fast system is the electromagnetic/radiative universe and the slow system is the inertial/gravitational universe.

If we feel that 30 cm or 1 foot is about the proper scale for our everyday spatial descriptions, then to remove our space- time bias we should select one nanosecond (10^{-9} sec) as our unit of time. The velocity of light in terms of a space unit of 30 cm and a time unit of 1 nanosecond is approximately equal to unity. On the other hand if we prefer to retain one second as about the proper size for a time unit, then to remove the space-time bias we should select a length of 300,000 kilometers (which is roughly the distance to the moon) as our basic unit of length. The velocity of light in terms of a space unit of 300,000 kilometers and a time unit of one second is approximately equal to unity. In either case we see that our local terrestrial mechanical/acoustical world is quite skewed with respect to the electromagnetic/radiation universe.

TEMPLATONICS

INTRODUCTION

Basically the subject of causality is about linkages, with the usual notion being that causality is about a particular kind of linkage, viz., about uni-directional linkages. [cf graph theory] But the usual notion of a linkage is a linear one. So contemporary views of causality are restrictive in being both linear and uni-directional. These restrictions limit applications to infrastructures or grounds that are either chain-like or tree-like. Linear, uni-directional linkages are not readily applicable to more complex networks or to interactions between network and ground (vertical interactions). This has resulted in a third restriction, all causalities must be horizontal or one level. [These notions may be traced to John Locke's three restrictions to critical thinking or modeling: What is earlier is primary, what is smaller is primary, and what is visible is primary. id est, causality is from past to future, from small to large (reductionism), and does not need to consider the infrastructure, only the horizontal context.]

Computer simulation is revealing the severe limitation of these 18th century views which have been absorbed into modern thinking. Parallel computing allows computations to involve several evolving processes simultaneously, freeing from "Lockean causality". [see James Bailey's book, "After Thought]. But simultaneous processing is not total liberation from linear uni-directional thinking. An entirely new paradigm for both figure and ground is needed. An attempt at this is what is here labeled, TEMPLATONICS.

OVERVIEW

The term templatonics is appropriate since the central idea involved is that of a template. But the fortuitous occurrence of PLATO within the word is also appropriate, for the idea of template is closely related to Plato's concept of archetype. What we shall here refer to as a template is an informational pattern, either static or dynamic, that governs the form(s) that matter and/or energy may assume. Plato's archetypes were also patterns or scenarios of an abstract nature that manifested themselves from time to time on the material level. Manifestations could vary considerably in setting and personae, but the plot would always be the same. Until we have better understanding of the relation between information and energy, we assume that templates or archetypes exist on an "informational level" which is the source of the information that governs all material structures. (Whether the templates/archetypes are "pure information" is for the present unanswerable.) In assuming the existence of (at least) two cosmological levels, we are not making a radical departure from present views which posit fields, forces, and other representations that disregard Locke's insistence on visibility. The principal advantage of the template/archetype model is that it divorces causality and time, allowing not only past-future, future-past, and bi-directional causalities, but also *sine-temporum* causality. However, instead of Plato's pre-existence of the archetypes, the templates may pre-exist, evolve, or be created and governed by some "meta-template".

TEMPLATE.WPG 96/10/31

figrund1.wp6 November 17, 1996

THE UNIVERSE CONSISTS OF TWO LEVELS, A FIGURE AND A GROUND.

▸ The Ground is a vast vibratory system, like a complex drum, capable of vibrating in many modes. The spacings of its nodes are determined by the three dimensionless numbers: α, μ, and S where

α is the fine structure constant = 0.007297353
μ is the mass ratio proton to electron = 1816.152701
S is the ratio of the coulomb to the gravitational force, $= 2.269239 \times 10^{39}$

▸ The Figure is the material universe whose basic modules are action packets [dimensionsally = ML^2/T] defined by the fundamental constants: $\hbar$, c, and G where

$\hbar$ is Planck's constant $[ML^2/T] = 1.054573 \times 10^{-27}$ cgs
c is the velocity of light $[L/T] = 2.997925 \times 10^{10}$ cgs
G is Newton's constant $[L^3/MT^2] = 6.672599 \times 10^{-8}$ cgs

The action packet, sometimes called the Planck particle, has the values:

$m_p = 2.176710 \times 10^{-5}$ grams
$l_p = 1.616050 \times 10^{-33}$ centimeters
$t_p = 5.390560 \times 10^{-44}$ seconds

The interaction of these two levels creates a universe. Many figures are possible with the same Ground. However, what actually occurs depends on the values of the constants $\hbar$, c, and G. The vibratory system which supports various dynamics may also be alterable, but whatever its structure, it provides the "theme" within whose template all "variations on the theme" take place.

Since material existence occurs at the nodes, the organization of the action modules and their transforms is governed by the locations of the nodes. The largest net of nodes is set by S or $\sqrt{S}$, giving a "fractal" structure to the universe. Small scale nets are determined by α and μ in various combinations. These several nets of nodes provide many templates by means of which all possible material entities are formed.

The two levels involved are those of the templates and those of the packets. These levels constitute a basic dualism underlying the universe. What can occur is defined by the Ground, what does occur is open but infected with what has already occurred. But beyond the necessity of this dualism lies the question of its sufficiency. Is a third element required to make it happen?

SOME SUPPLEMENTARY INPUTS:

- A dynamic sub-system of the cosmos evolves so as to maximize its options and potentialities. This evolution is counter to the second law of thermodynamics.

- The cutting edge of such an evolving system gravitates toward a region rich in alternatives, resulting in existence occurring where the density of alternate possibilities is a maximum. (usually at some interface or interstice) ~~AF~~ nodes ?

- The universe does not march to the beat of a single drummer. The clock rate at any locality varies inversely with the square root of the local density. ~~The~~ Change or evolution is most rapid where the mass density is greatest.

The Kiang Bang

Inverse Firmware

IS THERE SIZE-FORM INDEPENDENCE?

Flat space has the unique property of size-form independence. In other topologies form varies with size. [eg, the sum of the interior angles of a spherical triangle depends on the size of the triangle, being 270 deg for an octant down to just over 180 deg for a very small triangle.] Conversely, if the radius of the sphere is increasing [expanding universe] and the size of an object remains unchanged, then its shape will change. As R increases, the sum of the angles will decrease. Locally the result of expansion is toward flatness and space-form independence. (This could infer that what is seen as gravitational contraction is really the change in size-form resulting from expansion in a non-flat universe.)

If shape does not change w/ expansion ⇒ universe is flat

If we postulate the existence of H-SPACE, the space containing all the archetypal forms, and further that there is a "resonance" between forms, then an object in our universe will be placed in resonant communication with H-SPACE whenever the R of the universe is such that the form of the object is similar [congruent?] to an archetypal form in H_SPACE. The inference of this is that certain special events occur in this universe whenever R attains a value belonging to a set of critical eigen values. What sort of events? Creation? Innovation?

The evolutionary and creative changes taking place in the universe are orchestrated by the expansion of the universe itself, there not being continuous change, but rather discrete events of creation and modification occurring at values of R equal to some value in the set of "cosmic eigen values". These are Maxwell's "singular points".

DESIGN OF WORLDS DISK

Reality is a consensus derived from temporal and spatial continuity. But all continuity, both temporal and spatial is illusory. Hence, to think about the universe at all we must consider its *measure*. Where by measure is meant Lebesgue measure.

Both space and time are dyadic in nature. Space is divided into extension and separation, time is divided into duration and interval ("while and until"). If these dyads are viewed with higher resolving power, the concept of density is involved. In the case of physical space, matter density, ρ. When $\rho = 0$, there is pure separation, when $\rho > 0$, there is some sort of extension. Similarly with time. The Kepler-Newton law,

(1) $$T=2\pi\frac{R^{3/2}}{\sqrt{GM}}$$

states that time $\propto \rho^{-1/2}$. Thus when $\rho = 0$, T is infinite. Spatial separation is associated with infinite time or eternity. But when $\rho > 0$, time is finite having duration and space possesses extension.

Aristotle based the idea of change on motion, in fact holding they were equivalent. (What about color change?) Assuming he is right, then all change is related to velocity, which is space/time.

(2) $$vel = \frac{SPACE}{TIME}=\frac{\rho}{\rho^{-1/2}}=\rho^{3/2} < c$$

But this quantity is assumed in relativity theory to be bounded. In particular linear velocities are bounded by c, the velocity of light. We conclude that $\rho^{3/2}$ is bounded by some appropriate power of the velocity of light.

NUMLEVL2.WPD October 27, 1998

THE BASIC DESIGN INGREDIENTS OF THE COSMOS.

Symmetry

In the first Pythagorean level, the structure's essence is symmetry and balance. The numbers involved are the positive and negative integers. The null or fulcrum of the first level is symbolized by the quantity ***zero***. [-x ←0→+x] The conservation laws of physics such as conservation of charge, angular momentum, or energy all derive from some basic symmetry. [The relation between symmetry and conservation was pioneered by Emmy Noether]. Symmetry-balance appears in modern game theory in the, "tit for tat" strategy. In the fields of morality and ethics symmetry-balance takes the forms of justice, level playing field, middle way (Madyamika). Many religions have this first level ingredient in their teachings, as for example, in orthodox Judaism, the teaching, "an eye for an eye, a tooth for a tooth". The logic of this level is Aristotelean two value logic based on the law of the excluded middle. The operation involved is negation. This level is cyclic (repetitive) and reversible.

Inversion

The second Pythagorean level is based on reciprocity or inversion. The numbers involved are the rational numbers. The null is symbolized by the quantity ***one***. [x^{-1}←1→x^{+1}] Inversion in the unit circle or unit sphere maps the exterior in a one to one manner onto the interior (and vice versa).

NULL

(1) ARITHMETIC + − $-A \leftarrow 0 \rightarrow A$ $A+(-A)=0$ 0

(2) Geometric × ÷ $\frac{1}{A} \leftarrow 1 \rightarrow A$ $A\times(\frac{1}{A})=1$ 1

(3) Power ^ −^ 2 quantities $A^{1/B} \leftarrow A \rightarrow A^B$ $(A^B)^{\frac{1}{B}} = A$ A $A, B \neq 1$ if $=1$ clones

(4) Logarithmic exp ln e^A $\ln A$

MIX $-\frac{1}{A}$ A $A(-\frac{1}{A})=-1$ → imaginary

NUMLEVL2.WPD October 27, 1998 October 28, 1998

THE BASIC DESIGN INGREDIENTS OF THE COSMOS.

There is an interesting parallel between the discovery of the various kinds of numbers and the increase of human understanding both of the physical world of determinism and of the moral world of choice. This parallelism is not only an affirmation of the role of mathematics as a valid and extensive symbolism for the nature of the world, but also that mathematics can serve as a useful guide on a spiritual path. But Pythagoras understood this many centuries ago and organized communities dedicated to the mathematical path to knowledge and spiritual growth. Over time the fullness of the power of mathematics was ignored, as the doctrines of competing religious institutions prevailed over the philosophy of Pythagoras, relegating mathematics to a purely secular role. But in the present century the extensive implications of the role of mathematics in such realms as aesthetics and ethics are liberating it from its long confinement solely to matters of quantity. It is timely to reopen the qualitative aspects of number, not in the sense of the pseudo science of numerology, but in the sense of seeking deeper interpretations for what the numbers found in nature have to tell us. The grammar of mathematics, after all, underlies the grammars of music and art as well as of physics and biology. It is our best symbolism for representing the cosmos.

This approach to cosmic structure is based on levels of numerical symmetry.

Arithmetic Symmetry

In the first Pythagorean level, the structure's essence is symmetry and balance. The numbers involved are the positive and negative integers. The null or fulcrum of the first level is symbolized by the quantity ***zero***. [-x ←0→+x] The conservation laws of physics such as conservation of charge, angular momentum, or energy all derive from some basic symmetry. [The relation between symmetry and conservation was pioneered by Emmy Noether]. Symmetry-balance appears in modern game theory in the, "tit for tat" strategy. In the fields of morality and ethics symmetry-balance takes the forms of justice, level playing field, middle way (Madyamika). Many religions have this first level ingredient in their teachings, as for example, in orthodox Judaism, the teaching, "an eye for an eye, a tooth for a tooth". The logic of this level is Aristotelean two value logic based on the law of the excluded middle. The operation involved is negation. This level is cyclic (repetitive) and reversible.

Geometric Symmetry

The second Pythagorean level is based on reciprocity or inversion. The numbers involved are the rational numbers. The null is symbolized by the quantity ***one***. [x^{-1}←1→x^{+1}] Inversion in the unit circle or unit sphere maps the exterior in a one to one manner onto the interior (and vice versa).

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Symmetry

An intrinsic property of a mathematical object which causes it to remain invariant under certain classes of transformations (such as Rotation, Reflection, Inversion, or more abstract operations). The mathematical study of symmetry is systematized and formalized in the extremely powerful and beautiful Area of mathematics called Group Theory.

Symmetry can be present in the form of coefficients of equations as well as in the physical arrangement of objects. By classifying the symmetry of polynomial equations using the machinery of Group Theory, for example, it is possible to prove the unsolvability of the general Quintic Equation.

In physics, an extremely powerful theorem of Noether states that each symmetry of a system leads to a physically conserved quantity. Symmetry under Translation corresponds to momentum conservation, symmetry under Rotation to angular momentum conservation, symmetry in time to energy conservation, etc.

See also Group Theory

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SIZEFORM.WPD

October 8, 1998

Flat space has the unique property of size-form independence. In other topologies form varies with size. [eg, the sum of the interior angles of a spherical triangle depends on the size of the triangle, being 270 deg for an octant down to just over 180 deg for a very small triangle.] Conversely, if the radius of the sphere is increasing [expanding universe] and the size of an object remains unchanged, then its shape will change. As R increases, the sum of the angles will decrease. Locally the result of expansion is toward flatness and space-form independence.

If we postulate the existence of H-SPACE, the space containing all the archetypal forms, and further that there is a "resonance" between forms, then an object in our universe will be placed in resonant communication with H-SPACE whenever the R of the universe is such that the form of the object is similar [congruent?] to an archetypal form in H_SPACE. The inference of this is that certain special events occur in this universe whenever R attains a value belonging to a set of critical eigen values. What sort of events? Creation? Innovation?

The evolutionary and creative changes taking place in the universe are orchestrated by the expansion of the universe itself, there is not ~~be~~ continuous change, but rather discrete events of creation and modification occurring at values of R equal to some value in the set of "cosmic eigen values". These are Maxwell's "singular points".

BODESLAW.WPD May 28, 2006

THE TITIUS-BODE LAW

This relationship approximating the distances of the planets from the sun was first noticed by Titius of Wittenberg, then independently by Bode in 1772. It may be developed as follows:

1) Form the sequence: 0 3 6 12 24 48 96 192 384 768
each number after 3 being doubled

2) Add 4 to each number: 4 7 10 16 28 52 100 196 388 772

3) Divide by 10 0 .4 0.7 1.0 1.6 2.8 5.2 10 19.6 38.8 77.2

The sequence in 3) closely approximates the distances of the successive planets from the sun as measured in astronomical units (earth = 1)

PLANET	DISTANCE IN A.U.	BODE VALUE
MERCURY	0.3871	0.4
VENUS	0.7233	0.7
EARTH	1.0000	1,0
MARS	1.5237	1.6
CERES (ASTEROID)	2.767	2.8
JUPITER	5.2028	5.2
SATURN	9.540	10
URANUS	19.18	19.6
NEPTUNE	30.07	38.8

This relation made important contributions to ~~astronomical history~~ the history of astronomy, leading to the search for Uranus and the discovery of the asteroids. Uranus was discovered in 1781 having a distance in good agreement with the Bode sequence. But there still was a gap. No planet in the 2.8 position. This lead to a search that discovered the first asteroid, Ceres, on Jan 1 1801, followed by hundreds of others filling in the blank. A planet that fragmented? Or never coalesced?

Since Neptune and Pluto and all beyond disregard the sequence, and having no physical basis, Bode's Law lost its status of being a law and became just a curiosity. None the less, its numerical regularity with approximate fits to each of the eight existing planetary objects nearest the sun should require its being kept on the table. When data from other planetary systems is available, there might turn out to be a "Bode Zone" in which planetary distances from their principal star, follow a similar sequence.

But according to our way of describing the world, to be a "law" requires that a relationship be ~~universally~~ everywhere valid ~~for all time~~. The idea that there might be different laws for different zones and different times is ~~repugnant~~ contrary to our monolatry tradition§ places

KALPASUP.WPD July 8, 2005

HUBBLE AND THE KALPAS

The units of the Hubble parameter, H_o, are in kilometers/second/megaparsec.
One megaparsec is equivalent to 19.489352 kilometers [$\log_{10}$ value]
Hence an $H_o = 1$ is equal to -19.489352 sec^{-1}
Or an $H_o = V$ gives a frequency of logV -19.489352 sec^{-1}, or a time of 19.489352 - logV sec

The current value proposed for the Hubble constant, H_o, is about 72 km/sec/mpc.
Let us use the value $H_o = 71.994$[1] . From this value we get a Hubble time of 13.584465 B.Y.
This corresponds to an age of the universe of 9.056310 B.Y. , with $\log_{10}$ value = 0.956951 B.Y
This is equivalent to 9.956951 years or 17.456064 seconds ($\log_{10}$ values)

A Kalpa or day in the life of Brahma is defined as 4.320×10^9 years
[with a $\log_{10}$ value of 9.635484 years = 17.134596 seconds]
If the age of the present Brahma began with the Hubble time, then

the first Kalpa began	13.584×10^9 years ago	Big Bang
the second Kalpa began	9.264×10^9 years ago	First generation stars
the third Kalpa began	4.944×10^9 years ago	Second generation stars, sun
the fourth Kalpa began	624×10^6 years ago	In the Sinian Era[2]

The present Brahma is now in his fourth day.

On the other hand, if the universe began about 9.056310 billion years ago, then the lifetime of the present Brahma began with the Big Bang and:

the first Kalpa began	9.056×10^9 years ago	Big Bang
the second Kalpa began	4.736×10^9 years ago	Age of sun
the third Kalpa began	416×10^6 years ago	in the Silurian period[3]

The present Brahma is now in his third day.

---

[1]This value of the Hubble parameter derives from the assumption that the age of the universe is given by $(r_e/l_o)^3 t_o$, where r_e is the electron radius, l_o is the Planck length and t_o is the Planck time.

[2]The Sinian era was from about 800 to 570 million years ago, time of the oldest animal fossils. The Cambrian Period began 570 million years ago, with the great Cambrian radiant at about 530 million years ago.

[3]The Silurian period , 439-409 million years ago, time of the first land plants. [The first recorded extinction was about 440 million years ago.]

THE ANTHROPIC PRINCIPLE

ANTHPRN3.WP5

THE ANTHROPIC PRINCIPLE

OUTLINE

0 THE "COINCIDENCES" LEADING TO THE APPEARANCE OF PHYSICISTS
- 0.1 SPACE THREE DIMENSIONAL
- 0.2 ANTIMATTER/MATTER IMBALANCE
- 0.3 PROTON ELECTRON CHARGE BALANCE
- 0.4 THE FORMATION OF ATOMS
- 0.5 THE ISOTROPIC UNIVERSE
  - 0.5.1 recessional velocity = excape velocity
- 0.6 THE EXISTENCE OF GALAXIES
  - 0.6.1 density of stars in galaxy
  - 0.6.2 collisions, perturbations, captures
- 0.7 THE LIFE TIME OF STARS
  - 0.7.1 The role of G
  - 0.7.2 neutron mass slightly > proton mass
  - 0.7.3 Strong force barely holds deuteron together
- 0.8 THE EXISTENCE OF HEAVIER ELEMENTS
  - 0.8.1 The Helium, Beryllium, Carbon resonances in red giants, $C^{12} \rightarrow O^{16}$
- 0.9 THE FORMATION OF PLANETS
- 0.10 HABITABLE ZONES → liquidity of water: Hot star short lived, Cool - close one face ∴ ☺
- 0.11 THE PROPERTIES OF WATER

1 THE DEVELOPMENT OF THE IDEA
- 1.1 THE NECESSITY: IGNORANCE OF EARLY EVENTS
  - 1.1.1 Postdiction: In law this type of thinking is common. Given an event such as a crime, construct the steps leading up to the event. Usually in carrying out this process, the notion or motive or purpose is introduced.

  Retrodiction
- 1.2 DIRAC'S DILEMMA 1961
  - 1.2.1 Encounter with the large numbers
  - 1.2.2 The constant = the variable
- 1.3 DICKE'S DEVELOPMENT
  - 1.3.1 The time it takes for physicists to appear
- 1.4 CARTER'S CONTRIBUTION
  - 1.4.1 Restrictions on Copernicism
  - 1.4.2 Other ratios and means
  - 1.4.3 The available world

2 HOYLE'S APPROACH
- 2.1 A CHILD'S QUESTION
  - 2.1.1 The convergence to the present. Multiple universes in the past and in the future, a single universe in the now.

3 WHEELER'S CONCLUSION
- 3.1 TRANSDICTION

4 STATEMENTS OF THE ANTHROPIC PRINCIPLE

5 The Anthropic Principle ≠ Natural Selection (See Barrow www p. 85

THE ANTHROPIC PRINCIPLE

As an illustration of an area that is filled with problems that concern both science and theology, and whose understanding is enhanced with the viewpoints of both, I would like to give a brief summary of what scientists are calling "The Anthropic Principle".

Anthropic principles have their origin in the fact that there are some highly improbable numerical relations between the values of the fundamental constants of nature, such as the velocity of light, Newton's gravitational constant, Planck's constant of action, the value of the charge of the electron and proton, the value of the mass of the proton, and some others; most importantly these constants turn out to have values, within very tight limits, which are just right for the occurrence of the biological basis of life and hence of consciousness. The universe appears to have been 'fine tuned' for evolution toward the existence of a rational species capable of observing and theorizing about it. It is uncontraversial that if the values of these constants had been ever so slightly different, life and consciousness as we know it could not have existed. This is what is known as the 'weak anthropic principle'.

Even slight changes in the values of c, h, and e cause huge changes in the structures of atoms and atomic nuclei. Even when changes are slight, most atomic nuclei are unstable and cannot exist. This would result in the universe having little more than hydrogen, with therefore the impossibility of earth like planets and the impossibility of such biologically important elements as carbon, nitrogen and oxygen.

Slight changes in c, G, h, e, and the masses of the sub-atomic particles would cause huge changes in the structure and evolution of stars. With slightly different values, the universe would not contain stars at all, or only non-luminous stars, or stars that burn out so quickly that there would be no time for bio-evolution.

Life forms depend for their complexity on the existence of a variety of elements. Life requires a habitable environment, such as a planet warmed by a long-lived star. These requirements are met only when the values of the fundamental constants are essentially what they are. Slightly different values would render important elements, stars, planets, and life impossible. Our universe would not exist if the fundamental physical constants had different values.

Theologians should have no trouble with the idea that the properties of the universe are precisely such that life, intelligence, and consciousness should come into being. There is a simple explanation. <u>God designed the universe so that this would happen.</u>

The matter is not so simple, however, for the scientific world view that limits itself to models in which all causes are contained within the system. No external agencies are allowed. Science must explain the high improbability of the values of the constants being just right for life, in terms of a universe that is a self-organizing, self-operating and self-contained system. The idea of design is off-limits for science. So science must decide whether these very sensitive values of the constants are just due to chance or is there some physical explanation yet to be discovered that makes these values necessary.

A third hypothesis has been proposed to avoid the cop-out of 'it's a matter of chance' and to sustain the non-design approach under the uncertainty of whether or not there may exist some physical explanation for the values of the constants. This hypothesis is the 'multi-world' hypothesis. It posits that there exist myriads of universes, not just the one that we know and live in. In this ensemble of worlds, the values of the fundamental constants may take on any value. In some of the worlds not even atoms will ever form; in others, atoms and molecules will come into existence but stars and planets will never form. In others, stars will be too short lived for bio-evolution to take place; in still others stars will be too cool to support life. There are thousands of possibilities for the multi-worlds to take on. But there is included in the ensemble the extremely rare worlds in which the conditions are just right for life, intelligence, and consciousness to evolve. And we live in such a world.

There are many scientists who argue that all of this hypothesizing is unscientific. It cannot be checked empirically and tells us nothing useful. It is all for the purpose of satisfying the requirements that the universe be a system that is self-contained, have no director or manager, and causality must be goal free, always operating from past to future, never from future to present. We thus have an example of the box in which scientific thinking still must take place.

But the theologians also have a problem with the values of the fundamental constants. This is the problem of the unsustainability of omnipotence under any act of creation. An omnipotent God can design a universe or universes anyway God wishes. But after the first elements of the design are in place, does God have the freedom to ignore them? Before God selected the particular set of values of the fundamental constants that brought into existence the particular world in which we live, God must previously have set up the relationships between the values of the fundamental constants and their potentialities. Once these relationships were in place, God was free to select particular values for the constants, but without erasing all and starting over, God was constrained by what was previously established in the relationships. That is to say that at every stage of creation, the omnipotence of God, through his own actions, was diminished.

This is not a new theological problem. It is a root of the problem of evil. This latest formulation of the omnipotence problem, however, affords an example of what Pope John Paul II referred to as science presenting "an opportunity to bring out of Christian belief some of the possibilities that have not yet been realized, informing those parts of the theological enterprise that bear on the relation of nature, humanity, and God."

In the rapidly changing world of the late twentieth century, businesses frequently have to ask themselves the question, "What business are we really in?" Those who fail to do this find themselves obsolete and overtaken by more flexible competitors. The railroads are a prime example, they thought they were in the railroad business, never realizing until it was too late that they were in the transportation business. I feel that today the Church has to ask itself the question, "What is the real business of the Church?" It is clear that in certain areas the Church and Science are in the same business. The business of finding answers to those fundamental questions of meaning. Who are we, where are we, why are we here, and what is our role in the universe? It is also clear that the theological and scientific answers to these questions need not be contradictory. If both disciplines can perceive their prejudices and limitations, realize their special competencies, and maintain a dialogue in areas of common concern, both can be in the business of serving a great human need.

ANTHPRN4.WP5 DISK:ESSAYS1

STATEMENTS OF THE ANTHROPIC PRINCIPLE

The universe has the properties we observe today because if its earlier properties had been much different, we would not be here as observers today. (which ==> that properties do not change)

The fact that the physical universe does harbor intelligent observers places certain constraints on the diversity of ways the universe could have begun and on the physical laws that could have governed its development.
George Gale Sci Am Dec 1981

The Anthropic Principle takes the very existence of humanity to be an important datum constraining the laws of physics. If different universes or different epochs have different fundamental constants, sentient observers would see only those values of the constants that are consistent with the evolution of such observers.
Physics Today March 1989 p24 Bertram Schwarzschild

If some feature of the natural world is required for our existence, then it must indeed be the case.
Greenstein p46

In the absence of knowers, [resonances] cannot be known
ibid p47.

The Anthropic Principle in its purist form:
The only things that can be known are those compatible with the existence of knowers.
ibid p47

Greenstein's Rule: "If it is simple, it is dead"

Causality runs from the existence of the resonances to us.
No one claims the resonances match because we are here.
The claim is that we know they match because we are here.
(due to Hoyle) ibid p46

Thus through our existence the Universe has become self-reflective. It follows that one of the functions of the resonances is to ensure that their existence be known.
ibid p48

The metaphor of the train and the red X p48

Dirac: $\frac{\text{age of universe}}{\text{Coulomb force}}$ =

one jiffy Gravitational force

variable constant

Dicke: age of stars = age of universe
age of stars = time required for physicists to appear

{[apply this to the appearance of phi in the analemma]}

The universe has many unusual properties that *a priori* appear extremely unlikely. If we ask which universe of all possible universes we could exist in, there would be few indeed. Many of the unusual properties are prerequisites for the existence of intelligent observers. Could the set of simultaneous coincidences that allow our existence be telling us that life must in some way be necessary in order to make it meaningful?
Left Hand of Creation p206-7

The life compatibility of the universe depends on a very exact setting or tuning of nuclear constants. Thus matter will evolve in such a way that life, and in time mind, comes into being.
Wilson p34

THE WEAK ANTHROPIC PRINCIPLE:
There are types of universe which we could not expect to observe. (cf. Kant's noumena) This is generally non-controversial

Brandon Carter's STRONG ANTHROPIC PRINCIPLE:
Because there appear to exist such a large number of remarkable and apparently disconnected "coincidences" which conspire to <u>allow</u> life to be possible in the Universe, the Universe <u>must</u> give rise to observers at some stage in its history.
World within the World p360

It is incorrect to generalize Copernicus from we are not special in some particular ways to we are not special in every way as was done in the 19th century. It turns out that while not special in every way we are indeed special in many ways.

Wheeler's Self-referential Cosmology:
"[Rejecting life and mind as accidents], quantum mechanics has led us to take seriously and explore the directly opposite view that the observer is as essential to the creation of the universe as the universe is to the creation of the observer."

{[Throughout the thinking of physicists and cosmologists centers on the 'observer' rather than on the 'human'. It is not surprising that the inference is made that the role of the human in the universe is to observe it, thus becoming the Universe's agent for self-reference. Herein lies humanity's meaning and necessity.]}

ANTHPRN2.WP5 DISK:ESSAYS1

THE ANTHROPIC PRINCIPLE

NOTES

One important value of the Anthropic Principle lies in that it opens up and explores a rich vein of new cosmological possibilities. Though it is speculative it is critical and thereby serves to generate alternative hypotheses. Though it is controversial it is reasonable and thereby serves to focus energy and thought on some very fundamental and significant questions. In cosmology it is currently playing the role that the expansive/decision dialectic plays in management science. No progress is ever made without open ended yin type exploration preceding converging factual yang pruning. And where facts are lacking such speculation provides an essential temporary scaffolding for the construction of the edifice of knowledge.

Deductive logic, the logic of "IF, ... Then ...", is conventionally tied to the direction of time, past to future. In the Anthropic Principle this customary linkage between deduction and time is abandoned. This should not, however, be viewed as the abandonment of logical thinking, only of its disassociation with temporal causality.

The Anthropic Principle emerges from a series of highly improbable coincidences. In regarding these "coincidences" the thinking of physicists and cosmologists encounters what C.G. Jung had years earlier called *synchronicities*, that is, coincidences which possess extra-causal meaning. (That Jung's work was unknown to physical scientists is not surprising. The word "synchronicity" does not appear in Webster's Unabridged Dictionary, Third Edition, nor in any Collegiate Dictionary up to and including the seventh edition (1965). A definition does, however, appear in the Britannica Dictionary of 1960.) Synchronicity differs from plain coincidence in that in a synchronicity there appears to be a non-causal linkage between two disparate causal chains. This non-causal link is associated with the concept of <u>meaningfulness</u>. Meaning is thus seen to have an aspect of there existing some trans-causal or meta-causal pattern involving two or more causal chains. Whether synchronicity is a phenomenon which may be attributable to the observers' ignorance of all causal linkages or is due to the operation of some <u>diacausal</u> chain cannot be decided. All such possibilities must for the present be kept in mind.

MEANING AND NECESSITY

More is to be said on the subject of <u>meaning</u>. Something, for example life, must be <u>necessary</u> to something else in order to be meaningful. (We might here note that each element in a causal chain which is present of necessity consequently has meaning.) [see Barrow and Silk p206,7] If necessary, we may then ask, necessary to what? to whom? When we ask about the meaning of our being here, are we asking about some necessity for our being here? Necessary to what process, to what end, to what entity? Necessity has several parameterizations. When something is necessary, then we may ask:

1) Is it the specific actor that is necessary or is it only the role that is necessary? We may designate the former as strong necessity and the latter as weak necessity. Are there alternatives? Alternatives to the actor? Alternatives to the role? If so, then in either case the strength of the necessity is mitigated.

3) Is necessity used in the sense of pre or in the sense of post? Necessity locates an element in a causal chain either as cause or as effect or consequence. Given a cause, necessity allows the prediction of an effect, given an effect necessity allows the postdiction of a cause. Science is primarily concerned with prediction, law and evidence is primarily concerned with postdiction. It is to be noted that postdiction does not change the temporal direction of causality, only the direction in which the observer must move. In both prediction and postdiction the direction of causality is from past to future, but in prediction we are given the past and explore the future, while in postdiction we are given the present and explore the past. The Anthropic Principle, however, reverses the temporal direction of causality. It originated in an attempt to postdict the early stages of the universe, but ended with the notion that what happened in the beginning was caused by our own existence. It is also to be noted that postdiction frequently leads to the concept of motive or purpose. And it is but a short step from the Anthropic Principle to the introduction of purpose. The purpose of the universe was mankind. And purpose requires a purposer--God.

But if temporal chauvinism may be transcended and we may disregard the direction of time. Meaning has to do with necessary membership in a pattern, has to do with necessary relationships. Thus primary and secondary, pre and post, are but temporal prejudices, and purpose has no relevance being only an illusion introduced when attempting to merge the trans-temporal into the temporal. We may come to agree with Wheeler that the Universe and Man are to each other both cause and effect. Removing temporal prejudice, neither is primary.

Who is troubled with the question of meaning? A child in earliest years has no meaning problem. If meaning lies in necessity, a child's absolute dependence provides all of the necessity needed. A child with a strong bonding to a mother or a father feels secure in its linkages and relationships and is not concerned with the necessity of those relationships and hence not concerned with meaning. (So far as we know animals, having a strong bonding with the earth, have no problem with meaning.) Later, as the child grows older and the bonds alter, a review of the necessity of linkages takes place at some level and the search for meaning begins. This search takes the form of the search for a necessary relationship, the attempt to become necessary to someone or something, perhaps to a cause, and even to try to become indispensable. Later still when the necessary linkages formed in early life must be terminated, as in retirement, the problem of meaning reemerges.

But this is not the course for all people. The selfish seem untroubled by the question of meaning. This might be attributable to inadequate bonding in early years resulting in a turn inward to a "self bonding" instead of outward to external linkages. Only when and if we become troubled with the question of meaning do we begin to transcend ego centeredness and recognize we are part of something else, hopefully a necessary part. Being troubled with meaning is thus a measure of maturity or maturation. Those adults not troubled will probably be found to be locked into either themselves, their immediate family, their nation, or some cause. The maturing person is ever reaching out for larger meaning, for discovering in some way the largest possible domain for his necessity. This evolution may also be seen in religion. In the beginning, as in childhood, a strong bonding with God, his love, is a surrogate for an essential role and the need for meaning. The religions of maturity, on the other hand, construct theologies that attempt to show us the necessity of our being through service to

others and thus give us meaning. Finally our religions seek to show us our necessity to God. It is here that science in its disciplines of cosmogony and cosmology joins in the question of necessity and meaning.

ANTHPRN2.WP5

THE ANTHROPIC PRINCIPLE

NOTES

One important value of the Anthropic Principle lies in that it opens up and explores a rich vein of new cosmological possibilities. Though it is speculative it is critical and thereby serves to generate alternative hypotheses. Though it is controversial it is reasonable and thereby serves to focus energy and thought on some very fundamental and significant questions. In cosmology it is currently playing the role that the expansive/decision dialectic plays in management science. No progress is ever made without open ended yin type exploration preceding converging factual yang pruning. And where facts are lacking such speculation provides an essential temporary scaffolding for the construction of the edifice of knowledge.

Deductive logic, the logic of "IF, ... Then ...", is conventionally tied to the direction of time, past to future. In the Anthropic Principle this customary linkage between deduction and time is abandoned. This should not, however, be viewed as the abandonment of logical thinking, only of its disassociation with temporal causality.

The Anthropic Principle emerges from a series of highly improbable coincidences. In regarding these "coincidences" the thinking of physicists and cosmologists encounters what C.G. Jung had years earlier called synchronicities, that is, coincidences which possess extra-causal meaning. (That Jung's work was unknown to physical scientists is not surprising. The word "synchronicity" does not appear in Webster's Unabridged Dictionary, Third Edition, nor in any Collegiate Dictionary up to and including the seventh edition (1965). A definition does, however, appear in the Britannica Dictionary of 1960.) Synchronicity differs from plain coincidence in that in a synchronicity there appears to be a non-causal linkage between two disparate causal chains. This non-causal link is associated with the concept of <u>meaningfulness</u>. Meaning is thus seen to have an aspect of there existing some trans-causal or meta-causal pattern involving two or more causal chains. Whether synchronicity is a phenomenon which may be attributable to the observers' ignorance of all causal linkages or is due to the operation of some <u>diacausal</u> chain cannot be decided. All such possibilities must for the present be kept in mind.

MEANING AND NECESSITY

More is to be said on the subject of meaning. Something, for example life, must be necessary to something else in order to be meaningful. (We might here note that each element in a causal chain which is present of necessity consequently has meaning.) [see Barrow and Silk p206,7] If necessary, we may then ask, necessary to what? to whom? When we ask about the meaning of our being here, are we asking about some necessity for our being here? Necessary to what process, to what end, to what entity? Necessity has several parameterizations. When something is necessary, then we may ask:

1) Is it the specific actor that is necessary or is it only the role that is necessary? We may designate the former as strong necessity and the latter as weak necessity. Are there alternatives? Alternatives to the actor? Alternatives to the role? If so, then in either case the strength of the necessity is mitigated.

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CAUSMORF.WP5

CAUSALITY

I. Microcausality vav Macrocausality (Roger Sperry)
II. Diacausality vav Pericausality (Enneagram)
III. Path history parameter
    A. Markovian causality (Last point determinism)
    B. Fibonaccian causality (Last two points)
    C. Full path causality (~least action)
        "The particle 'smells' the optimum path" -- Feynman
IV. Singular points and archetypes
V. Causalism and Finalism
VI. Determinism, probabilism, teleology
    A. teleology involves extra-systemic parameters
        i.e. the existence of a second level. or
        the intersection of causal chains, (see synchronicity)
    B. Can innovation be accounted for by causality?
VII. The parallel/serial problem
    A. Synchronicity vav Coincidence
        two or more causal chains linked produces the notion of meaning or purpose. Does this mean that meaning emerges or strikes humans as emerging when certain ordinarily improbable events coincide? or when a certain interlacedness of causal chains creates a "meta-pattern"?

CAUSMRF2.WP5

MORE ON CAUSALITY

We must discriminate between prediction/postdiction and causalism/finalism. Prediction and postdiction have to do with the temporal direction of reasoning or logic. Causality and finality have to do with the temporal direction of causation or necessity. (A third consideration is the direction of time itself, which may go in either direction in certain mechanical systems like the solar system or in certain quantum mechanical situations, but which for most purposes possesses the arrow dictated by the second law of thermodynamics.) In general science is concerned with prediction, the direction of reasoning being the same as the direction of causation ~~causality~~ and time, from past to future. At times, however, it is required to reconstruct the past from given events in the present. Then reasoning becomes postdictive. (For example, the reasoning of Sherlock Holmes in the solving of a crime.) It is this type of reasoning that is required in cosmogony, in studying the origin and evolution of the universe.

It is of interest that in postdiction the notion of motive or purpose is frequently introduced. However this notion is not essential to postdiction. For example, consider the case of the collapse of the Tacoma Narrows Bridge. We are here presented with the fact of the destruction and collapse of the bridge, in the postdictive analyses seeking the causes for the collapse, quite properly the notion of motive was never introduced. Cause for collapse was determined as arising from a resonance between the natural vibrational frequencies of the bridge and the wind patterns--no motives involved. However, there is a among many people a tendency to project an anthropocentric motive onto all systems where postdiction is involved.

Another common example of postdiction, reconstructing events where historical or other records are fragmentary. Consider the pyramids. Who built them? when? how? Given the fact of the pyramids sitting beside the Nile in the present, we seek to restore the events leading to their existence, an exercise in postdiction. We learn from various peices of evidence that they were built some four to five thousand years ago. This time we may properly introduce the notion of purpose since finalism--future effecting the present--is involved. The builders were constructing tombs for the pharaohs. (While purpose is not necessarily involved in postdiction, it is an essential aspect of finalism.) They knew with certainty of a future event--the death of the pharaoh--and were engaged in an activity anticipatory of that event. (It is absurd to think causalistically here instead of finalistically. No one believes that the building of the pyramid caused the death of the pharaoh.) Since finalism depends on knowledge of some incontrovertible future event, how can we know such future events? Two methods: 1) The use of <u>rediction</u> or loops in the sequence of events, here the loop being the inductively well known life-death cycle of human mortality. and 2) The power of belief or faith, which resides in the infrastructure of all planning.

CAUS MRF2.WPS

p2

Is causation inextricably linked to time, either as causalism or finalism? A species of causation that appears to be time independent is implicit in reductionism. Here the direction of causation is from the small to the large. The properties of fundamental particles govern the properties of atoms, which in turn govern the properties of molecules, which in turn... Another example of non-temporal causation is top town. Here there exists an heirarchy of basic principles (like Mach's Principle) that go from the universal to the particular. Both ~~of~~ bottom-up (reductionist) and top-down causation seem to be time free until we recognize that each level in the hierarchy possesses its own characteristic time. Atomic times, micro times, meso-times, macro-times, cosmic-times...and that these times increase from the micro to the cosmic. In reductionism those events acting the faster override the slower. In top-down the long time-spans constrain the shorter time spans. There thus seems to be a temporal component in all causation.

Causation appears to be a time imposed linkage. Spatial linkages in which there do not exist any preferential directions, such as east over west or north over south, have no causal chains. We do not conceive of an object or event east of a second object to its west as having caused the second object. But time has a preferential direction of past to future, rendering time unlike space and inappropriately merged in the concept of space-time except in one level systems like the solar system which can run either forwards or backwards. In multi-leveled systems where the second law creates an arrow for time, the concept of space-time is invalid. If time's arrow can be removed, then linkages may still be seen as either open or necessary, and if necessary possessing of meaning but being without causation, either causalistic or finalistic and therefore devoid of purpose or telos.

multi level cause time and aging

How may time be removed? One paradoxical way is to focus on process, e.g. the process of natural selection or the rules for cellular automata. Process need have no purpose, no goal, no finalism. Here various orders of differential equations together with their initial and boundary conditions provide examples of the many possibilities. And ultimately time may be removed by introducing the notion of the extremum principle.

In addition to the predictive and the postdictive, we have the redictive which is like a loop in a computer program and the transdictive or crossdictive, which underlies Wheeler's statement of the cross necessity of both the Universe and Man.

Necessity has two parameters, a temporal parameter, and a serial parameter. The temporal parameter has two values, prenecessity and postnecessity. The serial parameter is either strong--no alternatives, or weak--the existence of parallel paths.

PROTO
PLANETS

PROTOPS2.WPD April 15, 2007

HARMONIES OF SPHERES
FIBONACCI NUMBERS AND PROTO PLANETS

THE OBSERVATIONS:
The earth's sidereal or orbital period, E* = 365.2564 days
The synodic period of the planet Venus, A" ~~= 224.7007 days~~ 583.9214
The synodic period of the planet Mercury, M" = 115.8775 days
[Notation: X* for sidereal, X" for synodic, A (Aphrodite) for the planet Venus]

The synodic periods, X" , can be converted to sidereal or orbital periods, X* , by the formula,
(1) $E^*\cdot X''/(E^* + X'') = X^*$,
giving,
The sidereal period of Venus, A* = 224.7007 days
The sidereal period of Mercury, M* = 87.9686 days

THE MATHEMATICS:
The Fibonacci sequence, $F_{n+2} = F_{n+1} + F_n$, 1, 1, 2, 3, 5, 8, 13, 21, ... diverges to infinity
The ratios of terms 1, 2, 3/2, 5/3, 8/5, 13/8, . . . converge to $(1 + \sqrt{5})/2 = \Phi = 1.618034...$
The ratios of terms 1, 1/2, 2/3, 3/5, 5/8, 8/13, . . converge to $(1 - \sqrt{5})/2 = \phi = 0.618034...$

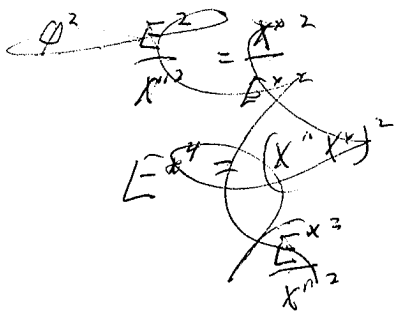
Φ is known variously as the "Golden Ratio", "Divine Proportion", or "extreme mean ratio"

Φ is also a solution to the equation,
(2) $a/b = b/(a+b)$,
Set $a/b = -x$, then $x^2 - x - 1 = 0$, with roots, $x = (1 + \sqrt{5})/2 = \Phi$ and $x = (1 - \sqrt{5})/2 = \phi$

THE HARMONIES:
Setting b = X" and a = E* in equation (2) gives, X" /(E* + X") = E*/X"
Comparing with equation (1) for sidereal periods, X" /(E* + X") = X*/ E*
we see X*/E* = E*/X" or,
(3) $(E^*)^2 = X^* \cdot X''$
That is, if Fibonacci ratios obtain between planetary sidereal periods, then the product of a planet's sidereal and synodic periods should equal the square of the earth's sidereal period.

only for Φ or Φ̄
but for Φ^2 = try $\left(\frac{X''}{E^* + X''}\right)^2$ etc
in powers
× f(Φ̄)

For example, let X be Venus,
A* x A" = 224.7007 x 583.9214 = 131207.54732
E* x E* = 365.2564 x 365.2564 = 133412.23774
(A* x A")/(E* x E*) = 0.983475 , not quite = 1.0000,
But we can say that the values are "98 % Fibonacci".



PROTOSUP2.WPD April 23, 2007

In general, $X'' = E^*X^*/(E^* - X^*)$, and $X^* = E^*X''/(E^* + X'')$

If $X^* = \phi^n E^*$, then $X'' = E^*/(\Phi^n - 1)$ or If $X^* = aE^*$, Then $X'' = aE^*/(1 - a)$

$E^* = \mathbf{365.2564}$

$A^* = \mathbf{224.7007}$	$A'' = \mathbf{583.9214}$
$(8/13)\ E^* = 224.7732$	$(8/5)\ E^* = 584.4102$
$\phi\ E^* = 225.7409$	$\Phi\ E^* = 590.9973$

$M^* = \mathbf{87.9686}$	$M'' = \mathbf{115.8775}$
$(5/8)^2\ (8/13)\ E^* = 87.8020$	$E^*a/(1-a) = 115.5876$
$\phi^3\ E^* = 86.2253$	$E^*/(\Phi^3 - 1) = 112.8612$

[In this case, $a = (5/8)^2\ (8/13) = 0.2403846$, then $a/(1-a) = 0.316456$]

From the above, we see that although ϕ and Φ are not so accurate as early Fibonacci ratios such as 5/8 and 8/13m there is an approximate golden ratio operating between the periods of the planets. To make the pattern more congruous to a Fibonacci sequence we insert a "proto-planet", P (for Proteus), between Venus and Mercury.

$P^* = \phi^2 E^* = 139.5155$ or $P^* = (5/13)E^* = 140.4832$

$P'' = E^*/\Phi = 225.7409$ or $P'' = (5/8)E^* = 228.2853$

[In the Φ case, the synodic period of Proteus is identical to the orbital period of Venus. But the square root of $A^*M^* = 140.5938$, which is closer to P^* of the **a** case.]

Two more proto-planets:

Hephaestus ϕ^4, and Vulcan ϕ^5

$H^* = 53.2902$, $V^* = 32.9352$

$H'' = 62.3933$, $V'' = 36.1992$

There are several symmetries in the sidereal and synodic periods of these five proto-planets:

Sidereal Periods (*)

EARTH	VENUS	PROTEUS	MERCURY	VULCAN
$E^* \phi^0$	$E^* \phi^1$	$E^* \phi^2$	$E^* \phi^3$	$E^* \phi^4$
365.2564	225.7409	139.5155	86.2253	53.2902
E	A [2]	P	M	V
	E - P	A – M	P – V	
	$\sqrt{(E \cdot P)}$	$\sqrt{(A \cdot M)}$	$\sqrt{(P \cdot V)}$	
	♀* + 1	$\sqrt{(E \cdot V)}$	☿* – 1	
		E – A		
		M + V		
		(E + V)/3		

$E/V = \Phi^4$ $A/M = \Phi^2$ $M/A = \phi^2$ $V/E = \phi^4$

Synodic Periods (^)

$E^* \cdot P^* = (E^* - P^*)^2$, $P^\wedge = E^* \cdot P^* / (E^* - P^*) = (E^* - P^*) = A^*$, $\therefore P^\wedge = A^*$

$P^* \cdot V^* = (P^* - V^*)^2$, $V^\wedge = P^* \cdot V^* / (P^* - V^*) = (P^* - V^*) = M^*$, $\therefore V^\wedge = M^*$

where $V^\wedge$ is the synodic period of Vulcan as observed from Proteus.

Since the synodic period of Proteus = the sidereal period of Venus , the Fibonacci sequence based on the Synodic period of Proteus is the same as the Fibonacci sequence of the sidereal periods of the five planets.

Approximately: $♀^\wedge = E^* \cdot \Phi$, $♀^* = E^* \cdot \phi$

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[2] To avoid V–confusion we restored Venus her proto–name, Aphrodite.

PROTOPS2.WPD April 15, 2007

THE HARMONICS OF THE SPHERES

FIBONACCI NUMBERS AND PROTO PLANETS

THE OBSERVATIONS:

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The synodic periods, X" , can be converted to sidereal or orbital periods, X* , by the formula,

(1.) $E^*\cdot X''/(E^* + X'') = X^*$, giving,

The sidereal period of the planet Venus, A* = 224.7007 days
The sidereal period of the planet Mercury, M* = 87.9686 days

THE MATHEMATICS:

The Fibonacci sequence, $F_{n+2} = F_{n+1} + F_n$, 1, 1, 2, 3, 5, 8, 13, 21, ... diverges to infinity
The ratios of terms 1, 2, 3/2, 5/3, 8/5, 13/8, . . . converge to $(1+\sqrt{5})/2 = \Phi = 1.618034...$
The ratios of terms 1, 1/2, 2/3, 3/5, 5/8, 8/13, . . . converge to $(1 - \sqrt{5})/2 = \phi = 0.618034$
Φ is known as the "Golden Ratio" or "Divine Proportion" and is also defined by the solution to the equation,

(2.) $a/b = b/(a+b)$, or $a^2 + a\cdot b - b^2 = 0$, set $a = -x$

$x^2 - b\cdot x - b^2 = 0$, $x = [b \pm \sqrt{(b^2 + 4\cdot b^2)}]/2 = (1 \pm \sqrt{5})/2$

THE HARMONIES:

Assume the equation for sidereal periods, (1), and the equation for Φ, (2), are both valid,
From (1) X" /(E* + X") = X*/ E* ; with a = E* and b = X" (2) becomes X" /(E* + X") = E*/X"
Hence, X*/E* = E*/X" or (3) $(E^*)^2 = X^* \cdot X''$
That is, if Fibonacci ratios obtain between planetary periods, then the product of a planet's sidereal and synodic periods should equal the earth's sidereal period squared.

For example, let X be Venus,
A* x A" = 224.7007 x 583.9214 = 131207.54732
E* x E* = 365.2564 x 365.2564 = 133412.23774
(A* x A")/(E* x E*) = 0.983475 , not quite = 1.0000,
But we can say that the values are "98 % Fibonacci".

Another example, let X be Mercury,
M* x M" = 87.9686 x 115.8775 = 10193.5814465
(E* x E*)/(M* x M") = 13.08787 ; 5 x Φ^2 = 13.09017
[(E* x E*)/(M* x M")] / 5 x Φ^2 = 0.99982, close to 100% Fib.

INERPLNTS.WPD April 12, 2007

SOME NUMERICAL CONSPIRACIES BY THE INNER PLANETS

The Fibonacci sequence, $F_{n+2} = F_{n+1} + F_n$; 1,1,2,3,5,8,13,21.....diverges, but the ratios of successive terms, 1, 2, 3/2, 5/3, 8/5, 13/8,.... converge to $\Phi = (1+\sqrt{5})/2$ and their reciprocals, 1/2, 2/3, 3/5, 5/8, 8/13,.... converge to $\phi = (1-\sqrt{5})/2$.

The earth's sidereal period $E^* = 365.2564$ days
$E^* \times 8/13 = 224.7732$, while the sidereal period of Venus = 224.7007 days
$E^* \times 8/5 = 584.4102$, while the synodic period of Venus = 583.9214 days
The sidereal period of Venus x 5/8 = 140.4379 days,
and 140.4379 x 5/8 = 87.7737, while the sidereal period of Mercury = 87.9686 days

These relations, though not accurate to the full precision of the observations, suggest that Fibonacci ratios, and ϕ or Φ, play a role in the relationships between the periods of the inner planets. This is especially evident when a quasi-planet, Proteus[1], is placed between Venus and Mercury, as shown in the following table:

TABLE I

SIDEREAL PERIODS (In earth days)

EARTH	VENUS	PROTEUS	MERCURY	VULCAN
$365.2564 \times \phi^0$	$365.2564 \times \phi^1$	$365.2564 \times \phi^2$	$365.2564 \times \phi^3$	$365.2564 \times \phi^4$
365.2564	225.7409	139.5155	86.2253	53.2902
365.2564	224.7007	139.5155	87.9686	53.2902

The shaded row in Table I gives the observed sidereal periods of Mercury, Venus, and Earth, and the Fibonacci values for Proteus and Vulcan. The third row of Table I gives the numerical values of the products of the second row.

The notion of a quasi-planet is not new. In the middle of the 19th century, the French astronomer Le Verrier, who had successfully predicted the existence and position of Neptune from perturbations in the orbit of Uranus, found some irregularities in the orbit of Mercury and predicted the existence of a planet "Vulcan" whose orbit lay between that of Mercury and the sun. Using several reported sightings of small black bodies passing across the disk of the sun, Le Verrier calculated that there existed a planet of small mass with an orbital period of 33 days. It was predicted that this planet would transit the sun on the 22 March 1877. The transit did not occur or was not observed, so Vulcan went into limbo. While, Le Verrier predicted Vulcan from perturbations, here we need Proteus and Vulcan to fill out the Fibonacci sequence in Table I.

[1] Proteus, named for the god who was adept at shape changing and predicting the future, seems an appropriate label for a planet that plays a predictive role but has somehow hidden itself from observation.

INERPLNTS.WPD April 12, 2007

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365.2564	225.7409	139.5155	86.2253	53.2902
365.2564	224.7007	139.5155	87.9686	53.2902

The shaded row in Table I gives the observed sidereal periods of Mercury, Venus, and Earth, and the Fibonacci values for Proteus and Vulcan. The third row of Table I gives the numerical values of the products of the second row.

The notion of a quasi-planet is not new. In the middle of the 19th century, the French astronomer Le Verrier, who had successfully predicted the existence and position of Neptune from perturbations in the orbit of Uranus, found some irregularities in the orbit of Mercury and predicted the existence of a planet "Vulcan" whose orbit lay between that of Mercury and the sun. Using several reported sightings of small black bodies passing across the disk of the sun, Le Verrier calculated that there existed a planet of small mass with an orbital period of 33 days. It was predicted that this planet would transit the sun on the 22 March 1877. The transit did not occur or was not observed, so Vulcan went into limbo. While, Le Verrier predicted Vulcan from perturbations, here we need Proteus and Vulcan to fill out the Fibonacci sequence in Table I.

[1] Proteus, named for the god who was adept at shape changing and predicting the future, seems an appropriate label for a planet that plays a predictive role but has somehow hidden itself from observation.

There are several symmetries in the sidereal and synodic periods of these five proto-planets:

Sidereal Periods (*)

EARTH	VENUS	PROTEUS	MERCURY	VULCAN
$E^* \phi^0$	$E^* \phi^1$	$E^* \phi^2$	$E^* \phi^3$	$E^* \phi^4$
365.2564	225.7409	139.5155	86.2253	53.2902
E	A [2]	P	M	V
	E - P	A - M	P - V	
	$\sqrt{(E \cdot P)}$	$\sqrt{(A \cdot M)}$	$\sqrt{(P \cdot V)}$	
	♀* + 1	$\sqrt{(E \cdot V)}$	☿* - 1	
		E - A		
		M + V		
		(E + V)/3		

$E/V = \Phi^4$ $A/M = \Phi^2$ $M/A = \phi^2$ $V/E = \phi^4$

Synodic Periods (^)

$E^* \cdot P^* = (E^* - P^*)^2$, $P^\wedge = E^* \cdot P^* / (E^* - P^*) = (E^* - P^*) = A^*$, $\therefore P^\wedge = A^*$

$P^* \cdot V^* = (P^* - V^*)^2$, $V^\wedge = P^* \cdot V^* / (P^* - V^*) = (P^* - V^*) = M^*$, $\therefore V^\wedge = M^*$

where $V^\wedge$ is the synodic period of Vulcan as observed from Proteus.

Since the synodic period of Proteus = the sidereal period of Venus , the Fibonacci sequence based on the Synodic period of Proteus is the same as the Fibonacci sequence of the sidereal periods of the five planets.

Approximately: ♀^ = E* · Φ ♀* = (E* · ϕ)

---

[2] To avoid V–confusion we restored Venus her proto–name, Aphrodite.

SYNODIC PERIODS

The synodic period of a planet may be defined as the period of time between alignments of the sun, earth, and planet. If all were in the same plane, an alignment would be when a straight line could be passed through all three. If E* and G* are the sidereal periods of the earth and a planet G, then the synodic period of G = G^ is given by the equation,

$$\frac{E^* G^*}{E^* - G^*} = G^{\wedge}$$

TABLE II
SYNODIC PERIODS (in Earth days)

ϕ =0.618033989	VENUS	PROTEUS	MERCURY	VULCAN
x ϕ^{-1}		365.2564		
SYNODIC	583.9214	225.7409	115.8775	62.39325
x ϕ	360.8833	139.5155	71.6162	38.5611
x ϕ^2	223.0381	86.2253	44.2613	23.8321
x ϕ^3	137.8452	53.2902	27.3550	
x ϕ^4	85.1930	33.9351		
x ϕ^5	52.6522			

In Table II the shaded row gives the synodic period for each planet in Earth days.
The columns are synodic Fibonacci sequences based on each planet's synodic period.

Let us next imagine we can travel to the other planets, both real and quasi, and determine what the synodic periods of other planets would be when observed from Venus, Proteus, Mercury, and Vulcan as we have already have done from Earth.. In Table III are listed the synodic periods as would be observed from the planet in the left column.

TABLE III (In Earth days)

	EARTH	VENUS	PROTEUS	MERCURY	VULCAN
EARTH	-	583.9206	225.7408	115.8763	62.3942
VENUS	583.9206	-	368.0126	144.5645	69.8589
PROTEUS	225.7408	368.0126	-	238.0935	86.2272
MERCURY	115.8763	144.5645	238.0935	-	135.1856
VULCAN	62.3942	69.8589	86.2272	135.1856	-

The sidereal periods: (in Earth days)

TABLE I

EARTH E*	VENUS A*	MERCURY M*
365.2564	224.7007	87.9686

While $A^* = 0.615186 \times E^*$, $M^* = (0.625693)^2 \times A^*$
or approximately,

$A^* = \phi \times E^*$, $M^* = \phi^2 \times A^*$

This suggests that if the Fibonacci sequence is to be without gaps, and harmony preserved, there should be another sphere (or proto-planet) located between Mercury and Venus. We might with some justification name this sphere, Proteus[1]. Harmonizing we have,

$P^* = \phi \times A^*$ and $M^* = \phi \times P^*$

But let us extend the sequence further and introduce, or rather re-introduce, another sphere or proto-planet Vulcan[2] , with $V^* = \phi \times M^*$.

We update Table I to Table II

TABLE II Sidereal periods in earth days

EARTH	VENUS	PROTEUS	MERCURY	VULCAN
$365.2564 \times \phi^0$	$365.2564 \times \phi^1$	$365.2564 \times \phi^2$	$365.2564 \times \phi^3$	$365.2564 \times \phi^4$
365.2564	225.7409	139.5155	86.2253	53.2902
365.2564	224.7007	139.5155	87.9686	53.2902

The values corresponding to the products in row 2 are given in row 3.
The shaded row gives the observed values of the sidereal periods of Earth, Venus, and Mercury, and the Fibonacci values for Proteus and Vulcan.

$\phi^5 E$
$= 32,935152$

---

[1] Proteus, the god who was adept at shape changing and predicting the future, seems an appropriate name for a sphere or proto–planet that plays a predictive role but has somehow hidden itself from observation.

Vulcan
Haephestus

[2] In the middle of the 19th century, the French astronomer Le Verrier, who had successfully predicted the existence and position of Neptune from perturbations in the orbit of Uranus, found some irregularities in the orbit of Mercury and predicted the existence of a planet "Vulcan" whose orbit lay between that of Mercury and the sun. Using several reported sightings of small black bodies passing across the disk of the sun, Le Verrier calculated that there existed a planet of small mass with an orbital period of 33 days. It was predicted that this planet would transit the sun on the 22 March 1877. The transit did not occur or was not observed, so Vulcan went into limbo. While, Le Verrier predicted Vulcan from perturbations, here we need Vulcan and Proteus to fill out the Fibonacci sequence and preserve the harmony of the spheres.

Equation (1) solved for X" becomes,

(4) $X" = X^*\cdot E^*/(E^* - X^*)$

By (4), The synodic period of Proteus = P" = 225.7408

and The synodic period of Vulcan = V" = 62.3933

TABLE III Periods in earth days

	EARTH	VENUS	PROTEUS	MERCURY	VULCAN
SYNODIC		583.9214	225.7408	115.8775	62.3933
SIDEREAL	365.2564	224.7007	139.5155	87.9686	53.2902

TABLE IV gives the synodic periods of each planet as seen from the planet in the left column.

TABLE IV Periods in earth days

	EARTH	VENUS	PROTEUS	MERCURY	VULCAN
EARTH	-	583.9214	225.7408	115.8775	62.3933
VENUS	583.9214	-	368.0126	144.5645	69.8577
PROTEUS	225.7408	368.0126	-	238.0955	86.2254
MERCURY	115.8775	144.5645	238.0955	-	135.1811
VULCAN	62.3933	69.8577	86.2254	135.1811	-

Proteus sees ⊕ synodic as A sidereal

A synodic as ⊕ "

M synodic "

V synodic as M sidereal

SYNODIC PERIODS

The synodic period of a planet may be defined as the period of time between alignments of the sun, earth, and planet. If all were in the same plane, an alignment would be when a straight line could be passed through all three. If E* and G* are the sidereal periods of the earth and a planet G, then the synodic period of G = G^ is given by the equation,

$$\frac{E^* G^*}{E^* - G^*} = G^{\wedge}$$

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x ϕ^4	85.1930	33.9351		
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In Table II the shaded row gives the synodic period for each planet in Earth days.
The columns are synodic Fibonacci sequences based on each planet's synodic period.

Let us next imagine we can travel to the other planets, both real and quasi, and determine what the synodic periods of other planets would be when observed from Venus, Proteus, Mercury, and Vulcan as we have already have done from Earth.. In Table III are listed the synodic periods as would be observed from the planet in the left column.

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MERCURY	115.8763	144.5645	238.0935	-	135.1856
VULCAN	62.3942	69.8589	86.2272	135.1856	-

In tabular form we have,

TABLE I Sidereal periods in Earth days

EARTH E*	VENUS A*	MERCURY M*
365.2564	224.7007	87.9686

We note $A^* = 0.615186 \times E^*$ and $M^* = (0.625693)^2 \times A^*$, or approximately,

$A^* = \phi \times E^*$ and $M^* = \phi^2 \times A^*$

This suggests that if the Fibonacci sequence is to be without gaps, and harmony preserved, there should be another sphere (or proto-planet) located between Mercury and Venus. We might with some justification name this sphere or planet, Proteus[1]. So, to " harmonize" we have,

$P^* = \phi \times A^*$ and $M^* = \phi \times P^*$

And while harmonizing, let us extend the sequence further and introduce, or rather re-introduce, another sphere or proto-planet, Vulcan[2] , with $V^* = \phi \times M^*$.

Table I updates to Table II

TABLE II Sidereal periods in earth days

EARTH	VENUS	PROTEUS	MERCURY	VULCAN
$365.2564 \times \phi^0$	$365.2564 \times \phi^1$	$365.2564 \times \phi^2$	$365.2564 \times \phi^3$	$365.2564 \times \phi^4$
365.2564	225.7409	139.5155	86.2253	53.2902
365.2564	224.7007	139.5155	87.9686	53.2902

The numerical values corresponding to the products in row 2 are given in row 3.
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---

[1] Proteus, the god who was adept at shape changing and predicting the future, seems an appropriate name for a sphere or proto–planet that plays a predictive role but has somehow succeeded in hiding itself from all observers.

[2] In the middle of the 19th century, the French astronomer Le Verrier, who had successfully predicted the existence and position of Neptune from perturbations in the orbit of Uranus, found some irregularities in the orbit of Mercury and predicted the existence of a planet "Vulcan" whose orbit lay between that of Mercury and the sun. Using several reported sightings of small black bodies passing across the disk of the sun, Le Verrier calculated that there existed a planet of small mass with an orbital period of 33 days. It was predicted that this planet would transit the sun on the 22 March 1877. The transit did not occur or was not observed, so Vulcan went into limbo. While, Le Verrier predicted Vulcan from perturbations, here the role of Vulcan and Proteus is to fill out a Fibonacci sequence and harmonize the spheres.

ENERGY

VARIENG1.WPD
~~CONEXIST.WPD~~

January 9, 2000

THE VARIETIES OF ENERGY

The Planck particle whose properties are defined by the basic physical constants, c, G, ħ, is the "stem cell" of the cosmos. Four basic energies associated with the Planck particle turn out to be identical:

The Hertz wave energy,	$H = \hbar\nu$	=	16.291442 ergs = ϵ_o
The Einstein kinetic energy,	$E = mc^2$	=	16.291442 ergs = ϵ_o
The Volta electric energy,	$V = e^2/\alpha R$	=	16.291442 ergs = ϵ_o
The Newton gravitational energy,	$N = Gm^2/R$	=	16.291442 ergs = ϵ_o
If all are assumed positive, their total is		=	65.165768 ergs = ϵ_o^4

A formula for the product HEVN, using the relation, $e^2 = \hbar\alpha c$, gives,

$$HEVN = \frac{GM^2}{R} * Mc^2 * \frac{\hbar c}{R} * \frac{e^2}{\alpha R} = \frac{GM^3}{R^3}\hbar^2 c^4$$

Using the definition of the Planck mass, $m_o = \sqrt{(\hbar c/G)}$, we may write,

$$HEVN = \left(\frac{GM}{R}\right)^3 m_o^4 c^2 = \left(\frac{GM}{c^2 R}\right)^3 m_o^4 c^8 = \left(\frac{GM}{c^2 R}\right)^3 \varepsilon_o^4$$

The quantity GM/c^2R is dimensionless and has the value of unity when N = E. Hence all bodies having N = E will have HEVN = ϵ_o^4 and will be located on the Schwartzschild boundary. In addition to the condition N = E which places a body on the Schwartzschild boundary, we note that if N = V (or N = H since V ≡ H) the mass of the body must be the Planck mass, $M = m_o$.

$$\frac{N}{V} = \frac{GM^2}{\hbar c} = \frac{M^2}{m_o^2}$$

And if E = V (or E = H), then $MR = m_o l_o = \hbar/c$, which places the body on the Heisenberg boundary.

$$\frac{E}{V} = \frac{Mc^2}{\hbar c / R} = \frac{MR}{m_o l_o}$$

And for a body on the Heisenberg boundary:

$$HEVN = \left(\frac{GM^2}{c\hbar}\right)^3 \varepsilon_o^4 = \left(\frac{M}{m_o}\right)^6 \varepsilon_o^4$$

In summary: For any body on the Schwartzschild boundary, HEVN = ϵ_o^4; For any body on the Heisenberg boundary, HEVN = $(M/m_o)^6\ \epsilon_o^4$. For the Planck particle, which fits both conditions, $M = m_o$ and HEVN = ϵ_o^4.

Conservation of energy requires that the energies of derivative or metamorphosed bodies be the same as those of the Planck particle. If all four energies are taken as positive, then the universe should also exhibit HEVN = ϵ_o^4. For the Hubble universe with mass $M = (\alpha\mu S)^{3/2}\ m_o$ and with radius $R = (\alpha\mu S)^{3/2}\ l_o$:

$H = \hbar c/R = -44.432991$ ergs
$E = M c^2 = +77.015877$ ergs
$V = e^2/\alpha R = -44.432991$ ergs
$N = GM^2/R = +77.015877$ ergs

whose total = 65.165772 = ϵ_o^4. This value precisely replicates that of the Planck particle indicating that energy is conserved.

Further, in the case of a neutron star with $M = Sm_o = 34.693681$ and $R = Sl_o = 6.564335$, the four energies are:

H = −23.064438 ergs
E = + 55.647322 ergs
V = −23.064438 ergs
N = + 55.647322 ergs
with a total = + 65.165770 = ϵ_o^4, again the same as the Planck particle.

For other standard stars:

For $M = (auS)m_o = 35.820757$ and $R = (auS)l_o = 7.691910$ the energies are:
H = V = −24.191513 ergs and
E = N = + 56.774399 ergs
with a total of + 65.165772 = ϵ_o^4

For $M = (S/\alpha\mu)m_o = 33.566607$ and $R = (S/\alpha\mu)l_o = 5.437261$ the energies are:
H = V = - 21.937364 ergs and
E = N = + 54.520249 ergs
with a total of + 65.165770 ergs = ϵ_o^4

In the above examples we see that two of the energies are negative and two positive. In the case of the Planck particle the four energies being equal suggests that if two were taken as negative the Planck energy would be equal to zero. If the Planck particle is indeed a "cosmic stem cell" initial zero energy would support the hypothesis of "creation ex nihilo". If we were to assign N as plus and E as minus and H as plus and V as minus, the Planck total energy would be zero and all of the above objects would also have a total energy of zero, still preserving energy conservation.

GEONRGY.WPD February 15, 1999

GEOMETRY ⟷ ENERGY

The basic equation of the general theory of relativity,

$$R_{ij} = 8\pi G\left(T_{ij} - \tfrac{1}{2} g_{ij} T\right)$$

where R_{ij} is the curvature tensor, T_{ij} is the stress-energy tensor, and g_{ij} is the metric tensor, states that the geometry (curvature and metric) and the dynamics (stress-energy) of a system determine one another. Or as J. A. Wheeler succinctly puts it:

Curvature tells matter how to move;
Matter tells space time how to curve.

This interaction between geometry and force-energy has been confirmed by many astronomical and physical observations. The equation has been applied mostly in attempts to describe the large scale structure and behavior of the universe, for which purpose it is assumed that the universe is both homogeneous and isotropic because of the great difficulty in solving the equations for more complex configurations. The implications of this equation have been revolutionary in both astronomy and physics, and currently generalizations are sought that will include all the known forces of physics. But in this essay a different kind of generalization is sought.

It is tautological to note that the dynamic capabilities of all systems, animate and inanimate, are both enabled and limited by their form or structure. Historically interactions between structure and behavior have long been recognized. Centuries ago Plato described a realm of archetypes or templates that manifest themselves as behavior or energy patterns in the material world. Einstein's equation marries the structure of space-time to the behavior of bodies in the material world. Plato's dichotomy is information (template or scenario) // form-behavior in the material world. Einstein's dichotomy is structure (information) of space-time // behavior of material objects. If the realm of archetypes is the equivalent of space-time then Plato and Einstein are conceptually in accord. However there may be an important difference. In the material world both energy and information (matter is energy plus information) are present. But what about space-time? Does it contain only information (geometry = pure information) or is space-time itself a species of energy? The equations put information into the curvature and metric tensors and energy into the stress tensor. Is this separation totally correct?

We note here that energy is proportional to frequency:

$$E = \hbar\nu$$

Hence we may consider space-time as space-ħ/energy. That is energy is implicitly contained in space-time. So called "empty" space, since it contains "free" energy, will necessarily expand. No cosmological constant is required.

If not only information but also energy is present in space-time then both the material world of physical things and the world of archetypes contain both information and energy. An archetype is then more than a template or scenario, it is a species of energy.

Let us redo Plato. Instead of a realm of pure information, let us hypothesize a realm of non material energy forms. That is energy plus information need not necessarily result in matter.

FREQUENCIES AND CYCLES

Deltas.wpd July 14, 2010

COSMIC MASSES

δ = 1.19463740625
16 δ = 19.114198500

universe	52.680191696	
meta cluster	51.48555428975	Down 1 δ
galaxy cluster	50.2909168835	2 δ
blue galaxy	47.901642071	4 δ
red galaxy	43.123092446	8 δ
star cluster	38.344542821	12 δ
star	33.565993196	16 δ
planet	24.008893946	24 δ
dark	14.451794696	32 δ
Planck	-4.662403804	48 δ
baryon	-23.776602304	64 δ

star	33.565993196	star cluster	38.344542821
	32.371355789		37.149905414
	31.176718383		35.955268008
	29.982080977		34.760630602
	28.787443571	star	33.565993196
	27.592806164		
	26.398168758		
	25.203531352		
planet	24.008893946		

THE THREE MAJOR GRIDS

The first grid is the M,L,T. grid
The second grid is the Planck grid consisting of c,G,h.
The third grid is the Dirac grid consisting of α,μ,S

Deltas.wpd July 14, 2010

$\delta = 1.19463740625$
$16\,\delta = 19.114198500$

universe	52.680191696	
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Planck	-4.662403804	48 δ
baryon	-23.776602304	64 δ

star	33.565993196		star cluster	38.344542821 O
	32.371355789			37.149905414 B
	31.176718383			35.955268008 A
	29.982080977	SATURN JUPITER		34.760630602 F
	28.787443571	URANUS, NEPstar		33.565993196 G
	27.592806164	VENUS, ED		
	26.398168758	MERCURY		
	25.203531352	MOON		
planet	24.008893946			

Galaxy

D

THE SUN:

Measured values: $M_\odot = 33.298685$ $R_\odot = 10.842303$

$M_\odot/R_\odot = 22.456832$ approximately $\cong \alpha^{-5}\,\mu^{-5}\,c^2/G = 22.493575$ $\delta = 0.036743$

$M_\odot\,R_\odot = 44.169181 =$ exactly $= S^2\,\alpha^{-9}\,\mu^{-5}\,\hbar/c = 44.169181$ $\delta = 0.000000$

Values computed from the preceding fundamental constant approximations:

Sun in reference to Planck particle:

$M_\odot = m_o\,S\,\alpha^{-7}\,\mu^{-5} = 33.331378$ δ(comp - meas) = 0.032693

$R_\odot = l_o\,S\,\alpha^{-2} = 10.837803$ δ(meas - comp) = 0.004500

$(M_\odot/R_\odot)/(m_o/l_o) = \alpha^{-5}\,\mu^{-5}$ $M_\odot\,R_\odot/m_o\,l_o = S^2\,\alpha^{-9}\,\mu^{-5}$

Sun in reference to standard star:

$M_\odot/M_\star = \alpha^{-6}\mu^{-4}$; $R_\odot/R_\star = \alpha^{-3}\mu^{-1}$;

$(M_\odot/R_\odot)/(M_\star/R_\star) = \alpha^{-3}\mu^{-3}$; $M_\odot R_\odot/M_\star/R_\star = \alpha^{-9}\mu^{-5}$

Sun in reference to baryon:

$M_\odot = m_p\,S^{3/2}\,\alpha^{-15/2}\,\mu^{-11/2}$; $R_\odot = r_e\,S^{1/2}\,\alpha^{-5/2}\,\mu^{-1/2}$

$(M_\odot/R_\odot)/(m_p/r_e) = S\,\alpha^{-5}\,\mu^{-5}$; $M_\odot\,R_\odot/m_p\,r_e = S^2\,\alpha^{-10}\,\mu^{-6}$

FORCE RATIOS:

The planck force $= X = c^4/G = 49.082587$

The coulomb force $= Q = \hbar c/r_e^2 = 8.600033$

Gravitation force $= N = G\,m_p^2/r_e^2 = -29.628371$

$Q/N = S/\alpha\mu = 38.228404$

$X/Q = \alpha\mu S = 40.482554$

$X/N = S^2 = 78.710956$

$XN/Q^2 = (\alpha\mu)^2 = 2.254148$

$S = \hbar\alpha c/Gm_pm_e = \alpha\mu\,(m_o/m_p)^2 = r_ec^2/m_pG = \alpha^{-23}\,\mu^{-3}$

$e^2 = \hbar\alpha c = -18.636938\ [ML^3/T^2]$; $m_e^2 = \hbar c/G$; $e^2/m_er_e = c^2$

{ $SG/c^3 = 0.749712 \sim 3/4\ [T/M]$ }

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Measured values: $M_\odot$ = 33.298685 $R_\odot$ = 10.842303

$M_\odot/R_\odot$ = 22.456832 approximately $\cong \alpha^{-5}\,\mu^{-5}\,c^2/G$ = 22.493575 δ = 0.036743

$M_\odot R_\odot$ = 44.169181 = exactly = $S^2\,\alpha^{-9}\,\mu^{-5}\,\hbar/c$ = 44.169181 δ = 0.000000

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$R_\odot = l_o\,S\,\alpha^{-2}$ = 10.837803 δ(meas - comp) = 0.004500

$(M_\odot/R_\odot)/(m_o/l_o) = \alpha^{-5}\,\mu^{-5}$ $M_\odot R_\odot/m_o l_o = S^2\,\alpha^{-9}\,\mu^{-5}$

Sun in reference to standard star:

$M_\odot/M_\star = \alpha^{-6}\mu^{-4}$; $R_\odot/R_\star = \alpha^{-3}\mu^{-1}$;

$(M_\odot/R_\odot)/(M_\star/R_\star) = \alpha^{-3}\mu^{-3}$; $M_\odot R_\odot/M_\star R_\star = \alpha^{-9}\mu^{-5}$

Sun in reference to baryon:

$M_\odot = m_p\,S^{3/2}\,\alpha^{-15/2}\,\mu^{-11/2}$; $R_\odot = r_e\,S^{1/2}\,\alpha^{-5/2}\,\mu^{-1/2}$

$(M_\odot/R_\odot)/(m_p/r_e) = S\,\alpha^{-5}\,\mu^{-5}$; $M_\odot R_\odot/m_p r_e = S^2\,\alpha^{-10}\,\mu^{-6}$ $x(\alpha\mu) = \frac{M_\odot R_\odot}{m_o l_o}$

$\approx S\,\frac{M_\odot/R_\odot}{m_o l_o}$

$M_\odot R_\odot = \frac{\hbar}{c}\,S^{5/2}\,\alpha^{5/2}\,\mu^{1/2}$

$= \frac{\hbar}{c}\,(\alpha^{-5}\mu^{-1})$ "

$\frac{M_\odot}{R_\odot} \approx \frac{c^2}{G}\,\alpha^{-5}\mu^{-5}$

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The coulomb force = Q = $\hbar c/r_e^2$ = 8.600033

These are at 8 level

repeat at other levels

Gravitation force = N = $G\,m_p^2/r_e^2$ = –29.628371

Q/N = $S/\alpha\mu$ = 38.228404 $\approx S/\alpha\mu$ $\frac{\hbar\alpha c}{r_e^2}$ = 6.463(199)

X/Q = $\alpha\mu S$ = 40.482554 $\approx \alpha\mu S$

X/N = S^2 = 78.710956 $\approx S^2$

XN/Q^2 = $(\alpha\mu)^2$ = 2.254148

$M_\odot = m_o\,\alpha^{-30}\,\mu^{-8}$

$R_\odot = l_o\,\alpha^{-28}\,\mu^{-3}$

$S = \hbar\alpha c/Gm_pm_e = \alpha\mu\,(m_o/m_p)^2 = r_ec^2/m_pG = \alpha^{-23}\,\mu^{-3} \approx \frac{m_o}{m_p}\cdot\frac{r_e}{l_o}$

$e^2 = \hbar\alpha c$ = –18.636938 [ML^3/T^2] ; $m_e^2 = \hbar c/G$; $e^2/m_er_e = c^2$

{ SG/c^3 = 0.749712 ~ 3/4 [T/M] } → curiosity [T/M] on

Sun in reference to P

EARTHCYC.WPD November 28, 2010

EARTH CYCLES

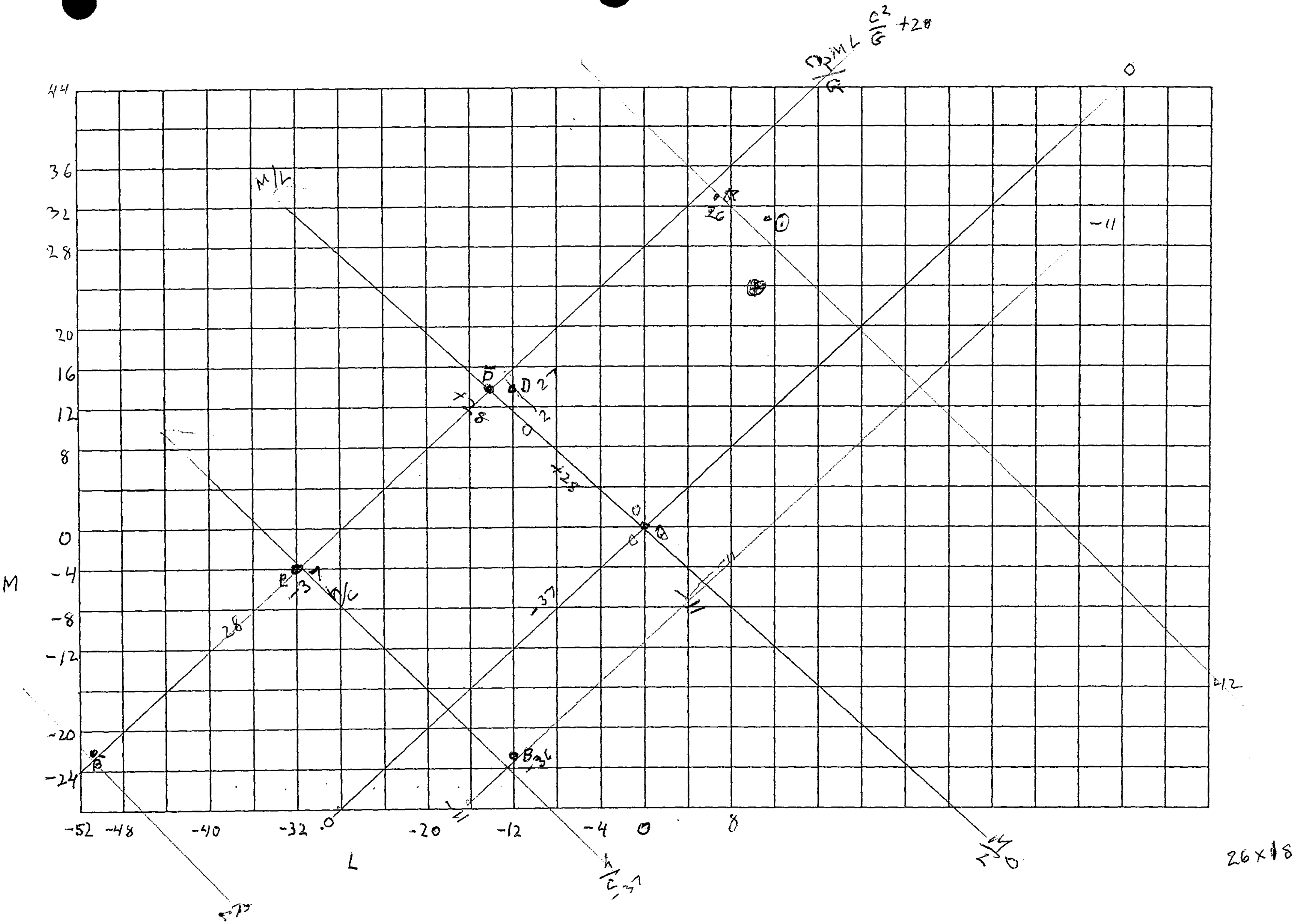
I. CYCLES > 1 YEAR

ORBITAL ECCENTRICITY CYCLE	93,408 ANOMOLYSTIC YEARS
OBLIQUITY OF THE ECLIPTIC 23° 27' 8.26"	40,032 YEAR INCLINATION CYCLE J. G. BENNETT?
PRECESSION OF EQUINOXES	25,725 YEAR CYCLE
ZERO CHECK CYCLE	4,668 YEARS (LAST LINE UP 1437)
4 PULSE	556 YEARS (LAST 1996)
SOTHIC CYCLE	1,461 YEARS
DIONYSIAN CYCLE	532 YEARS
METONIC CYCLE	235 LUNATIONS = 19 YEARS
SAROS	223 LUNATIONS = 18.03 YEARS = 6585.33 DAYS

Galactic Rotation 200 MY

APSIDES

1 KALPA ≈ 4,5 GYR



M
L
M/L
26 x 18

DIMENSIONAL MATRICES: INTRODUCTION

Dimensional matrices are an alternate approach to the relations that exist between the magnitudes of the fundamental constants of physics [initially c, G, and ħ] and the masses, sizes, and frequencies of material bodies ranging from sub-atomic particles to the universe itself. Traditionally the relations or linkages between physical bodies are organized around such concepts as force, action, energy, power, etc. Dimensional matrices show that in many cases relations may be viewed in different but equivalent ways. For example, equivalences between frequency resonance, energy conservation, and symmetries. The matrices also show that the richness of relations exceeds those commonly recognized or utilized.

The construction of a matrix starts with equation 1).

$$1) \qquad M^a L^b T^e c^x G^y \hbar^z = M^u L^v T^w$$

There are three sets of exponents each with three members:

The exponents **u, v, w**, in the right member are pre-assigned according to the dimensionality of the desired matrix. For example, to create a force-matrix, assign u=+1, v=+1, and w= –2; or to create a frequency matrix, assign u=0, v=0, and w = –1.

The exponents **a, b, e**, in the left member are coordinate exponents that assign coordinates to M, L, or M, T, or L,T depending on the designation of the dimensionality of the matrix.

The third set of exponents, **x, y, z**, are those derived for the fundamental constants. This set is a function of the input and coordinate exponents.

To determine the values of **x, y, z**, we rewrite equation 1) with the constants expressed in their dimensional form:

$$2) \qquad \mathbf{M^a L^b T^e} \cdot \left\{\frac{\mathbf{L}}{\mathbf{T}}\right\}^{\mathbf{x}} \cdot \left\{\frac{\mathbf{L^3}}{\mathbf{M \cdot T^2}}\right\}^{\mathbf{y}} \cdot \left\{\frac{\mathbf{M \cdot L^2}}{\mathbf{T}}\right\}^{\mathbf{z}} = \mathbf{M^u L^v T^w}$$

Arranging the exponents according to their parent parameter,

$$
\begin{aligned}
&M: \quad a - y + z = u \\
&L: \quad b + x + 3y + 2z = v \\
&T: \quad e - x - 2y - z = w
\end{aligned}
$$

Solving for x, y, and z,

$$
\begin{aligned}
2x &= u - 3v - 5w - a + 3b + 5e \\
2y &= -u + v + w + a - b - e \\
2z &= u + v + w - a - b - e
\end{aligned}
$$

may be required to cover , to possibilities. For example, a separate matrix, each covering the
numerical ranges of a and b, for different assigned value of e. In general, there can be six input arrangements:
a fixed, b and e variable a and b fixed, e variable
b fixed, a and e variable a and e fixed, b variable
e fixed, a and b variable b and e fixed, a variable
Selecting one of these six options, three "pre-matrices" are to be generated: a matrix for x in terms of, (for example), a and b with fixed e, and similar matrices for y and for z. From these three matrices the basic matrix is constructed, whose elements each have the assigned dimensionality (eg force, MR/T2) with specified ranges for a and b, (the exponents of M and R respectively), and for a specified value of eFinally, from a basic matrix, several numerical matrices can be developed using specific values for M and R. For example, In a floating M,R matrix with input T-' , inserting mp for M and re for R to obtain all frequencies related to a proton 1n addition, several types of "restricted" basic matrices may be constructed. For example, matrices in which constraints are placed on c, G or 'i, such as a matrix that displays all forces in which planck's constant plays no role [z=0].
Examples:
1: A Force Matrix

Rewriting equation 2) in logarithmic form,

4) aM + bR + eT + A(a, b, e) = uM + vR + wT

where the function A(a,b,e) is given by,

A(a,b,e) = 0.5[c(u - 3v - 5w - a + 3b + 5e) + +G(-u+v+w+a-b-e)+

+hi(u+v+w-a-b-e)]

For force, we set u = 1, v = 1, and w = -2., and initially setting e = 0, we have,

CL 4-6 R 4 0s (-) +c(_2 -)f (- -)j

Page -2-

TIMATRX0.WPD

November 30, 2009

TIME TABLE: T=T(G,M,L,ħ,c)

[T] = 1

M\L	–1	–0.5	0	+0.5	+1	+1.5	+2
+3							
+2.5							
+2							
+1.5							
+1 (11)	$\sqrt{G^3M^2h/L^2}$ c^9		GM/c³ (2)		$\sqrt{GM^2L^2/hc^3}$ (3)		
+0.5		$\sqrt{G^2Mh/Lc^7}$		$\sqrt{GML/c^4}$ 10		$\sqrt{ML^3/hc}$	
0	4 Gh/Lc⁴ (4)		$\sqrt{Gh/c^5}$ (5)		L/c (6)		$\sqrt{L^4c/Gh}$
-0.5		$\sqrt{Gh^2/MLc^6}$		$\sqrt{Lh/Mc^3}$		$\sqrt{L^3/GM}$ (12)	
-1 (7)	$\sqrt{Gh^3/M^2L^2}$ c^7		h/Mc² (8)		$\sqrt{L^2h/GM^2c^9}$		
-1.5							
-2							
-2.5							
-3							

FORCARAY.WPD November 30, 2009 June 29, 2010

FORCE ARRAY: F=F(M,L,G,ħ,c)

ħ

M\L	3	2	1	0	-1	-2	-3
-5							
-4							
-3	L^3c^{10}/G^4M^3		$Lc^7\,ħ/G^3M^3$		$c^4\,ħ^2/G^2M^3L$		$c\,ħ^3/GM^3L^3$
-2		L^2c^8/G^3M^2		$c^5\,ħ/G^2M^2$		$c^2\,ħ^2/GM^2L^2$	
-1	$L^3c^9/G^3M\,ħ$		Lc^6/G^2M		$c^3\,ħ/GML$		$ħ^2/ML^3$
0		$L^2c^7/G^2\,ħ$		c^4/G		$cħ/L^2$	
1	$ML^3c^8/G^2\,ħ^2$		$MLc^5/G\,ħ$		Mc^2/L		$GM\,ħ/L^3c$
2		$M^2L^2c^6/G\,ħ^2$		$M^2c^3/ħ$		GM^2/L^2	
3	$M^3L^3c^7/G\,ħ^3$		$M^3Lc^4/ħ^2$		$GM^3c/L\,ħ$		G^2M^3/L^3c^2
4		$M^4L^2c^5/ħ^3$		$GM^4c^2/ħ^2$		$G^2M^4/L^2c\,ħ$	
5	$M^5L^3c^6/\,ħ^4$		$GM^5Lc^3/ħ^3$		$G^2M^5/L\,ħ^2$		$G^3M^5/L^3c^3\,ħ$
6							
7							

FORC2 OBJECT log(cgs) FORCES

$G := -7.175296$ $c := 10.476821$ $h := -26.976924$

$S := 39.355471$ $\alpha := -2.136835$ $\mu := 3.263909$

$M := -23.776602$ $L := -12.550068$ BARYON

$F_1 := 3 \cdot L + 9 \cdot c - 3 \cdot G - M - h$ $F_1 = 128.920599$

$F_2 := L + 6 \cdot c - 2 \cdot G - M$ $F_2 = 88.438052$

$F_3 := 3 \cdot c + h - G - M - L$ $F_3 = 47.955505$

$F_4 := M + 3 \cdot L + 8 \cdot c - 2 \cdot G - 2 \cdot h$ $F_4 = 90.692202$

$F_5 := M + L + 5 \cdot c - G - h$ $F_5 = 50.209655$

$F_6 := M + 2 \cdot c - L$ $F_6 = 9.727108$

$F_7 := 3 \cdot M + 3 \cdot L + 7 \cdot c - G - 3 \cdot h$ $F_7 = 52.463805$

$F_8 := 3 \cdot M + L + 4 \cdot c - 2 \cdot h$ $F_8 = 11.981258$

$F_9 := G + 3 \cdot M + c - L - h$ $F_9 = -28.501289$

$F_{10} := 4 \cdot c - G$ $F_{10} = 49.08258$

$F_{11} := G + 2 \cdot M - 2 \cdot L$ $F_{11} = -29.628364$

FORC2 OBJECT log(cgs) FORCES

$G := -7.175296$ $c := 10.476821$ $h := -26.976924$

$S := 39.355471$ $\alpha := -2.136835$ $\mu := 3.263909$

$M := 52.680194$ $L := 27.932476$ UNIVERSE

$F_1 := 3 \cdot L + 9 \cdot c - 3 \cdot G - M - h$ $F_1 = 173.911435$

$F_2 := L + 6 \cdot c - 2 \cdot G - M$ $F_2 = 52.4638$

$F_3 := 3 \cdot c + h - G - M - L$ $F_3 = -68.983835$

$F_4 := M + 3 \cdot L + 8 \cdot c - 2 \cdot G - 2 \cdot h$ $F_4 = 288.59663$

$F_5 := M + L + 5 \cdot c - G - h$ $F_5 = 167.148995$

$F_6 := M + 2 \cdot c - L$ $F_6 = 45.70136$

$F_7 := 3 \cdot M + 3 \cdot L + 7 \cdot c - G - 3 \cdot h$ $F_7 = 403.281825$

$F_8 := 3 \cdot M + L + 4 \cdot c - 2 \cdot h$ $F_8 = 281.83419$

$F_9 := G + 3 \cdot M + c - L - h$ $F_9 = 160.386555$

$F_{10} := 4 \cdot c - G$ $F_{10} = 49.08258$

$F_{11} := G + 2 \cdot M - 2 \cdot L$ $F_{11} = 42.32014$

Change Name

ENERGIES

Results.wpd

December 3, 2010

Universe:

G := -7.175296 c := 10.476821 h := -26.976924

M := 52.680194 L := 27.932478

T = 17.455657 = L/c

1 E = -44.432581 = h/T

2 E = 70.252614 = GM^2/L

3 E = 73.633836 = Mc^2

4 E = 77.015056 = c^4L/G

5 E = -44.432581 = h/T

E planck = 16.291238

Δ = ~~25.820033~~ 114.685195 = $\left(\frac{S}{\alpha\mu}\right)^3$

Δ = 3.381222 = $(\alpha\mu)^3$

Δ = 3.381222 = $(\alpha\mu)^3$

Δ = 32.582475 / 2 = 16.291238 ; Δ = 121.447637 = $(\alpha\mu S)^3$

$E_1 + E_4 = (\alpha\mu S)^3 = 121.447637$

$E_4 - E_1 = \frac{hc^5}{G} = 32.582475 = E_2^2$

$E_2 - E_5 = 25.82033$

DIMENSIONALITIES
REPRESENTATIONS

Σ		FREE M	L	T	PLANCK VALUE log10 CGS	PLANCK c	G	ħ		Σ
0	c	0	1	-1	-4.662 404	1/2	-1/2	1/2	M	1/2
0	G	-1	3	-2	-32.791 341	-3/2	1/2	1/2	L	-1/2
0	ħ	1	2	-1	-43,268 162	-5/2	1/2	1/2	T	-3/2
2	cħ	1	3	-2	-16.500 103	1	0	1	(CHARGE)²	2
1	ENERGY	1	2	-2	+16.291 238	5/2	-1/2	1/2		5/2
0	POWER	1	2	-3	+59.559 399	5	-1	0		4
0	FORCE	1	1	-2	+49.082 578	4	-1	0		3
1	TIME	0	0	1	-43.268 162	-5/2	1/2	1/2		-3/2
2	ACTION	1	2	-1	-26.976 942	0	0	1		1
0	VELOCITY	0	1	-1	+10.476 821	1	0	0		1
-2	DENSITY	1	-3	0	+93.711 619	5	-2	-1		2
-1	ACCELERATION	0	1	-2	+53.744983	7/2	-1/2	-1/2		5/2
0	MOMENTUM	1	1	-1	9.814 417	4	-1	0		3
1	CHARGE	1/2	3/2	-1	-8.250052	1/2	0	1/2		1
0	CURRENT	1/2	3/2	-2	+35.018 110	3	-1/2	0		5/2
0	VOLTAGE	1/2	1/2	-1	+24.541 289	2	-1/2	0		3/2
0	RESISTANCE	0	-1	1	-10.476 821	-1	0	0		-1
1	MASS	1	0	0	10.476 821	1	0	0	C	1
1	LENGTH	0	1	0	-7.175 296	0	1	0	G	1
1	TIME	0	0	1	-26.976 924	0	0	1	ħ	1

GRAVITATIONAL FREQUENCIES

TIMATRX2.WPD 2003-01-18

TIME TABLE: T=T(G,M,R,ħ,c)

[T] = 1

M	0	0.5	+1	1.5	+2	+2.5	+3
+3	G^2M^3/hc^4		$\sqrt{G^3M^6R^2/h^3c^5}$		GM^3R^2/h^2c		$\sqrt{GM^6R^6c/h^5}$
+2.5		$\sqrt{G^3M^5R/h^2c^6}$		$\sqrt{G^2M^5R^3/h^3c^3}$		$\sqrt{GM^5R^5/h^4}$	
+2	$\sqrt{G^3M^4/hc^7}$		GM^2R/hc^2		$\sqrt{GM^4R^4/h^3c}$		M^2R^3c/h^2
+1.5		$\sqrt{G^2M^3R/hc^5}$		$\sqrt{GM^3R^3/h^2c^2}$		$\sqrt{M^3R^5c/h^3}$	
+1	$T = GM/c^3$ 10	Ω	$= \sqrt{GM^2R^2/hc^3}$ 3		$\varphi = MR^2/h$		$\sqrt{M^2R^6c^3/Gh^3}$
+1/2	Υ	$= \sqrt{GMR/c^4}$ 2		$\Phi = \sqrt{MR^3/hc}$ 6		$\sqrt{MR^5c^2/Gh^2}$ 8	
0	$t_o = \sqrt{Gh/c^5}$ 1		$t = R/c$ 4		$\sqrt{R^4c/Gh}$ 7		R^3c^2/Gh 9
-1/2		$\sqrt{Rh/Mc^3}$		$\tau = \sqrt{R^3/GM}$ 5		$\sqrt{R^5c^3/G^2Mh}$	
-1	$K = h/Mc^2$		$\sqrt{R^2h/GM^2c}$		R^2c/GM		$\sqrt{R^6c^5/G^3M^2h}$
-3/2		$\sqrt{Rh^2/GM^3c^2}$		$\sqrt{R^3hc/G^2M^3}$		$\sqrt{R^5c^4/G^3M^3}$	
-2	$\sqrt{h^3/GM^4c^3}$		$\zeta = Rh/GM^2$		$\sqrt{R^4hc^3/G^3M^4}$		R^3c^3/G^2M^2
-5/2		$\sqrt{Rh^3/G^2M^5c}$		$\sqrt{R^3h^2c^2/G^3M^5}$		$\sqrt{R^5hc^5/G^4M^5}$	
-3	h^2/GM^3c		$\sqrt{R^2h^3c/G^3M^6}$		R^2hc^2/G^2M^3		$\sqrt{R^6hc^7/G^5M^6}$

Notation: In the above table h is used for ħ, the Planck constant / 2π .

√ is for entire expression

TIMATRX3.WPD

2003-01-18

$T = T(M, L; G, \hbar, c)$

TIME TABLE: T=T(G,M,R,ħ,c)

[T] = 1

M\R	-3	-2.5	-2	-1.5	-1	-0.5	0
+3	$\sqrt{G^7M^6h/R^6c^{17}}$		G^3M^3/R^2c^7		$\sqrt{G^5M^6/R^2hc^{11}}$		G^2M^3/hc^4
+2.5		$\sqrt{G^6M^5h/R^5c^{15}}$		$\sqrt{G^5M^5/R^3c^{12}}$		$\sqrt{G^4M^5/Rhc^9}$	
+2	G^3M^2h/R^3c^8		$\sqrt{G^5M^4h/R^4c^{13}}$		$\hbar = G^2M^2/Rc^5$		$\sqrt{G^3M^4/hc^7}$
+1.5		$\sqrt{G^5M^3h^2/R^5c^{14}}$		$\sqrt{G^4M^3h/R^3c^{11}}$		$\sqrt{G^3M^3/Rc^8}$	
+1	$\sqrt{G^5M^2h^3/R^6c^{15}}$		G^2Mh/R^2c^6	$\omega = \sqrt{G^3M^2h/R^2c^9}$ (1)			$T = GM/c^3$
+1/2		$\sqrt{G^4Mh^3/R^5c^{13}}$	η	$= \sqrt{G^3Mh^2/R^3c^{10}}$		$\sqrt{G^2Mh/Rc^7}$	
0	G^2h^2/R^3c^7		$\sqrt{G^3h^3/R^4c^{11}}$		$Z = Gh/Rc^4$		$\sqrt{Gh/c^5}$
-1/2		$\sqrt{G^3h^4/MR^5c^{12}}$		$\sqrt{G^2h^3/MR^3c^9}$		$\sqrt{Gh^2/MRc^6}$	
-1	$\sqrt{G^3h^5/M^2R^6c^{13}}$		Gh^2/MR^2c^5		$\sqrt{Gh^3/M^2R^2c^7}$		$K = h/Mc^2$
-3/2		$\sqrt{G^2h^5/M^3R^5c^{11}}$		$\sqrt{Gh^4/M^3R^3c^8}$		$\sqrt{h^3/M^3Rc^5}$	
-2	$Gh^3/M^2R^3c^6$		$\sqrt{Gh^5/M^4R^4c^9}$		h^2/M^2Rc^3		$\sqrt{h^3/GM^4c^3}$
-5/2		$\sqrt{Gh^6/M^5R^5c^{10}}$		$\sqrt{h^5/M^5R^3c^7}$		$\sqrt{h^4/GM^5Rc^4}$	
-3	$\sqrt{Gh^7/M^6R^6c^{11}}$		$h^3/M^3R^2c^4$		$\sqrt{h^5/GM^6R^2c^5}$		h^2/GM^3c

Notation: In the above table h is used for ħ, the Planck constant / 2π .

In the tables, L should have been used instead of R

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

FREQUENCY TABLE

SUN

c g s

		0		1		2		3	
									3
-10.409758									2
		-5.274388				81.983908			1
					41.172445				
-86.897314		-43.268166		0.360982	22.175556	43.990130		87.619278	0 M
					3.178667				
		-81.261944				5.996532			-1
-162.88487			-75.626574						-2
									-3
									-4
-1		0		1		2		3	

R

DIMENET1.WPD December 3, 2010

M-L DIMENSIONALITY TABLE _____ = f(G,c,ħ,M,L)

M \ L	–1	–1/2	0	1/2	1	3/2	2
3							
5/2							
2							
3/2							
1							
1/2							
0							
–1/2							
–1							
–3/2							
–2							
–5/2							
–3							

THE GRAVITATIONAL CONSTANT

UNITG.WPD November 23, 2006

A NEW VALUE FOR Newton's Constant, G
All values are $\log_{10}$(cgs)

Present values: m_p = mass of proton = -23.776602, m_o = planck mass = - 4.662199

$m_p/m_o = -19.114403$

However, $\alpha^{12}\cdot\mu^2 = -19.114202$ [= also $(\alpha\mu/S)^{1/2}$]

where α = the fine structure constant, -2.136835 and μ = proton/electron mass ratio = 3.263909

α, μ, and m_p have been determined to six or more places, while m_o, involving G, is less accurate.

Assume the value for $m_p/m_o = \alpha^{12}\cdot\mu^2 = -19.114202$, rather than the current = –19.114403

then 1) $m_o = m_p\,\alpha^{-12}\cdot\mu^{-2} = (\hbar c/G)^{1/2}$,

where $\hbar$ is planck's constant = –26.976924 and c is the velocity of light = 10.476821

Solving equation 1) for G:

2) $G = \hbar c\cdot\alpha^{24}\cdot\mu^4/m_p^2 =$ **–7.175303**

as against the current value, G = –7.175705, δ = 0.000402

VALUES FOR PHYSICAL PARAMETERS INVOLVING THE NEW **G**:

planck mass	$m_o = (\hbar c/G)^{1/2}$	**–4.662400**	[M]
planck length	$l_o = (G\hbar/c^3)^{1/2}$	**–32.791345**	[L]
planck time	$t_o = (G\hbar/c^5)^{1/2}$	**–43.268166**	[T]
heisenberg bound	$\hbar/c = m_o\cdot l_o$	**–37.453745**	[ML]
schwarzschild bound	$c^2/G = m_o/l_o$	**28.128945**	[M/L]
	c^3/G	**38.605766**	[M/T]
planck force	c^4/G	**49.082587**	[ML/T^2]
planck power	c^5/G	**59.559408**	[ML^2/T^3]
planck energy	$\epsilon_o = (\hbar c^5/G)^{1/2}$	**16.291242**	[ML^2/T^2]
planck density	$\rho_o = m_o/l_o^3$	**93.711635**	[M/L^3]
electron radius	r_e	**–12.550068**	[L]
electron mass	m_e	**–27.040511**	[M]
proton mass	m_p	**–23.776602**	[M]

NEWNUMB.WPD March 26, 2007

Values 2002 [American Scientist]			Log_{10}(cgs)
Fine structure constant	α	7.297 352 533 10^{-3}	-2.136 834 6726
Proton–electron mass ratio	μ	1836.152 667 5	3.263 908 7879
Planck's constant	$\hbar$	1.054 571 596 10^{-34} Js	-26.976 923 9302
Velocity of light	c	299 792 458 km/s	10.476 820 7029
Proton mass	m_p	1.672 621 58 10^{-27} kg	-23.776 602 3043
Electron radius	r_e	2.817 940 285 10^{-15} m	-12.550 068 2143
Compton wave length	λ_c	386.159 2642 10^{-15} m	-10.413 233 5417
Bohr radius	a_o	0.529 177 2083 10^{-10} m	-8.276 398 8691

A revised value for G:

The current value for the Planck mass is $m_o = -4.662\ 199$
Using the above value for m_p, $m_p/m_o = -19.114\ 403$
$\alpha^{12}\mu^2 = -19.114\ 198\ 4954$ and $m_p/(\alpha^{12}\mu^2) = -4.662\ 403\ 8089$
Assume this last value is the correct value of m_o, then since $m_o = \checkmark(\hbar c/G)$,
$G = \hbar c/m_o^2 = -7.175\ 295\ 6095$ vs the current value $G = -7.175\ 705$

The revised value of $G = -7.175\ 296$ leads to the following values:

planck mass	$m_o = (\hbar c/G)^{1/2}$	=	–4.662 403 8089
planck length	$l_o = (G\hbar/c^3)^{1/2}$	=	–32.791 340 8242
planck time	$t_o = (G\hbar/c^5)^{1/2}$	=	–43.268 161 5271
planck force	$f_o = c^4/G$	=	49.082 578 4211
planck power	$p_o = c^5/G = \hbar/t_o^2$	=	59.559 399 1240
planck energy	$\epsilon_o = (\hbar c^5/G)^{1/2}$	=	16.291 237 5969
planck density	$\rho_o = m_o/l_o^3$	=	93.711 618 6637
	$\alpha\mu$	=	1.127 074 1153
force ratio	$S = \alpha\mu(m_o/m_p)^2$	=	39.355 471 4061

D

UNITS

DIMENSIONLESS CONSTANTS

All values $\log_{10}$

$(S/\alpha\mu)^{-1/2}$ = **–19.114202** = $m_p/m_o = \alpha^{12}\,\mu^2$

$(S/\alpha\mu)^{1/2}$ **19.114202**

$(S/\alpha\mu)$ **38.228404**

$(S/\alpha\mu)^{3/2}$ **57.342606**

$S^{1/2}$ **19.677739**

S = **39.355478** = $r_e m_o/m_p l_o = \alpha^{-23}\,\mu^{-3} = \alpha\mu(m_o/m_p)^2 = (\alpha\mu)^{-1}\,(r_e/l_o)^2$

$S^{3/2}$ **59.033217**

S^2 **78.710956**

S^3 **118.066434**

$(\alpha\mu S)^{1/2}$ = **20.241276** = $r_e/l_o = \alpha^{-11}\,\mu^{-1}$

$(\alpha\mu S)$ **40.482552**

$(\alpha\mu S)^{3/2}$ **60.723828**

$(\alpha\mu)^{1/2}$	**0.563537**	$\alpha^{1/2}$	**–1.068417**	$\mu^{1/2}$	**1.631954**
$(\alpha\mu)$	**1.127074**	α	**–2.136835**	μ	**3.263909**
$(\alpha\mu)^{3/2}$	**1.690611**	$\alpha^{3/2}$	**–3.205253**	$\mu^{3/2}$	**4.895864**
$(\alpha\mu)^2$	**2.254148**	α^2	**–4.273670**	μ^2	**6.527818**
$(\alpha\mu)^3$	**3.381222**	α^3	**–6.410505**	μ^3	**9,791727**

$\pi = 0.497150$; $2\pi = 0.798180$; $4\pi/3 = 0.662089$; $4\pi^2 = 1.596360$; $e = 0.434294$

NOT IN Note book 2007

rev

NEWNUMB.WPD March 26, 2007 Rev, September 22, 2007

A NUMERICALLY DERIVED VALUE FOR NEWTON'S CONSTANT G

The following SI values of physical constants are taken from PHYSICS TODAY, August 2002

		mkgs values	$\log_{10}$(cgs) values
Fine structure constant	α	7.297 352 533 10^{-3}	-2.136 834 672 6
Proton–electron mass ratio	μ	1836.152 667 5	3.263 908 787 9
Planck's constant	$\hbar$	1.054 571 596 10^{-34} Js	-26.976 923 930 2
Velocity of light	c	299 792 458 km/s	10.476 820 702 9
Proton mass	m_p	1.672 621 58 10^{-27} kg	-23.776 602 304 3
Electron radius	r_e	2.817 940 285 10^{-15} m	-12.550 068 214 3
Newton's constant	G	6.673 10^{-11} $m^3 kg^{-1} s^{-2}$	-7.175 679
Planck mass	m_o	2.1767 10^{-8} kg	-4.662 201
Planck length	l_o	1.6160 10^{-35} m	-32.791 559
Planck time	t_0	5.3906 10^{-44} s	-43.268 363
Elec/Gravity force ratio	S	2.269 300 10^{39}	39.355892

The first six constants, α, μ, $\hbar$, c, m_p, r_e have been measured to nine significant figures., but G only to four. Since the Planck values of mass, length, etc and S depend on G, their values are good only to four significant figures..

Using the above logarithmic values we obtain the quantities:

$\alpha\mu = 1.127\ 074\ 116$; $m_o/m_p = 19.114\ 401$; $r_e/l_o = 20.241\ 491$

All these values are dimensionless.

The ratio, $m_p r_e/m_o l_o = 1.127\ 090$, is consistent to four decimal places with $\alpha\mu$. This suggests that the difference may due to the current value of G.

Calculating powers of α and μ, we find:

$\alpha^{-12}\mu^{-2} = 19.114\ 198\ 500$ and $\alpha^{-11}\mu^{-1} = 20.241\ 272\ 615$,

Assuming $m_o/m_p = \alpha^{-12}\mu^{-2}$ and using the above value of m_p, m_o becomes $-4.662\ 403\ 804$

Since $m_o = \sqrt{(\hbar c/G)}$ and $G = \hbar c/m_o^2$, using the above $\hbar$ and c gives $G = -7.175\ 295\ 619$

Assuming $r_e/l_o = \alpha^{11}\mu^{1}$ and using the above value of r_e, l_o becomes $-32.791\ 340\ 829$

Since $l_o = \sqrt{(G\hbar/c^3)}$ and $G = c^3 l_o^2/\hbar$, we again obtain $G = -7.175\ 295\ 619$

Not in Note book 2007

NEWNUMB2.WPD September 25, 2007

A NEW VALUE FOR NEWTON'S CONSTANT G

Most of the fundamental constants of physics have been measured to six or more significant figures. Newton's constant, G, and other constants whose values depend on G have been an exception. Current values of basic constants are displayed in Table I:

TABLE I

The following SI values of physical constants are taken from PHYSICS TODAY, August 2002

		mkgs values	$\log_{10}$(cgs) values
Fine structure constant	α	7.297 352 533 10^{-3}	-2.136 834 673
Proton–electron mass ratio	μ	1836.152 667 5	3.263 908 788
Product	$\alpha\mu$		1.127 074 116
Planck's constant	$\hbar$	1.054 571 596 10^{-34} Js	-26.976 923 930
Velocity of light	c	299 792 458 km/s	10.476 820 703
Proton mass	m_p	1.672 621 58 10^{-27} kg	-23.776 602 304
Electron radius	r_e	2.817 940 285 10^{-15} m	-12.550 068 214
Newton's constant	G	6.673 10^{-11} $m^3 kg^{-1} s^{-2}$	-7.175 7
Planck mass	m_o	2.1767 10^{-8} kg	-4.662 2
Planck length	l_o	1.6160 10^{-35} m	-32.791 6
Planck time	t_0	5.3906 10^{-44} s	-43.268 4
Elec/Gravity force ratio	S	2.269 300 10^{39}	39.355 9

The first six constants, α, μ, $\hbar$, c, m_p, r_e have been measured to nine decimal places, but G only to four. Since S and the Planck values of mass, length, etc depend on G, their values are also only good to four places.

Using the logarithmic values from Table I, we can derive the dimensionless quantities:

$m_o/m_p = 19.114\,4$; $r_e/l_o = 20.241\,5$, $m_p r_e/m_o l_o = 1.127\,1$

Note that the ratio $m_p r_e/m_o l_o = 1.1271$ fits the value of $\alpha\mu$ to four decimal places. This suggests that the other ratios may also be functions of α and μ.

Calculating powers of α and μ, we find:

$\alpha^{-12}\,\mu^{-2} = 19.114\,198\,500$ and $\alpha^{-11}\,\mu^{-1} = 20.241\,272\,615$,

Assuming $m_o/m_p = \alpha^{-12}\,\mu^{-2} = 19.114\,198\,500$ and using the table value for m_p, m_o becomes $-4.662\,403\,804$; and since $m_o = \sqrt{(\hbar c/G)}$ and $G = \hbar c/m_o^2$, using the table values for $\hbar$ and c, $G = -7.175\,295\,619$

Assuming $r_e/l_o = \alpha^{11}\,\mu^{1} = 20.241\,272\,615$ and using the table value for r_e, l_o becomes $-32.791\,340\,829$; and since $l_o = \sqrt{(G\hbar/c^3)}$ and $G = c^3\,l_o^2/\hbar$, we again obtain $G = -7.175\,295\,619$

S, the ratio of coulomb to gravitational force is defined as $S = \hbar\alpha c/Gm_p m_e = \alpha\mu\hbar c/Gm_p^2$; using the new value of G, $S = 39.355\,471\,115 = \alpha^{-23}\mu^{-3}$.

TABLE II

NEW VALUES DERIVED USING **G = −7.175 295 619** [all $\log_{10}$(cgs)]

Planck mass	m_o	$= (\hbar c/G)^{1/2}$	−4.662 403 804
Planck length	l_o	$= (G\hbar/c^3)^{1/2}$	−32.791 340 829
Planck time	t_o	$= (G\hbar/c^5)^{1/2}$	−43.268 161 532
Planck energy	$m_o l_o^2/t_o^2$	$= (\hbar c^5/G)^{1/2}$	16.291 237 602
Planck density	m_o/l_o^3	$= c^5/\hbar G^2$	93.711 618 683
Schwarzschild bound	m_o/l_o	$= c^2/G$	28.128 937 025
Planck mass/time	m_o/t_o	$= c^3/G$	38.605 757 728
Planck force	$m_o l_o/t_o^2$	$= c^4/G$	49.082 578 431
Planck power	$m_o l_o^2/t_o^3$	$= c^5/G$	59.559 399 134

Physics Today 2002

Measured $G = 6.673(10) \times 10^{-11}$

$\log_{10}{}_{cgs} G = -7.175(6789)$

Calculated $-7.175\ 295\ 619$

NEWG.WPD November 23, 2006 July 4, 2008

A MORE ACCURATE VALUE FOR NEWTON'S CONSTANT: G

CONSISTENT

While several basic physical quantities have been measured to accuracies better than eight places, Newton's gravitational constant, G, has yet to be measured to better than five places. This in turn has limited the accuracy of all constants involving G, such as the Planck mass, $m_o = \sqrt{(\hbar c/G)}$ and the Planck length, $l_o = \sqrt{(G\hbar/c^3)}$.

The present values of relevant constants are taken from [Physics Today 2002 pp BG6 – BG13]
The $\log_{10}$(cgs) values of the constants are given in TABLE I

TABLE I

fine structure constant	α =	-2.136 834 673
proton mass	m_p =	-23.776 602 304
electron mass	m_e =	–27.040 511 092
proton/electron mass ratio	μ =	3.263 908 788
electron radius	r_e =	-12.550 068 214
velocity of light	c =	10.476 820 703
Planck's constant	$\hbar$ =	-26.976 923 930
and		
Newton's constant	G =	-7.175 7
Planck mass	m_o =	-4.662 2
Planck length	l_o =	-32.791 6

Using the values from TABLE I,

r_e/l_o = 20.2415 $\quad$ $m_p r_e/m_o l_o$ = 1.127 1

m_o/m_p = 19.114 4 $\quad$ $\alpha\mu$ = 1.127 074 115

The equality between the first five places of $m_p r_e/m_o l_o$ and $\alpha\mu$ suggests that the quantities are indeed equal, and that the other ratios may also be functions of α and μ.
Calculating powers of α and μ, we find that $\alpha^{-12}\,\mu^{-2} = 19.114\,198\,500$
Comparing and assuming m_o/m_p = 19.114 198 500 and using the value of m_p from TABLE I, m_o becomes = -4.662 403 804 But $m_o = \sqrt{(\hbar c/G)}$, or $G = \hbar c/m_o^2$
Using the values of $\hbar$ and c from TABLE I,

G becomes = -7.175 295 619

Calculating powers of α and μ, we find that $\alpha^{-11}\,\mu^{-1} = 20.241\,272\,615$
Similarly, assuming r_e/l_o = 20.241 272 615 and using the value of r_e from TABLE I, l_o becomes = -32.791 340 829, But $l_o = \sqrt{(G\hbar/c^3)}$, or $G = c^3 l_o^2/\hbar$,
Using the values of $\hbar$ and c from TABLE I, again

G becomes = -7.175 295 619

Summarizing:

Newton's constant	G =	-7.175 295 619
Planck mass	m_o =	-4.662 403 804
Planck length	l_o =	-32.791 340 829

and the coulomb/gravity ratio at the nucleon level, $S = \hbar\alpha c/Gm_p m_e$ becomes,

S = +39.355 471 115 = $\alpha^{-23}\,\mu^{-3}$

$5 + \sqrt{15} = 8.872983346$

$(5 + \sqrt{15})^2 = 78.729633 46$

$\frac{(5+\sqrt{15})^2}{2} = 39.364916 73$

$5 - \sqrt{15} = 1.127016 654$

"S" $= 39.364\ 916\ 730$

"α_M" $= 1.127\ 016\ 654$

"$\frac{\alpha_M}{\sqrt{S}}$" $= -38.237\ 900\ 080$

$\log_{10}(c_{95})$

$\hbar = -26.976\ 923\ 930$

$c = +10.476\ 820\ 703$

$m_p = -23.773\ 602\ 304$

$\frac{\hbar c}{m_p^2} = 31,053\ 101\ 370$

"$\frac{\alpha_M}{\sqrt{S}}$" $\cdot \frac{\hbar c}{m_p^2} = -7.184\ 798\ 797$

$= "G"$

$G = "\frac{\alpha_M}{\sqrt{S}}" \frac{\hbar c}{m_p^2}$

$\alpha_M = 1.127\ 074\ 115$

$S = 39.355\ 471\ 115$

$\frac{\alpha_M}{S} = -38.228\ 397\ 000$

$\frac{\alpha_M}{S} \frac{\hbar c}{m_p^2} = -7.175\ 295\ 63 = G$

AVAILABLE."

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#9

NEWG.WPD November 23, 2006 July 4, 2008

A CONSISTENT VALUE FOR NEWTON'S CONSTANT: G

Several basic physical quantities have been determined to accuracies better than eight places, but Newton's gravitational constant, G, has yet to be determined with certainty to more than four places. This in turn has limited the accuracy of other constants involving G, such as the Planck mass, $m_o = \sqrt{(\hbar c/G)}$ and the Planck length, $l_o = \sqrt{(G\hbar/c^3)}$. Herewith is presented a "consistency process" for determining G, m_o, l_o, etc to more significant places:

The present values of relevant constants are taken from [Physics Today 2002 pp BG6 – BG13]
The $\log_{10}$(cgs) values of the constants are given in TABLE I

TABLE I

fine structure constant	α =	−2.136 834 673	[0]
proton mass	m_p =	−23.776 602 304	[M]
electron mass	m_e =	−27.040 511 092	[M]
proton/electron mass ratio	μ =	3.263 908 788	[0]
electron radius	r_e =	−12.550 068 214	[L]
velocity of light	c =	10.476 820 703	[L/T]
Planck's constant	$\hbar$ =	-26.976 923 930	[ML^2/T]
Newton's constant	G =	−7.175 7	[L^3/MT^2]
Planck mass	m_o =	−4.662 2	[M]
Planck length	l_o =	−32.791 6	[L]

Using the values from TABLE I,

~~$r_e/l_o = 20.2415$ [0]~~ and $m_p r_e/m_o l_o$ = 1.127 1 [0]

~~$m_o/m_p = 19.114\,4$ [0]~~ $\alpha\mu$ = 1.127 074 115 [0]

The equality between the first five places of $m_p r_e/m_o l_o$ and $\alpha\mu$ suggests that the quantities are indeed equal, and that the other ratios may also be functions of α and μ.

Again for Table I $m_o/l_o \simeq 19.114\,4$,

Calculating powers of α and μ, we find that $\alpha^{-12}\,\mu^{-2} = 19.114\,198\,500$

Comparing and assuming m_o/m_p = 19.114 198 500 and using the value of m_p from TABLE I, m_o becomes = −4.662 403 804 But $m_o = \sqrt{(\hbar c/G)}$, hence $G = \hbar c/m_o^2$

Using the values of $\hbar$ and c from TABLE I,

G becomes = −7.175 295 619

Again calculating powers of α and μ, we find that $\alpha^{-11}\,\mu^{-1} = 20.241\,272\,615$

Similarly, assuming r_e/l_o = 20.241 272 615 and using the value of r_e from TABLE I, l_o becomes = −32.791 340 829, But $l_o = \sqrt{(G\hbar/c^3)}$, hence $G = c^3 l_o^2/\hbar$,

Using the values of $\hbar$ and c from TABLE I, again

G becomes = −7.175 295 619

Summarizing: The $\log_{10}$(cgs) values become:

Newton's constant	G =	−7.175 295 619
Planck mass	m_o =	−4.662 403 804
Planck length	l_o =	−32.791 340 829

The coulomb/gravity force ratio at the baryon level, $S = \hbar\alpha c/Gm_p m_e$ = + 39.355 471 115 [0]

$\simeq \alpha^{-23}\mu^{-3}$

GOOGLE2006.WPD May 18, 2009

G from Planck values (see scrap #)	$\log_{10}$(cgs)
$G = 6.678\ 891\ 387 \times 10^{-8}$	$-7.175\ 295\ 619$

GOOGLE VALUES 2006

$G_1 = 6.674\ 28 \times 10^{-8}$	$-7.175\ 60$	
		$-7.174\ 99$
$G_2 = 6.693 \times 10^{-8}$	$-7.174\ 38$	
$h = 6.626\ 068\ 96 \times 10^{-27}$	$-26.178\ 744\ 048$	
$\hbar = 1.054\ 571\ 636 \times 10^{-27}$	$-26.976\ 923\ 914$	
$c = 299\ 792\ 458$ m/s	$10.476\ 820\ 703$	
$m_p = 1.672\ 621\ 637 \times 10^{-24}$	$-23.776\ 602\ 289$	
$m_e = 9.109\ 382\ 15 \times 10^{-28}$	$-27.040\ 511\ 078$	
$\mu = 1836.\ 152\ 672\ 47$	$3.263\ 908\ 789$	
$r_e = 2.817\ 940\ 92 \times 10^{-13}$	$-12.550\ 068\ 116$	
$\alpha = 0.007\ 297\ 357$	$-2.136\ 834\ 407$	
$\alpha\mu = 13.399\ 061\ 547$	$1.127\ 074\ 382$	
$N_A = 6.022\ 141\ 79 \times 10^{23}$	$23.779\ 750\ 977$	

$N_A + m_p = 0.003\ 148\ 688$

NEWGR2.WPD November 23, 2006 August 31, 2009 September 29, 2010

A CONSISTENT VALUE FOR NEWTON'S CONSTANT: G

Several basic physical quantities have been determined to accuracies better than eight places, but Newton's gravitational constant, G, has yet to be determined with certainty to more than five places. This in turn has limited the accuracy of those other constants involving G, such as the Planck mass, $m_{,,} = /(hc/G)$ and the Planck length, $1_0 = /(Gh/c^3)$.

Here is presented a "consistency process" for determining G, m_0,1_0, etc to more places: The present values of relevant constants are taken from CODATA 2006 The $\log_{10}$(cgs) values of those constants are given in TABLE I

TABLE I

fine structure constant	a = -2.136834672	[0]
proton mass	Hip= -23.776602289	[M]
electron mass	m_e= -27.040511078	[M]
proton/electron mass ratio	p, = 3.263908789	[0]
electron radius	r_e = -12.550068213	[L]
velocity of light	c = 10.476820703	[L/T]
Planck's constant	h = -26.976923917	[ML^2/T]
and		
Newton's constant	G = -7.1756	[L^3/MT^2
Planck mass	$m_{,}$ = -4.662 2	[M]
Planck length	1_0 = -32.7916	[L]

Using the values from TABLE I,

=19.1143 [0] rA = 20.2414 [0]

= 1.1271 [0] *a\i* = 1.127074115 [0]

The equality between the first four places of *mjjmj^* and *a.\i* suggests that the quantities are possibly equal, and that the other ratios may also be functions of a and ji.

Calculating powers of a and *\i,* we find that $a^{12}\ i^2 = 19.114\ 198\ 500$

Comparing and assuming *mjm^* = 19.114 198 500 and using the value of $m_{,,}$ from TABLE I, m_0 becomes = -4.662 403 789 But $m_{,,} = V"(hc/G)$, or $G = hc/m_{,,}^2$

Using the values of h and c from TABLE I,

G becomes = -7.175295636

Again calculating powers of a and *\i,* we find that $a^{\sim II}\ i^{\sim\prime} = 20.241\ 272\ 615$ Similarly, assuming rA ~ 20.241 272615 and using the value of r_e from TABLE I, 1_0 becomes = -32.791340828, But $1_0 = /(Gh/c^3)$, or $G = c^3$ LjVh, Using the values of h and c from TABLE I,

G becomes = -7.175295630

Summarizing: The $\log_{10}$(cgs) values become:

Newton's constant	G =	-7.175295633
Planck mass	m_0 =	-4.662403789
Planck length	1_0 =	-32.791340828

The coulomb/gravity force ratio at the baryon level, S= $hac/Gmpm_e$=+39.355 471 115 [0]

Re do

NEWG.WPD November 23, 2006 August 31, 2009

A CONSISTENT VALUE FOR NEWTON'S CONSTANT: G

Several basic physical quantities have been determined to accuracies better than eight places, but Newton's gravitational constant, G, has yet to be determined with certainty to more than five places. This in turn has limited the accuracy of those other constants involving G, such as the Planck mass, m,, = /(hc/G) and the Planck length, 1_0 = /(Gh/c^3).

Here is presented a "consistency process" for determining G, m_0,1_0, etc to more places: The present values of relevant constants are taken from CODATA 2006 <u>The $\log_m$(cgs) values of those constants are given in TABLE I</u>

TABLE I

fine structure constant	a =	-2.136834672	[0]
proton mass	Hip=	-23.776602289	[M]
electron mass	m_e=	-27.040511078	[M]
proton/electron mass ratio	p, =	3.263908789	[0]
electron radius	r_e =	-12.550068213	[L]
velocity of light	c =	10.476820703	[L/T]
Planck's constant	h =	-26.976923917	[ML^2/T]
and			
Newton's constant	G =	-7.1756	[L^3/MT^2
Planck mass	m, =	-4.662 2	[M]
Planck length	1_0 =	-32.7916	[L]

Using the values from TABLE I,

m_0/m_p=19.1143 [0] r_e/l_0 = 20.2414 [0]

$m_p r_e/m_0 l_0$ = 1.1271 [0] a\i = 1.127074115 [0]

The equality between the first four places of mjm^ and a.\i suggests that the quantities are possibly equal, and that the other ratios may also be functions of a and ji.

Calculating powers of a and \i, we find that a^{12} $\backslash i^2$ = 19.114 198 500

Comparing and assuming mjm^= 19.114 198 500 and using the value of m,, from TABLE I, m_0 becomes = -4.662 403 789 But m,, = V"(hc/G), or G = hc/m,,^{2}

Using the values of h and c from TABLE I,

G becomes = -7.175295636

Again calculating powers of a and \i, we find that a~^{II} \i~' = 20.241 272 615 Similarly, assuming rA ~ 20.241 272615 and using the value of r_e from TABLE I, 1_0 becomes = -32.791340828, But 1_0 = /(Gh/c^3), or G = c^3 LjVh, Using the values of h and c from TABLE I,

G becomes = -7.175295630

Summarizing: The $\log_{,0}$(cgs) values become:

Newton's constant	G =	-7.175295633
Planck mass	m_0 =	-4.662403789
Planck length	1_0 =	-32.791340828

The coulomb/gravity force ratio at the baryon level, S= hac/$Gmpm_e$=+39.355 471 115 [0]

NEWG.WPD November 23, 2006 July 4, 2008 June 3, 2011

A CONSISTENCY VALUE FOR NEWTON'S CONSTANT: G

Several basic physical quantities have been determined to accuracies better than eight places, but Newton's gravitational constant, G, has yet to be determined with certainty to more than four places. This in turn has limited the accuracy of other constants involving G, such as the Planck mass, $m_o = \sqrt{(\hbar c/G)}$ and the Planck length, $l_o = \sqrt{(G\hbar/c^3)}$. Herewith is presented a "consistency assumption" for determining G, m_o, l_o, etc to more significant places:

The present values of relevant constants are taken from [Physics Today 2002 pp BG6 – BG13]
The $\log_{10}$(cgs) values of the constants are given in TABLE I

TABLE I

fine structure constant	α =	-2.136 834 673	[0]
proton mass	m_p =	-23.776 602 304	[M]
electron mass	m_e =	–27.040 511 092	[M]
proton/electron mass ratio	μ =	3.263 908 788	[0]
electron radius	r_e =	-12.550 068 214	[L]
velocity of light	c =	10.476 820 703	[L/T]
Planck's constant	$\hbar$ =	-26.976 923 930	[ML^2/T]
and			
Newton's constant	G =	-7.175 7	[L^3/MT^2
Planck mass	m_o =	-4.662 2	[M]
Planck length	l_o =	-32.791 6	[L]

Using the values from TABLE I,

$m_p r_e/m_o l_o$ = 1.127 1 [0] m_o/m_p = 19.114 4 [0]

$\alpha\mu$ = 1.127 074 115 [0] r_e/l_o = 20.241 5 [0]

The equality between the first five places of $m_p r_e/m_o l_o$ and $\alpha\mu$ suggests that the quantities are possibly equal, and that the other ratios may also be functions of α and μ.

Calculating powers of α and μ, we find that $\alpha^{-12}\,\mu^{-2} = 19.114\,198\,500$
Comparing and assuming m_o/m_p = 19.114 198 500 and using the value of m_p from TABLE I, m_o becomes = -4.662 403 804 But $m_o = \sqrt{(\hbar c/G)}$, hence $G = \hbar c/m_o^2$
Using the values of $\hbar$ and c from TABLE I, G becomes = -7.175 295 619

Again calculating powers of α and μ, we find that $\alpha^{-11}\,\mu^{-1} = 20.241\,272\,615$
Similarly, assuming r_e/l_o = 20.241 272 615 and using the value of r_e from TABLE I, l_o becomes = -32.791 340 829, But $l_o = \sqrt{(G\hbar/c^3)}$, hence $G = c^3\, l_o^2/\hbar$,
Using the values of $\hbar$ and c from TABLE I, again G becomes = -7.175 295 619

Summarizing: The $\log_{10}$(cgs) values become:

Newton's constant	G =	-7.175 295 619	[L^3/MT^2]
Planck mass	m_o =	-4.662 403 804	[M]
Planck length	l_o =	-32.791 340 829	[L]
Planck time	$t_o = l_o/c$ =	–43.268 161 532	.[T]

Dirac's Number, the coulomb/gravity force ratio at the baryon level,

$S = \hbar\alpha c/Gm_p m_e$ = + 39.355 471 115 [0]

AGGREGATES AND PARTICLES

METVAL.WPD

September 28, 2007November 2, 2007 February 18, 2008 June 13, 2008

METRIC NUMERICAL VALUES

ALL VALUES ARE LOG_{10}(cgs)

FUNDAMENTAL CONSTANTS:

NEWTON'S CONSTANT	G =	−7.175 295 619	$[L^3/MT^2]$
PLANCK'S CONSTANT	$\hbar$ =	−26.976 923 930	$[ML^2/T]$
VELOCITY OF LIGHT	c =	10.476 820 703	[L/T]
PROTON MASS/ELECTRON MASS	μ =	3.263 908 788	[0]
FINE STRUCTURE CONSTANT	α =	−2.136 834 673	[0]
COULOMB/GRAVITY FORCE RATIO	S =	39.355 471 115	[0]
	$\alpha\mu$ =	1.127 074 115	[0]

PLANCK VALUES:

PLANCK MASS	$m_o = \sqrt{c\hbar/G}$ =	−4.662 403 804	[M]	
PLANCK LENGTH	$l_o = \sqrt{G\hbar/c^3}$ =	−32.791 340 829	[L]	
PLANCK TIME	$t_o = \sqrt{G\hbar/c^5}$ =	−43.268 161 532	[T]	
	c/G =	17.652 116 322	$[MT/L^2]$	
SCHWARTZSCHILD BOUND	c^2/G =	28.128 937 025	[M/L]	m_o/l_o
TIME FACTOR	c^3/G =	38.605 757 728	[M/T]	
PLANCK FORCE	c^4/G =	49.082 578 431	$[ML/T^2]$	
PLANCK POWER	c^5/G =	59.559 399 134	$[ML^2/T^3]$	
PLANCK ENERGY	$\sqrt{\hbar c^5/G}$ =	16.291 237 602	$[ML^2/T^2]$	
"	$\sqrt{\hbar c^5/G}$ =	$m_oc^2 = Gm_o^2/l_o = \hbar/t_o$	$[ML^2/T^2]$	
PLANCK DENSITY	$c^5/\hbar G^2$ =	93.711 618 683	$[M/L^3]$	
[PLANCK CHARGE]^2	$\hbar c$ =	−16.500 103 227	$[ML^3/T^2]$	
$m_o \cdot l_o$	$\hbar/c$ =	−37.453 744 633	[ML]	
$m_o \cdot t_o$	$\hbar/c^2$ =	−47.930 565 336	[MT]	

BARYON VALUES:

PROTON MASS	m_p =	−23.776 602 304	[M]	
NEUTRON MASS	m_n =	−23.776 004 075	[M]	
ELECTRON MASS	m_e =	−27.040 511 092	[M]	
ELECTRON RADIUS	r_e =	−12.550 068 214	[L]	
ELECTRON FREQUENCY	c/r_e =	+23.026 888 917	[1/T]	
[ELECTRON CHARGE]^2	$\hbar\alpha c$ =	−18.636 937 900	$[ML^3/T^2]$	e^2

1 dyne = 10^{-5} Newtons

1 Joule = 10^{7} ergs

1 e.v. = 1.60×10^{-12} ergs = = -11.179585 ergs

1 Watt = 1 Joule/sec = ~~$-11.17958\ 5\%$~~

$m_p = -80.951\ 897\ 923$

TEMPLATE VALUES

$S^{1/2}$	=	19.677 735 557		$(\alpha\mu)^{1/2}$	= 0.563 537 057
S	=	39.355 471 115	= $\alpha^{-23}\mu^{-3}$	$(\alpha\mu)$	= 1.127 074 115
$S^{3/2}$	=	59.033 206 671		$(\alpha\mu)^{3/2}$	= 1.690 611 171
S^{2}	=	78.710 942 230	= $\alpha^{-46}\mu^{-6}$	$(\alpha\mu)^{2}$	= 2.254 148 230
$S^{5/2}$	=	98.388 677 785		$(\alpha\mu)^{5/2}$	= 2.817 685 288
S^{3}	=	118.066 413 342	= $\alpha^{-69}\mu^{-9}$	$(\alpha\mu)^{3}$	= 3.381 222 342
$S^{7/2}$	=	137.744 148 899		$(\alpha\mu)^{7/2}$	= 3.944 759 403
S^{4}	=	157.421 884 456	= $\alpha^{-92}\mu^{-12}$	$(\alpha\mu)^{4}$	= 4.508 296 460
$S^{9/2}$	=	177.099 620 013		$(\alpha\mu)^{9/2}$	= 5.071 833 518
S^{5}	=	196.777 355 570	= $\alpha^{-115}\mu^{-15}$	$(\alpha\mu)^{5}$	= 5.635 370 575
$S^{11/2}$	=	216.455 091 127		$(\alpha\mu)^{11/2}$	= 6.198 907 633
S^{6}	=	236.132 826 684	= $\alpha^{-138}\mu^{-18}$	$(\alpha\mu)^{6}$	= 6.762 444 690
$S^{13/2}$	=	255.810 562 241		$(\alpha\mu)^{13/2}$	= 7.325 981 741
S^{7}	=	275.488 297 798	= $\alpha^{-161}\mu^{-21}$	$(\alpha\mu)^{7}$	= 7.889 518 798
$S^{15/2}$	=	295.166 033 355		$(\alpha\mu)^{15/2}$	= 8.453 055 855
S^{8}	=	314.843 768 912	= $\alpha^{-184}\mu^{-24}$	$(\alpha\mu)^{8}$	= 9.016 592 912

$(S/\alpha\mu)^{1/4}$	= 9.557 099 250	= $\alpha^{-6}\mu^{-1}$	$(\alpha\mu S)^{1/4}$	= 10.120 636 308	= $\alpha^{-11/2}\mu^{-1/2}$
$(S/\alpha\mu)^{1/2}$	= 19.114 198 500	= $\alpha^{-12}\mu^{-2}$	$(\alpha\mu S)^{1/2}$	= 20.241 272 615	= $\alpha^{-11}\mu^{-1}$
$(S/\alpha\mu)$	= 38.228 397 000	= $\alpha^{-24}\mu^{-4}$	$(\alpha\mu S)$	= 40.482 545 230	= $\alpha^{-22}\mu^{-2}$
$(S/\alpha\mu)^{3/2}$	= 57.342 595 500	= $\alpha^{-36}\mu^{-6}$	$(\alpha\mu S)^{3/2}$	= 60.723 817 845	= $\alpha^{-33}\mu^{-3}$
$(S/\alpha\mu)^{2}$	= 76.456 794 000	= $\alpha^{-48}\mu^{-8}$	$(\alpha\mu S)^{2}$	= 80.965 090 460	= $\alpha^{-44}\mu^{-4}$
$(S/\alpha\mu)^{5/2}$	= 95.570 992 500	= $\alpha^{-60}\mu^{-10}$	$(\alpha\mu S)^{5/2}$	= 101.206 363 075	= $\alpha^{-55}\mu^{-5}$
$(S/\alpha\mu)^{3}$	= 114.685 191 000	= $\alpha^{-72}\mu^{-12}$	$(\alpha\mu S)^{3}$	= 121.447 635 690	= $\alpha^{-66}\mu^{-6}$
$(S/\alpha\mu)^{7/2}$	= 133.799 389 500	= $\alpha^{-84}\mu^{-14}$	$(\alpha\mu S)^{7/2}$	= 141.688 908 305	= $\alpha^{-77}\mu^{-7}$
$(S/\alpha\mu)^{4}$	= 152.913 588 000	= $\alpha^{-96}\mu^{-16}$	$(\alpha\mu S)^{4}$	= 161.930 180 920	= $\alpha^{-88}\mu^{-8}$
$(S/\alpha\mu)^{9/2}$	= 172.027 786 500	= $\alpha^{-108}\mu^{-18}$	$(\alpha\mu S)^{9/2}$	= 182.171 453 535	= $\alpha^{-99}\mu^{-9}$
$(S/\alpha\mu)^{5}$	= 191.141 985 000	= $\alpha^{-120}\mu^{-20}$	$(\alpha\mu S)^{5}$	= 202.412 726 15	= $\alpha^{-110}\mu^{-10}$
$(S/\alpha\mu)^{11/2}$	= 210.256 183 500	= $\alpha^{-132}\mu^{-22}$	$(\alpha\mu S)^{11/2}$	= 222.653 998 765	= $\alpha^{-121}\mu^{-11}$
$(S/\alpha\mu)^{6}$	= 229.370 382 000	= $\alpha^{-144}\mu^{-24}$	$(\alpha\mu S)^{6}$	= 242.895 271 38	= $\alpha^{-132}\mu^{-12}$

$\frac{C^7}{G^2\hbar} = 114.665261$

$\alpha^{1/2}$	= −1.068 417 336	$\mu^{1/2}$	= 1.631 954 394	$(\alpha/\mu)^{1/2}$	= −2.700 371 731
α	= −2.136 834 673	μ	= 3.263 908 788	(α/μ)	= −5.400 743 462
$\alpha^{3/2}$	= −3.205 252 008	$\mu^{3/2}$	= 4.895 863 182	$(\alpha/\mu)^{3/2}$	= −8.101 115 193
α^{2}	= −4.273 669 346	μ^{2}	= 6.527 817 576	$(\alpha/\mu)^{2}$	= −10.801 486 924
$\alpha^{5/2}$	= −5.342 086 680	$\mu^{5/2}$	= 8.159 771 970	$(\alpha/\mu)^{5/2}$	= −13.501 858655
α^{3}	= −6.410 504 016	μ^{3}	= 9.791 726 364	$(\alpha/\mu)^{3}$	= −16.202 230 386
$\alpha^{7/2}$	= −7.478 921 352	$\mu^{7/2}$	= 11.423 680 758	$(\alpha/\mu)^{7/2}$	= −18.902 602 117
α^{4}	= −8.547 338 688	μ^{4}	= 13.055 635 152	$(\alpha/\mu)^{4}$	= −21.602 973 848
$\alpha^{9/2}$	= −9.615 756 024	$\mu^{9/2}$	= 14.687 589 546	$(\alpha/\mu)^{9/2}$	= −24.303 345 579
α^{5}	= −10.684 173 36	μ^{5}	= 16.319 543 940	$(\alpha/\mu)^{5}$	= −27.003 717 310
$\alpha^{11/2}$	= −11.752 590 696	$\mu^{11/2}$	= 17.951 498 334	$(\alpha/\mu)^{11/2}$	= −29.704 089 041
α^{6}	= −12.821 008 032	μ^{6}	= 19.583 452 728	$(\alpha/\mu)^{6}$	= −32.404 460 772
$\alpha^{13/2}$	= −13.889 425 368	$\mu^{13/2}$	= 21.215 407 122	$(\alpha/\mu)^{13/2}$	= −35.104 832 503
α^{7}	= −14.957 842 704	μ^{7}	= 22.847 361 516	$(\alpha/\mu)^{7}$	= −37.805 204 234
$\alpha^{15/2}$	= −16.026 260 004	$\mu^{15/2}$	= 24.479 315 910	$(\alpha/\mu)^{15/2}$	= −40.505 575 965
α^{8}	= −17.094 677 376	μ^{8}	= 26.111 270 304	$(\alpha/\mu)^{8}$	= −43.205 947 696

POWERS AND ROOTS:

c	10.476 820 703	l_o	−32.791 340 829	r_e	−12.550 068 214
c^2	20.953 641 406	l_o^2	−65.582 681 658	r_e^2	−25.100 136 428
c^3	31.430 462 109	l_o^3	−98.374 022 487	r_e^3	−37.650 204 642
c^4	41.907 282 812	l_o^4	−131.165 363 316.	r_e^4	−50.200 272 856
c^5	52.384 103 515	l_o^5	−163.956 704 145	r_e^5	−62.750 341 070
c^6	62.860 924 218	l_o^6	−196.748 044 974	r_e^6	−75.300 409 284
c^7	73.337 744 921	l_o^7	−229.539 385 803	r_e^7	−87.850 477 498
c^8	83.814 565 624	l_o^8	−262.330 726 632	r_e^8	−100.400 545 712
c^9	94.291 386 327	l_o^9	−295.122 067 461	r_e^9	−112.950 613 926
c^{10}	104.768 207 03	l_o^{10}	−327.913 408 29	r_e^{10}	−125.500 682 14

fermi	r_e	= −12.550 068 214	$\hbar\alpha/m_e c$	[L]
compton wave length	λ_c	= −10.413 233 541	$\hbar/m_e c$	[L]
bohr radius	a_o	= −8.276 398 868	$\hbar/m_e c\alpha$	[L]
rydberg *	r_∞^{-1}	= −6.139 564 195	$\hbar/m_e c\alpha^2$	[L]

Each of the above lengths differ by α.

*The Rydberg constant $R_\infty = m_e c\,\alpha^2/4\pi\hbar = 5.040\,354\,331$ $[L^{-1}]$.

The above quantity $r_\infty^{-1} = \hbar/m_e c\alpha^2$. (i.e.no 4π) [L]

TIME TABLE: T=T(G,M,R,ħ,c)

[T] = 1

M	0	0.5	+1	1.5	+2	+2.5	+3
+3	G^2M^3/hc^4		$\sqrt{G^3M^6R^2/h^3c^5}$		GM^3R^2/h^2c		$\sqrt{GM^6R^6c/h^5}$
+2.5		$\sqrt{G^3M^5R/h^2c^6}$		$\sqrt{G^2M^5R^3/h^3c^3}$		$\sqrt{GM^5R^5/h^4}$	
+2	$\sqrt{G^3M^4/hc^7}$		GM^2R/hc^2		$\sqrt{GM^4R^4/h^3c}$		M^2R^3c/h^2
+1.5		$\sqrt{G^2M^3R/hc^5}$		$\sqrt{GM^3R^3/h^2c^2}$		$\sqrt{M^3R^5c/h^3}$	
+1	GM/c^3		$\sqrt{GM^2R^2/hc^3}$		MR^2/h		$\sqrt{M^2R^6c^3/Gh^3}$
+1/2		$\sqrt{GMR/c^4}$		$\sqrt{MR^3/hc}$		$\sqrt{MR^5c^2/Gh^2}$	
0	$\sqrt{Gh/c^5}$	$(G\hbar R^2/c^7)^{1/4}$	R/c	$(R^6/cG\hbar)^{1/4}$	$\sqrt{R^4c/Gh}$		R^3c^2/Gh
-1/2		$\sqrt{Rh/Mc^3}$		$\sqrt{R^3/GM}$		$\sqrt{R^5c^3/G^2Mh}$	
-1	h/Mc^2		$\sqrt{R^2h/GM^2c}$		R^2c/GM		$\sqrt{R^6c^5/G^3M^2h}$
-3/2		$\sqrt{Rh^2/GM^3c^2}$		$\sqrt{R^3hc/G^2M^3}$		$\sqrt{R^5c^4/G^3M^3}$	
-2	$\sqrt{h^3/GM^4c^3}$		Rh/GM^2		$\sqrt{R^4hc^3/G^3M^4}$		R^3c^3/G^2M^2
-5/2		$\sqrt{Rh^3/G^2M^5c}$		$\sqrt{R^3h^2c^2/G^3M^5}$		$\sqrt{R^5hc^5/G^4M^5}$	
-3	h^2/GM^3c		$\sqrt{R^2h^3c/G^3M^6}$		R^2hc^2/G^2M^3		$\sqrt{R^6hc^7/G^5M^6}$

Notation: In the above table h is used for ħ, the Planck constant / 2π .

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TIME TABLE: T=T(G,M,R,ħ,c)

[T] = 1

M	-3	-2.5	-2	-1.5	-1	-0.5	0
+3	$\sqrt{G^7M^6h/R^6c^{17}}$		G^3M^3/R^2c^7		$\sqrt{G^5M^6/R^2hc^{11}}$		G^2M^3/hc^4
+2.5		$\sqrt{G^6M^5h/R^5c^{15}}$		$\sqrt{G^5M^5/R^3c^{12}}$		$\sqrt{G^4M^5/Rhc^9}$	
+2	G^3M^2h/R^3c^8		$\sqrt{G^5M^4h/R^4c^{13}}$		G^2M^2/Rc^5 8		$\sqrt{G^3M^4/hc^7}$
+1.5		$\sqrt{G^5M^3h^2/R^5c^{14}}$		$\sqrt{G^4M^3h/R^3c^{11}}$		$\sqrt{G^3M^3/Rc^8}$ 27	
+1	$\sqrt{G^5M^2h^3/R^6c^{15}}$		G^2Mh/R^2c^6		$\sqrt{G^3M^2h/R^2c^9}$		GM/c^3
+1/2		$\sqrt{G^4Mh^3/R^5c^{13}}$		$\sqrt{G^3Mh^2/R^3c^{10}}$		$\sqrt{G^2Mh/Rc^7}$	
0	G^2h^2/R^3c^7		$\sqrt{G^3h^3/R^4c^{11}}$		Gh/Rc^4 9	$\sqrt[24]{G^3\hbar^3/R^2c^{13}}$	$\sqrt{Gh/c^5}$
-1/2		$\sqrt{G^3h^4/MR^5c^{12}}$		$\sqrt{G^2h^3/MR^3c^9}$		$\sqrt{Gh^2/MRc^6}$	
-1	$\sqrt{G^3h^5/M^2R^6c^{13}}$		Gh^2/MR^2c^5		$\sqrt{Gh^3/M^2R^2c^7}$ 17		h/Mc^2
-3/2		$\sqrt{G^2h^5/M^3R^5c^{11}}$		$\sqrt{Gh^4/M^3R^3c^8}$		$\sqrt{h^3/M^3Rc^5}$	
-2	$Gh^3/M^2R^3c^6$		$\sqrt{Gh^5/M^4R^4c^9}$		h^2/M^2Rc^3 11		$\sqrt{h^3/GM^4c^3}$
-5/2		$\sqrt{Gh^6/M^5R^5c^{10}}$		$\sqrt{h^5/M^5R^3c^7}$		$\sqrt{h^4/GM^5Rc^4}$	
-3	$\sqrt{Gh^7/M^6R^6c^{11}}$		$h^3/M^3R^2c^4$		$\sqrt{h^5/GM^6R^2c^5}$		h^2/GM^3c

Notation: In the above table h is used for ħ, the Planck constant / 2π .

PLNUMB12

SECOND QUADRANT

FIRST QUADRANT

	INUNIV	Y	Q	BARYON	P;ANCK	DARK	STAR	X	UNIVERS
MASS	-62.004998		-42.890800	-23.776602	-4.662404	14.451794	33.565992		52.680194
LENGTH	27.932478		7.691205	-12.550068	-32.791341	-12.550068	7.691205		27.932478
M/L	-89.937476		-50.582005	-11.226534	28.128937	27.001862	25..874787		24.747712
AREA	55.864956		15.382410	-25.10013	-65.582682	-25.100136	15.382410		55.864956
M/L^2	-117.86995		-58.273210	1.223534	60.920278	39.551430	18.183582		-3.184766
VOLUME	83.797434		23..073615	-37.65020	-98.374023	-37.650204	23..073615		83.797434
DENSITY	-145.80243		-65.964414	13.873602	93.711619	52.101998	10.492377		-31.117244
TIME L/c	17.455657		-2.785616	-23.026889	-43.268162	.-23.026889	-2.785616		17.455657
ENERGY	-41.051357		-21.937159	-2.822961	16.291237	35.405435	54.519633		73.633835
E/V	-124.84879		-45.010774	34.827243	114.665260	73.055639	31.446018		-10.163599
FORCE	-68.983835		-29.628364	9.727107	49.082578	47.955503	46.828429		45.701355
GRVITY	-187.05030		-108.339306	-29.628337	49.082578	46.828428	44.574178		42.320128
GM^2/L^4	-242.91520		-123.721714	-4.528227	114.665260	71.928567	29.191879		-13.544819
POWER	-58.507014		-19.151543	20.203928	59.559399	58.432324	57.305249		56.178178
TEMP	-25.191441		-6.077243	13.036955	32.151153	51.265350	70.379548		89.493750

PLNUMB12

SECOND QUADRANT FIRST QUADRANT

	INUNIV	Y	Q	BARYON	P;ANCK	DARK	STAR	X	UNIVERS
MASS	-62.004998		-42.890800	-23.776602	-4.662404	14.451794	33.565992		52.680194
LENGTH	27.932478		7.691205	-12.550068	-32.791341	-12.550068	7.691205		27.932478
M/L	-89.937476		-50.582005	-11.226534	28.128937	27.001862	25..874787		24.747712
AREA	55.864956		15.382410	-25.10013	-65.582682	-25.100136	15.382410		55.864956
M/L^2	-117.86995		-58.273210	1.223534	60.920278	39.551430	18.183582		-3.184766
VOLUME	83.797434		23..073615	-37.65020	-98.374023	-37.650204	23..073615		83.797434
DENSITY	-145.80243		-65.964414	13.873602	93.711619	52.101998	10.492377		-31.117244
TIME L/c	17.455657		-2.785616	-23.026889	-43.268162	.-23.026889	-2.785616		17.455657
ENERGY	-41.051357		-21.937159	-2.822961	16.291237	35.405435	54.519633		73.633835
E/V	-124.84879		-45.010774	34.827243	114.665260	73.055639	31.446018		-10.163599
FORCE	-68.983835		-29.628364	9.727107	49.082578	47.955503	46.828429		45.701355
GRVITY	-187.05030		-108.339306	-29.628337	49.082578	46.828428	44.574178		42.320128
GM^2/L^4	-242.91520		-123.721714	-4.528227	114.665260	71.928567	29.191879		-13.544819
POWER	-58.507014		-19.151543	20.203928	59.559399	58.432324	57.305249		56.178178
TEMP	-25.191441		-6.077243	13.036955	32.151153	51.265350	70.379548		89.493750

PLNUMB12

SECOND QUADRANT

FIRST QUADRANT

U.V.U

	INUNIV	Y	Q	BARYON	P;ANCK	DARK	STAR	X	UNIVERS
MASS	-62.004998		-42.890800	-23.776602	-4.662404	14.451794	33.565992	114,685	52.680194
LENGTH	27.932478		7.691205	-12.550068	-32.791341	-12.550068	7.691205		27.932478
M/L	-89.937476		-50.582005	-11.226534	28.128937	27.001862	25..874787	114.685	24.747712
AREA	55.864956		15.382410	-25.10013	-65.582682	-25.100136	15.382410		55.864956
M/L^2	-117.86995		-58.273210	1.223534	60.920278	39.551430	18.183582	114.685	-3.184766
VOLUME	83.797434		23..073615	-37.65020	-98.374023	-37.650204	23..073615		83.797434
DENSITY	-145.80243		-65.964414	13.873602	93.711619	52.101998	10.492377	114.685	-31.117244
TIME L/c	17.455657		-2.785616	-23.026889	-43.268162	.-23.026889	-2.785616		17.455657
ENERGY	-41.051357		-21.937159	-2.822961	16.291237	35.405435	54.519633	114.685	73.633835
E/V	-124.84879		-45.010774	34.827243	114.665260	73.055639	31.446018	114.685	-10.163599
FORCE	-68.983835		-29.628364	9.727107	49.082578	47.955503	46.828429	114.685	45.701355
GRVITY	-187.05030		-108.339306	-29.628337	49.082578	46.828428	44.574178	229.37093	42.320128
GM^2/L^4	-242.91520		-123.721714	-4.528227	114.665260	71.928564	29.191768	229.410 X	-13.504828
POWER	-58.507014		-19.151543	20.203928	59.559399	58.432324	57.305249	114.685	56.178178
TEMP	-25.191441		-6.077243	13.036955	32.151153	51.265350	70.379548	114.685	89.493750

SUMS

38,225 $\frac{S}{24}$

76,456 $(\frac{S}{24})^2$

114,685 $(\frac{S}{24})^3$

PLNUMB12

SECOND QUADRANT

FIRST QUADRANT

	INUNIV	DIRAC	Q	BARYON	P;ANCK	DARK	STAR	DIRAC	UNIVERS
MASS	-62.004998	-19.114198	-42.890800	-23.776602	-4.662404	14.451794	33.565992	19.114198	52.680194
LENGTH	27.932478	20.241273	7.691205	-12.550068	-32.791341	-12.550068	7.691205	20.241273	27.932478
M/L	-89.937476	-39.355471	-50.582005	-11.226534	28.128937	27.001862	25..874787	-1.127074	24.747712
AREA	55.864956	40.482546	15.382410	-25.10013	-65.582682	-25.100136	15.382410	40.482546	55.864956
M/L^2	-117.86995	-59.097744	-58.273210	1.223534	60.920278	39.551430	18.183582	-21.368848	-3.184766
VOLUME	83.797434	+60.723818	23..073615	-37.65020	-98.374023	-37.650204	23..073615	+60.723818	83.797434
DENSITY	-145.80243	-79.838017	-65.964414	13.873602	93.711619	52.101998	10.492377	-41.609621	-31.117244
TIME L/c	17.455657	+26.241273	-2.785616	-23.026889	-43.268162	-23.026889	-2.785616	20.241273	17.455657
ENERGY	-41.051357	-19.114198	-21.937159	-2.822961	16.291237	35.405435	54.519633	19.114198	73.633835
E/V	-124.84879	-79.838017	-45.010774	34.827243	141.665260	73.055639	31.446018	-41.609621	-10.163599
FORCE	-68.783535	-39.355471	-29.428364	9.727107	49.082578	47.955503	46.828429	-1.127074	45.701355
GRVITY	-187.050112	-78.709442	-108.339277	-29.628337	49.082578	46.828428	44.574178	-2.254148	42.320128
GM^2/L^4	-242.91520	-119.193487	-123.721714	-4.528227	141.665260	71.928567	29.191768	-42.736693	13.504828
POWER	-58.506014	-39.355471	-19.151543	20.203928	59.559399	58.432324	57.305249	-1.127074	56.178178
TEMP	-25.191441	-19.114198	-6.077243	13.036955	32.151153	51.265350	70.379548	+19.114198	89.493750

-68.983835

-29.628364 9.727107

108.339306

-71.928567 29.191879

13.544819

Error 114 or some or 2.114 229/2 = 114

PLDIRAC12

SECOND QUADRANT ✓ αμ ħ .)$^{1/2}$ FIRST QUADRANT

	INUNIV	Y	Q	BARYON	P;ANCK	DARK	STAR	X	UNIVERS
MASS	$(\alpha\mu/S)^{3/2}$		$\alpha\mu/S$	$(\alpha\mu/S)^{1/2}$	$(c\,\hbar/G)^{1/2}$	$(S/\alpha\mu)^{1/2}$	$S/\alpha\mu$		$(S/\alpha\mu)^{3/2}$
LENGTH	$(S\alpha\mu)^{3/2}$		$S\alpha\mu$	$(S\,\alpha\mu)^{1/2}$.	$(G\,\hbar/c^3\,)^{1/2}$	$(S\,\alpha\mu)^{1/2}$	$S\alpha\mu$		$(S\alpha\mu)^{3/2}$
M/L	S^{-3}		S^{-2}	S^{-1}	c^2/G	$\alpha\mu^{-1}$	$\alpha\mu^{-2}$		$\alpha\mu^{-3}$
AREA					$G\,\hbar/c^3$				
M/L^2					$(c^7/G^3\,\hbar)^{1/2}$				
VOLUME					$(G\,\hbar/c^3)^{3/2}$				
DENSITY					$c^5/G^2\,\hbar$				
TIME L/c					$(G\,\hbar/c^5)^{1/2}$	$(S\,\alpha\mu)^{1/2}$	$S\alpha\mu$		$(S\alpha\mu)^{3/2}$
ENERGY					$(\,\hbar c^5/G)^{1/2}$				
E/V					$c^7/G^2\,\hbar$				
FORCE					c^4/G				
GRVITY					c^4/G				
GM^2/L^4					$c^7/G^2\,\hbar$				
POWER					c^5/G				
TEMP									

PLDIRAC12

SECOND QUADRANT $\alpha\mu$ $\hbar$ $.)^{1/2}$ FIRST QUADRANT

	INUNIV	Y	Q	BARYON	P;ANCK	DARK	STAR	X	UNIVERS
MASS	$(\alpha\mu/S)^{3/2}$		$\alpha\mu/S$	$(\alpha\mu/S)^{1/2}$	$(c\,\hbar/G)^{1/2}$	$(S/\alpha\mu)^{1/2}$	$S/\alpha\mu$		$(S/\alpha\mu)^{3/2}$
LENGTH	$(S\alpha\mu)^{3/2}$		$S\alpha\mu$	$(S\,\alpha\mu)^{1/2}$.	$(G\,\hbar/c^3)^{1/2}$	$(S\,\alpha\mu)^{1/2}$	$S\alpha\mu$		$(S\alpha\mu)^{3/2}$
M/L	S^{-3}		S^{-2}	S^{-1}	c^2/G	$\alpha\mu^{-1}$	$\alpha\mu^{-2}$		$\alpha\mu^{-3}$
AREA					$G\,\hbar/c^3$				
M/L^2					$(c^7/G^3\,\hbar)^{1/2}$				
VOLUME					$(G\,\hbar/c^3)^{3/2}$				
DENSITY				$[S^{-2}(\alpha\mu)]^{-1}$	$c^5/G^2\,\hbar$	$[S(\alpha\mu)^{-2}]^{-1}$			
TIME L/c					$(G\,\hbar/c^5)^{1/2}$	$(S\,\alpha\mu)^{1/2}$	$S\alpha\mu$		$(S\alpha\mu)^{3/2}$
ENERGY					$(\hbar c^5/G)^{1/2}$				
E/V				$S^{-2}(\alpha\mu)^{-1}$	$c^7/G^2\,\hbar$	$S^{-1}(\alpha\mu)^{-2}$			
FORCE				S^{-1}	c^4/G	$\alpha\mu^{-1}$			
GRVITY					c^4/G				
GM^2/L^4					$c^7/G^2\,\hbar$				
POWER					c^5/G				
TEMP									

PLDIRAC2

SECOND QUADRANT ✓ αμ ħ FIRST QUADRANT

	INUNIV	Y	Q	BARYON	P;ANCK	DARK	STAR	X	UNIVERS
MASS	✓$(\alpha\mu/S)^3$		$\alpha\mu/S$	✓$\alpha\mu/S$	✓$c\,\hbar/G$	✓$S/\alpha\mu$	$S/\alpha\mu$		✓$(S/\alpha\mu)^3$
LENGTH	✓$(S\alpha\mu)^3$		$S\alpha\mu$	✓$S\,\alpha\mu$	✓$G\,\hbar/c^3$	✓$S\,\alpha\mu$	$S\alpha\mu$		✓$(S\alpha\mu)^3$
M/L	S^{-3}		S^{-2}	S^{-1}	c^2/G	$\alpha\mu^{-1}$	$\alpha\mu^{-2}$		$\alpha\mu^{-3}$
AREA				$S\alpha\mu$	$G\,\hbar/c^3$	$S\alpha\mu$			
M/L^2				$\frac{(\alpha\mu S)^{3/2}}{\alpha\mu}$	✓$c^7/G^3\,\hbar$	$-\sqrt{S(\alpha\mu)^2}$			
VOLUME				$+(\alpha\mu S)^{3/2}$	✓$(G\,\hbar/c^3)^3$	$(\alpha\mu S)^{3/2}$			
DENSITY				$-S^2(\alpha\mu)$	$c^5/G^2\,\hbar$	$-S(\alpha\mu)^2$			
TIME L/c				$+(\alpha\mu S)^{1/2}$	✓$G\,\hbar/c^5$	✓$S\,\alpha\mu$	$S\alpha\mu$		✓$(S\alpha\mu)^3$
ENERGY				$-(\hbar/S)^{1/2}$	✓$\hbar c^5/G$	$\sqrt{S/\alpha\mu}$			
E/V				$-S^2(\alpha\mu)$	$c7/G^2\,\hbar$	$-S(\alpha\mu)^2$			
FORCE	S^{-3}		S^{-2}	S^{-1}	c^4/G	$-\alpha\mu$			
GRVITY	S^{-6}		S^{-4}	S^{-2}	c^4/G	$-(\alpha\mu)^2$			
GM^2/L^4				$-S^3(\alpha\mu)$	$c7/G^2\,\hbar$	$-S(\alpha\mu)^3$			
POWER	S^{-1}		S^{-2}	S^{-1}	c^5/G	$-(\alpha\mu)$			
TEMP				$-(\frac{S}{\alpha\mu})^{1/2}$		$+\sqrt{S/\alpha\mu}$			

PLNUMB34 THIRD QUADRANT FOURTH QUACRANT

	INUNIV	Y	Q	BARYON	P;ANCK	DARK	STAR	X	UNIVERS
MASS	-62.004998		-42.890800	-23.776602	-4.662404	14.451794	33.565992		52.680194
LENGTH					-32.791341				
M/L					28.128937				
AREA					-65.582682				
M/L^2					60.920278				
VOLUME					-98.374023				
DENSITY					93.711619				
TIME L/c					-43.268162				
ENERGY					16.291237				
E/V					141.665260				
FORCE					49.082578				
GRVITY					49.082578				
GM^2/L^4					141.665260				
POWER					59.559399				
TEMP					32.151153				

PLNUMB34 THIRD QUADRANT FOURTH QUACRANT

	INUNIV	Y	Q	BARYON	P;ANCK	DARK	STAR	X	UNIVERS
MASS	-62.004998		-42.890800	-23.776602	-4.662404	14.451794	33.565992		52.680194
LENGTH	-93.515160	(dM)'	-73.273887	-53.032614	-32.791341	-53.032614	-73.273887	(dM3)'	-93.515160
M/L	+31.510162	dμ		+29.258012	28.128937	67.484408	106.539379	5	146.195354
AREA	-187			-106.065228	-65.582682	-106.065228			-187.15032
M/L^2					60.920278				
VOLUME	-280.725480			-159.097042	-98.374023	-159.097042			-280.72548
DENSITY	+218.720482			+135.320440	93.711619	+173.588836			228.045286
TIME L/c					-43.268162				-103.99198
ENERGY	-41.051357				16.291237				73.633835
E/V	239.674123				141.665260				354.359315
FORCE					49.082578				
GRVITY	+55.965028				49.082578				285.3354112
GM^2/L^4					141.665260				
POWER					59.559399				
TEMP					32.151153				

$\frac{SUMS}{2} \sim R$, $DIFF \sim 114$

$\frac{DIFF}{2} - R$

$\frac{Sum}{2}$

$\Sigma E_0 + E_0 = 2E_R$

Diff	DIF	DIFF
354,359	159.520	146,195
239,674	146.195	31.510
114.685	9.325 $= M_0^2$	114.654

THE PLANCK PARTICLE

THE PLANCK UNITS

In the Planck system of units the dimensionalities of extension [L], mass [M], and time [T] are based on the three fundamental physical constants:

c = velocity of light [L/T]
h = Planck's constant of action [ML^2/T]
G = Newton's constant of gravitation [L^3/MT^2]

Specifically,

The Planck mass = $\sqrt{hc/G}$ = 2.17671 x 10^{-5} grams

The Planck length = $\sqrt{hG/c^3}$ = 1.61605 x 10^{-33} cms.

The Planck time = $\sqrt{hG/c^5}$ = 5.39056 x 10^{-44} sec.

(Values from Cohen and Taylor, Physics Today, Aug 1987, p11-15)

Frequently the logarithmic values are more useful for data displays which range over several magnitudes. The $\log_{10}$ values:

Planck mass	-4.662199
Planck length	-32.791545
Planck time	-43.268366

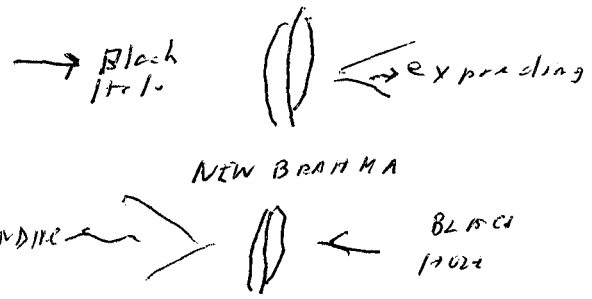
7-28-11

THE PLANCK PARTICLE

IS A "WORM HOLE"

CONNECTING "OUR" UNIVERSE

WITH ITS SYMMETRIC COUNTER UNIVERSE



LIFE TIME OF BRAHMA =

COSM QUESTIONS JULY 15 2011

ENTHALPY = ?

LENGTH ARRAY

3 curvatures → 3 frequencies

Expansion from rotation ?

DENSITY ARRAY

$\rho = \frac{c^5}{G^2\hbar}$, $\frac{M}{L^3}$, $\frac{M}{R^3} = \frac{c^6}{G^3M^2}$ when $R = \frac{GM}{c^2}$

EMV & Grav wave

What is vibrating ?

$\nu \approx \sqrt{G\rho}$ cf. Einstein's clock rate w height

if $\rho\downarrow$, $\nu\downarrow \Rightarrow z\uparrow$ as is observed

Part of universe contracts → black hole another expands to shell (event horizon)

Find all Planck w Dirac

$\sim \Delta < 0.02$ e.g. $\frac{c^7}{G^2\hbar}$ w $\left(\frac{S}{\alpha\mu}\right)^3$

21 cm band = ?

The role of direction: in arrays

in M, L, T Grid

c, G ħ, Arrays, grid

Direction & Dimensionality

Shamanistic Face ESWN

NE alt, azimuth

19.146 62.414 62.414
43.268 1.127 60.16 60.724 $= (8\,\alpha/\mu)^{3/2} (\alpha/\mu)^{3/2} = 8^{3/2}\,\alpha/\mu$
62.414 61287 1.690

Albert, here are the two quotes I read during my chatter. Use as needed and drink lots of water. When you have finished if you will send to me I will see that DO gets it, or you can send directly to him. Thank you so much.

" Every gun that is made, every warship launched, every rocket fired, signifies in the final sense a theft from those who hunger and are not fed, those who are cold and are not clothed." I think this was at the UN.

"we must guard against the acquisition of unwarranted influence, whether sought or unsought, by the military-industrial complex." This was to a more homey crowd.

$\nu^2 = G\rho$
τ

7, ..

ν τ
$\rho = -30$
$G = -7$
$\nu = 19$ sec

-31.117
-7.175
38.292
19.146 sec

T
52.680
7.175
45.505
31.430
14.075 sec

t
27.932
10.476
17.456 sec

14.075
19.146
33.221 ✓
16.610

14.075
43.268
57.343

$\tau^2 T = t^3 = 52367$

$\frac{ML^3T}{m_e TL}$ L

Compton wave length: $\lambda_c = -10.413\,233 = \frac{\hbar}{m_e c}$ [L]

-27.041
10.477
$m_e c$ -16.564

-26.977
-16.564
-10.413

$\frac{M L^2 T}{M L T}$ = [LT]

$\chi = LT$

$S = \frac{L}{T}$

SOLID BODY ROTATION — KEPLER — $S = k$

RACE TRACK $S = K$ ∴ S independent of L

$S \propto L$

$\frac{L^3}{T^2} = GM$

$S^2 = \frac{K}{L}$

$S = \left(\frac{K}{L}\right)^{1/2}$

$S = K$

$A \quad Y \quad B$

$\frac{L}{T} \propto L$ $\quad L^3 \propto T^2$ $\quad L \propto T$

$X^3 = AB^2$

$Y^3 = A^2B$

$T = K$ $\quad T \propto L^{3/2}$ $\quad T \propto L$

$L^{2/2}$

$L^2 =$ $\quad T \propto L^{3/2}$ $\quad L' =$ $\quad \frac{L^3}{T^2} = K$

$L^2 =$

$\frac{L}{T} = K$

$K^2 L$

A — B

$S = \frac{L}{T}$ $\quad \frac{GM}{L} = S^2$

$T = K \quad L^{1/3} \quad L^{1/2} \quad L^{2/3} \quad T \propto L$

$L \quad (TL^2)^{1/3} \quad (LT^2)^{1/3} \quad T$

Kepler $S \propto L^{-1/2}$

$T \propto L^{3/2}$

Speed $\quad L \quad L^{2/3} \quad L^{1/2} \quad L^{1/3} \quad K$

Kepler $S \propto L^{-1/2}$

① OBSERVED			
speed ∝	L	$L^{-1/2}$	K
	solid	Kepler	constant

I'm venerated

$\frac{L}{T} \propto T$ TIME $\quad K \quad L^{2/3} \quad L^{1/3} \quad L$

$A \quad B \quad \frac{B^2}{A}$

$A \quad \frac{1}{\sqrt{AB}} \quad B$

$L \quad L^{-1/2} \quad L^{-2}$

$\frac{1}{L^2}$ $\quad L \quad \frac{1}{\sqrt{L}} \quad \frac{1}{L^2}$

MUTUALITY

MYSTERY

ONTIC EPISTEMIC

ORTHOGONAL PARADIGMS PATTERNS

POLYTOPES

POWER of

PRODSUM NUMBERS

PROTO PLANETS

PURPOSE

QUESTIONS

RANDOM

RECURSION

REGRESSION

REPETITION

REPORT TO GALAXY

RITUAL

RULES META RULES

SEARCH

SEMIOTICS

SETS

SOCIETAL POLITICAL

SPACES

SYNCHRONIC QUESTS

SYMMETRIES

SYNTHESIS

SYSTEMATICS GST

TECHNOLOGY

TEMPLATES

THEOLOGY

TIME

TOPOLOGIES

TYPOLOGIES

UNITS

UNITY | DIVERSITY U|D

UNIVERSALS

UNLEARNING

WIDTH OF HERE

WIDTH OF NOW

WIDTH OF IDENTITY

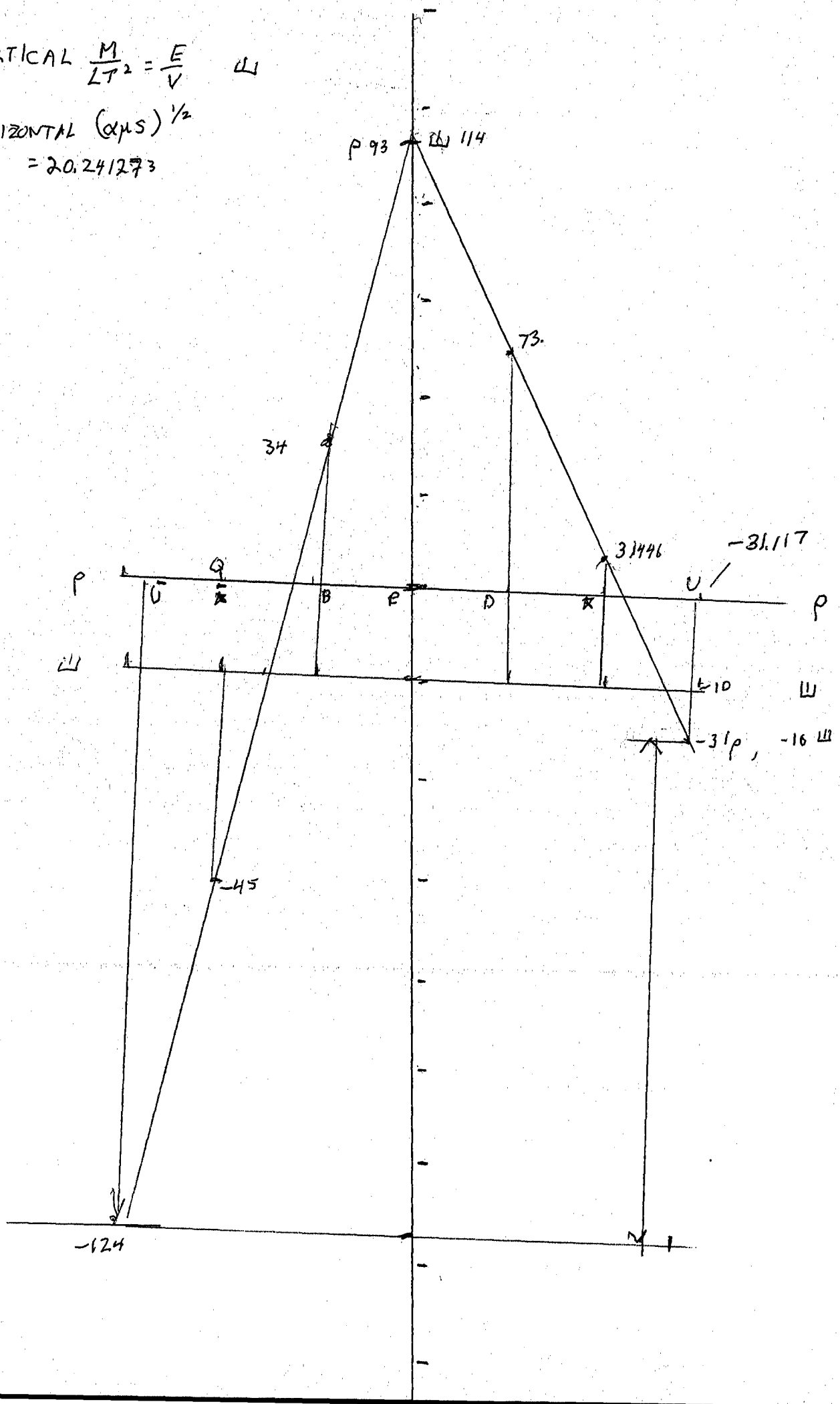
WIDTH OF VALIDITY

ZOOM

E/V

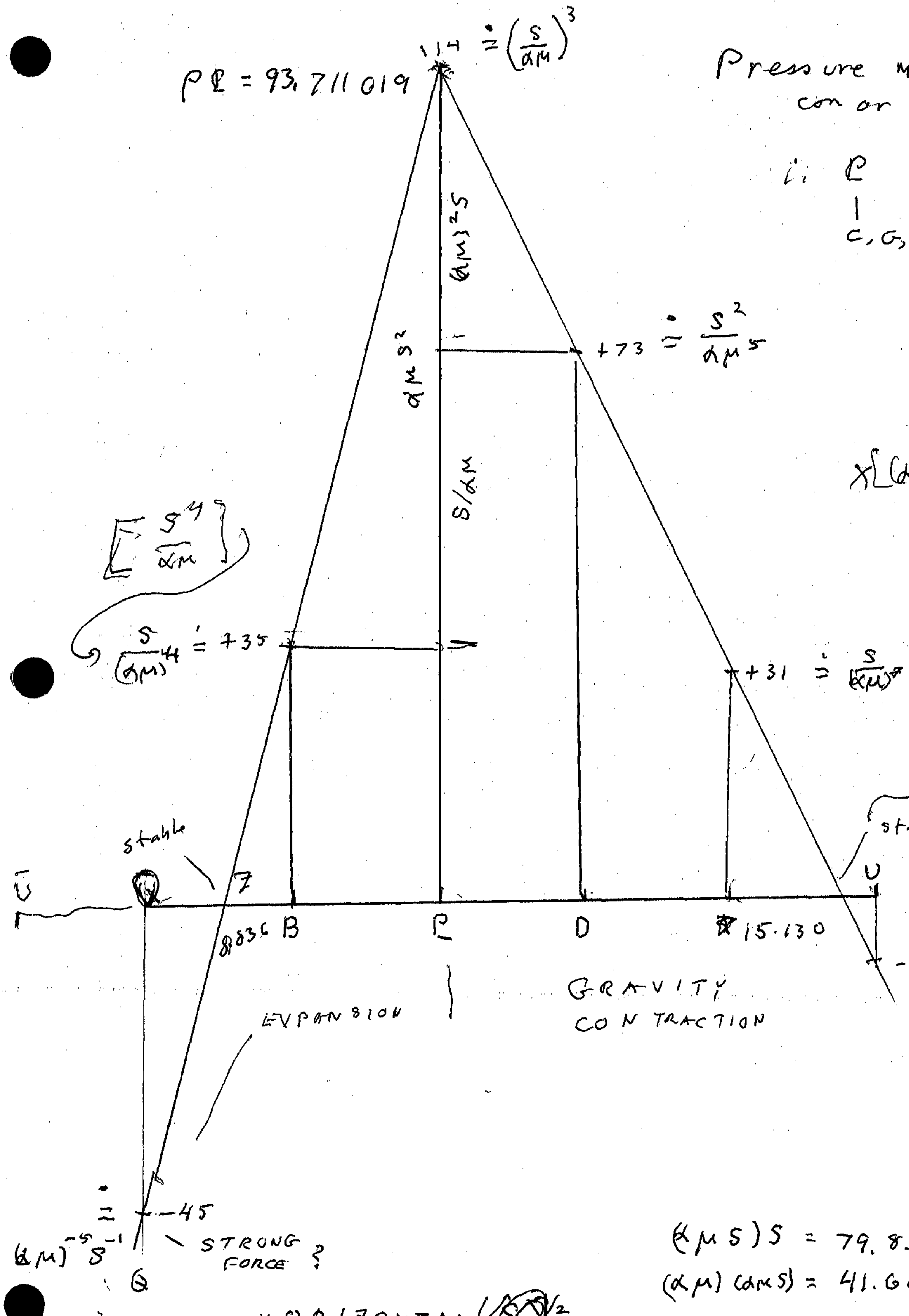
VERTICAL $\frac{M}{LT^2} = \frac{E}{V}$

HORIZONTAL $(\alpha\mu s)^{1/2}$
$= 20.241273$



$\frac{M}{LT^2}$ = PRESSURE

(2 - 5 - 11)



Pressure max at ℄
con or exp or eitha ?

i.e. ℄ related to BIG BANG
|
c, G, ℏ

$\frac{Mc^2}{L^3} = 0.011\,1$

$\times[(\alpha\mu)^2 S]^{-1}$

∃ 10^4 in U
↓
LARGEST ~~AGGREGATE~~
M = 48.011 893
L = 22.788 283

HORIZONTAL $\left(\frac{S}{\alpha\mu}\right)^{1/2}$
$(\alpha\mu S)^{1/2}$

$(\alpha\mu S)S = 79.838\,016$
$(\alpha\mu)(\alpha\mu S) = 41.609\,619$ > Δ = $\frac{S}{\alpha\mu}$

C f $\frac{\delta F}{F_G}\left(\frac{\alpha\mu}{S}\right)^{1/2}$
M_0 ~ 48 ≈ 47.906

$(\alpha\mu)^{-9} \times S(\alpha\mu)^{2} = S(\alpha\mu)^{-7}$

$S(\alpha\mu)^{-7} \times S(\alpha\mu)^{2} = S^{2}(\alpha\mu)^{-5}$

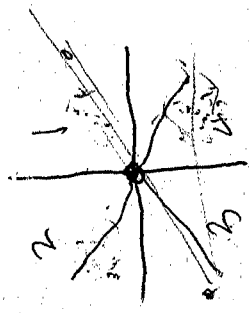
$S^{2}(\alpha\mu)^{-5} \times S(\alpha\mu)^{2} = S^{3}(\alpha\mu)^{-3}$

$S^{3}(\alpha\mu)^{-3} \times$ [illegible] $=$

$S^{-4}(\alpha\mu)^{-12} =$

$(\alpha\mu)^{-9}$	$S(\alpha\mu)^{2}$
$S(\alpha\mu)^{-7}$	
$S^{2}(\alpha\mu)^{-5}$	
$S^{3}(\alpha\mu)^{-3}$	
$S^{4}(\alpha\mu)^{-1} \rightarrow$	$S(\alpha\mu)^{-4}$

7.691
15.307
22.998 = L



31.465952 ☆

P 114.665261
D 73.055610
41.609621

$(\alpha\mu S)^{1/2}$

$$\frac{41.609621}{20.241273} = \frac{31.465952}{x}$$

$$x = \frac{31.465952 \times 20.241273}{41.609621}$$

A

$\rho = 48.040431^{M} / 68.994024^{L^3}$

$\rho = -10.954593$

$\rho \equiv c^{2}$

$\rho = \frac{1}{c^{2}}$

$x = 15.306819$ ✓ 7.691

~~40.482546~~

~~L = 55.789365~~

$L^{3} = 167.368095$

$\frac{M}{L^{3}} c^{2} = 1$

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

A

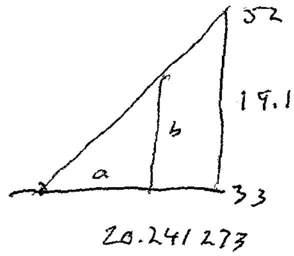
20.241273
15.306819 x
4.934454
27.932478
L = 22.998024

$L^{3} = 68.994072$
20.953641
M = 48.040431

$\rho_{A} = -c^{2}$

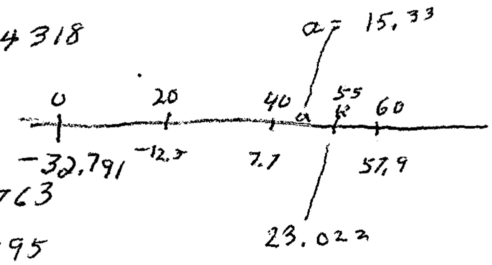
A M = 48.040431
L = 22.998024

LARGEST AGGREGATE



K = 55.814 117

slope $\frac{19.114}{20.241}$ = 0.944 318



a = K − 2μs

K 55.814 117
40.482 456
a = 15.331 661

b = slope × a = 14.477 763

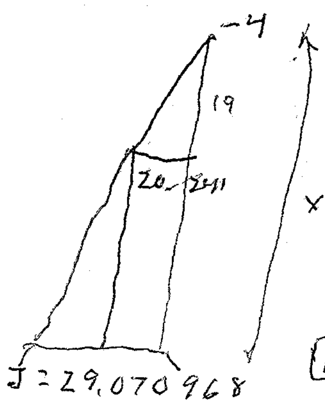
add 33.565 995

Mass 48.043958

at L = 23.022 796 = K − 32.791 340

ρ = −21.024 430

SMALLEST PARTICLE



$\frac{19}{20} = \frac{X}{J}$

X = J × 0.944 318

= 27.452 239

−4.662 404

MASS = −32.114 638 9

SIZE −32.791 340 ℓ

−29.070 968

−61.862 308 cm

60.723 819

14.1 338

$\frac{M}{L}$ +29.747 670

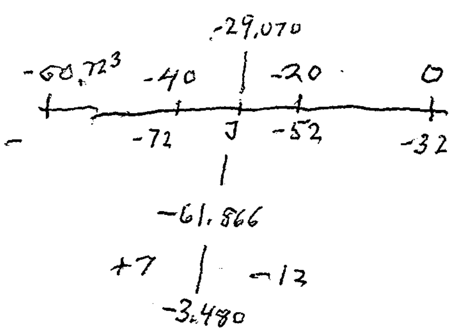
28.128

1.619 K(K)^{2L}

1.690 = (dμ)^{2L}

ρ = +150 Block H.I.

+55.098 366



Length

27.932

7.961

60.723

12.550

87.655

32

MASSES

−4.662 −4.662

−27.776 14.451

−42.890 33.395

−62.004 52.680

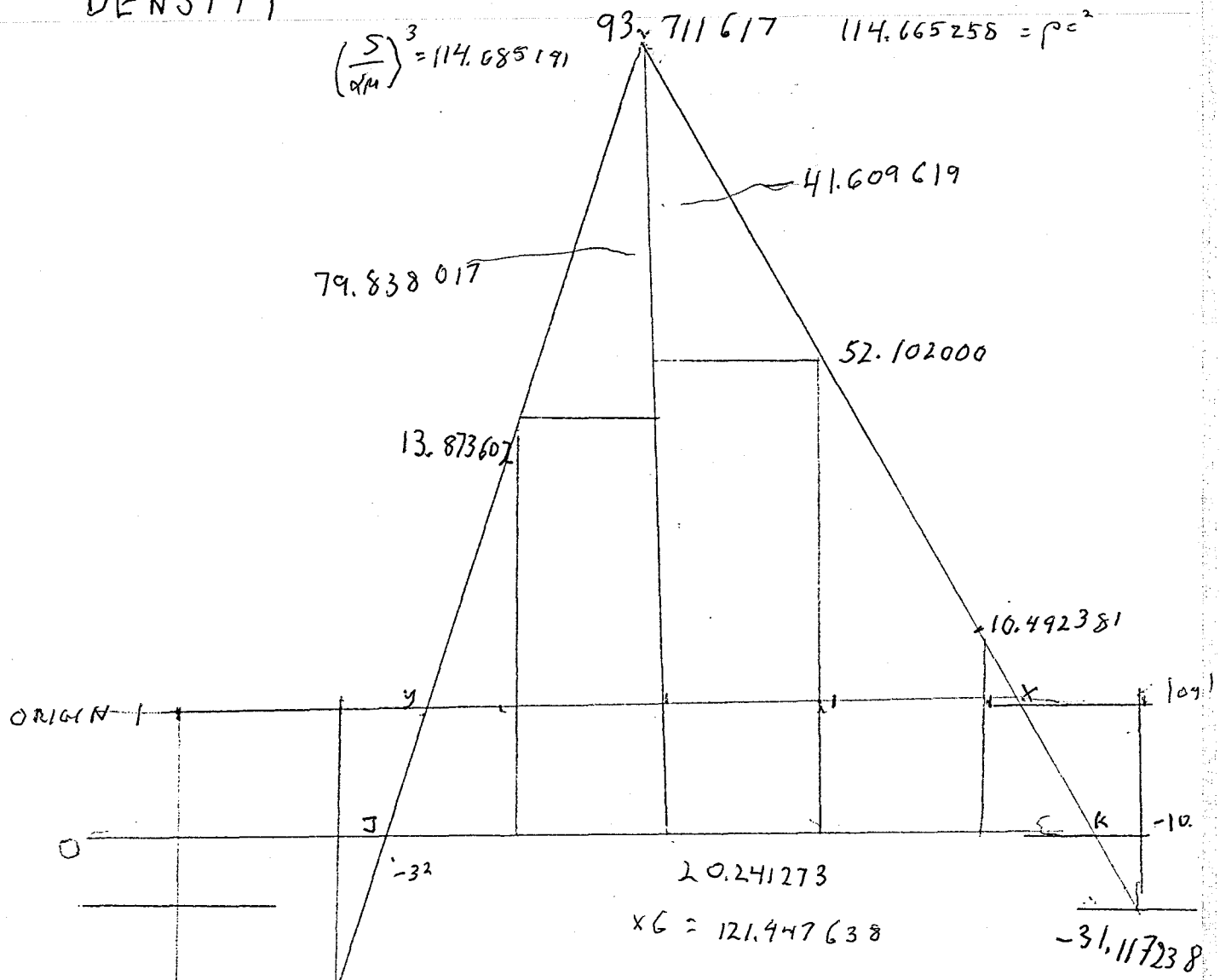
114.685 = 6 × 19.114

6 × 20.241 = 121.446

114.685

6.761 = (dμ)^6

DENSITY



MICRO SLOPE a/b

0.253529 a/b

y = 23.758636

MACRO SLOPE a/b

0.486757 b/a

x = 45.586633

x+y = 69.345269

|21 - 69| = 52.102369 of p 0

J = 29.070968

K = 55.814117

32.791341

23.022776

8+k = 84.885085

|21 - 84| = 36.562553

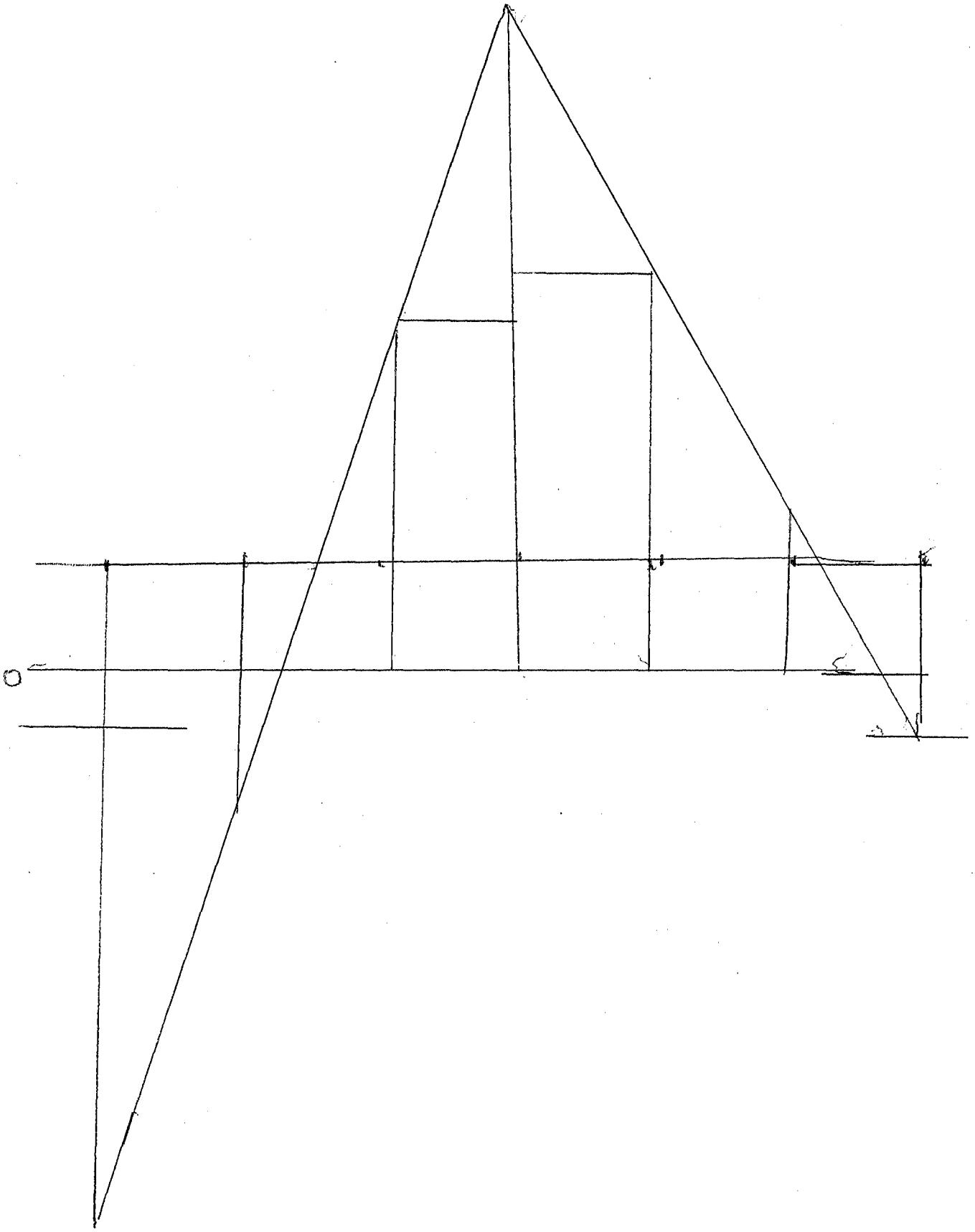
-145.802434

31.117238

114.685196 of $(S/\alpha\mu)^3$

x confirm

ρ = 0



VERTICAL $\left[\frac{M}{LT^2}\right]$, INTERVAL = 4/609620 $= (\alpha\mu)^2 S$

$Q = -45.010772 = S^{-1}(\alpha\mu)^{-5}$

$B = +34.847175 = S/(\alpha\mu)^4$

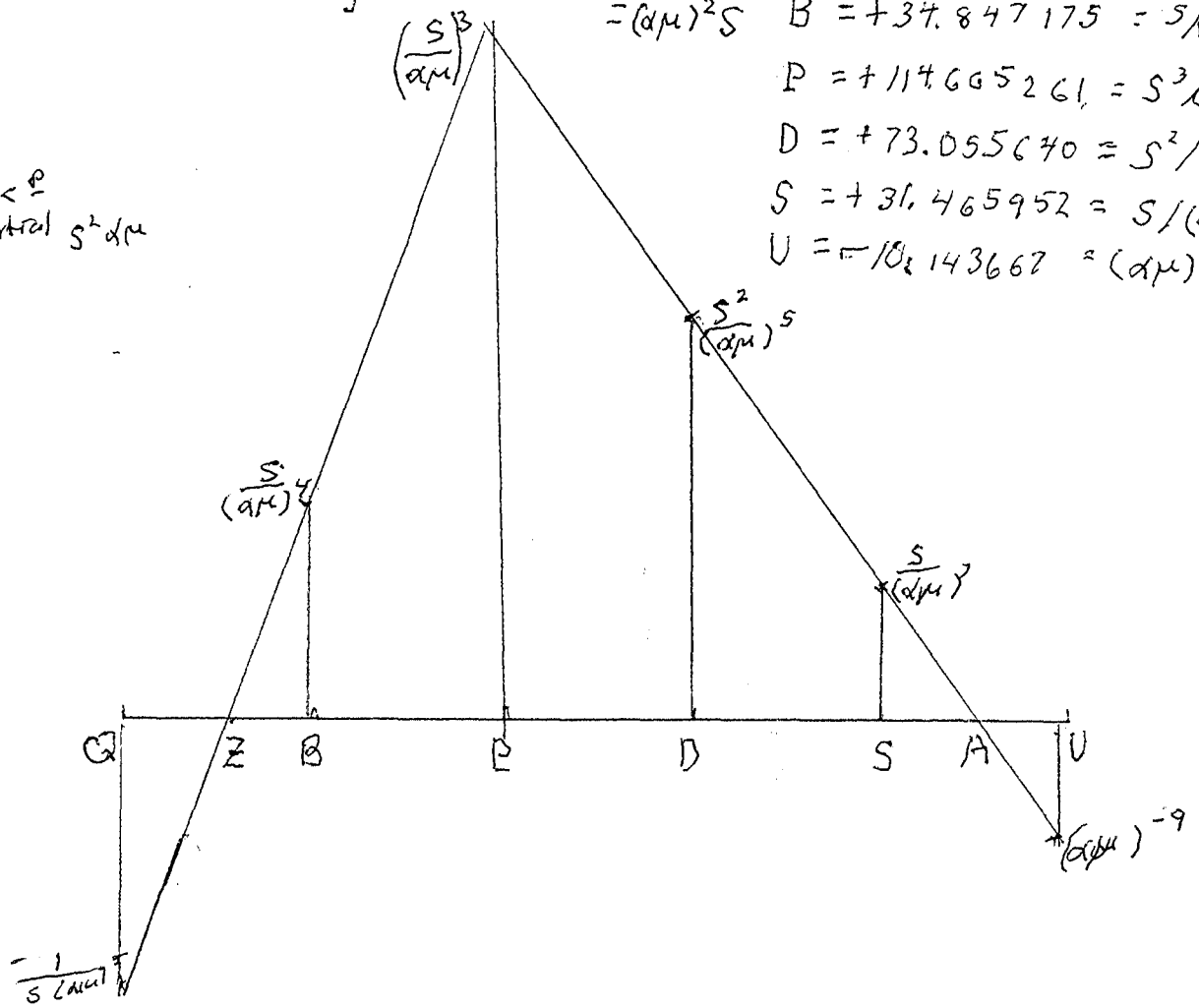
$P = +114.665261 = S^3/(\alpha\mu)^3$

$D = +73.055670 = S^2/(\alpha\mu)^5$

$S = +31.465952 = S/(\alpha\mu)^7$

$U = -10.143667 = (\alpha\mu)^{-9}$

$< \frac{P}{\text{Vertical}} S^2 d\mu$



$\frac{1}{S(\alpha\mu)^5}$ HORIZONTAL INTERVALS [L] 20.241273 $= (\alpha\mu S)^{1/2}$

$Q = -32.791241$

$B = -12.550068$

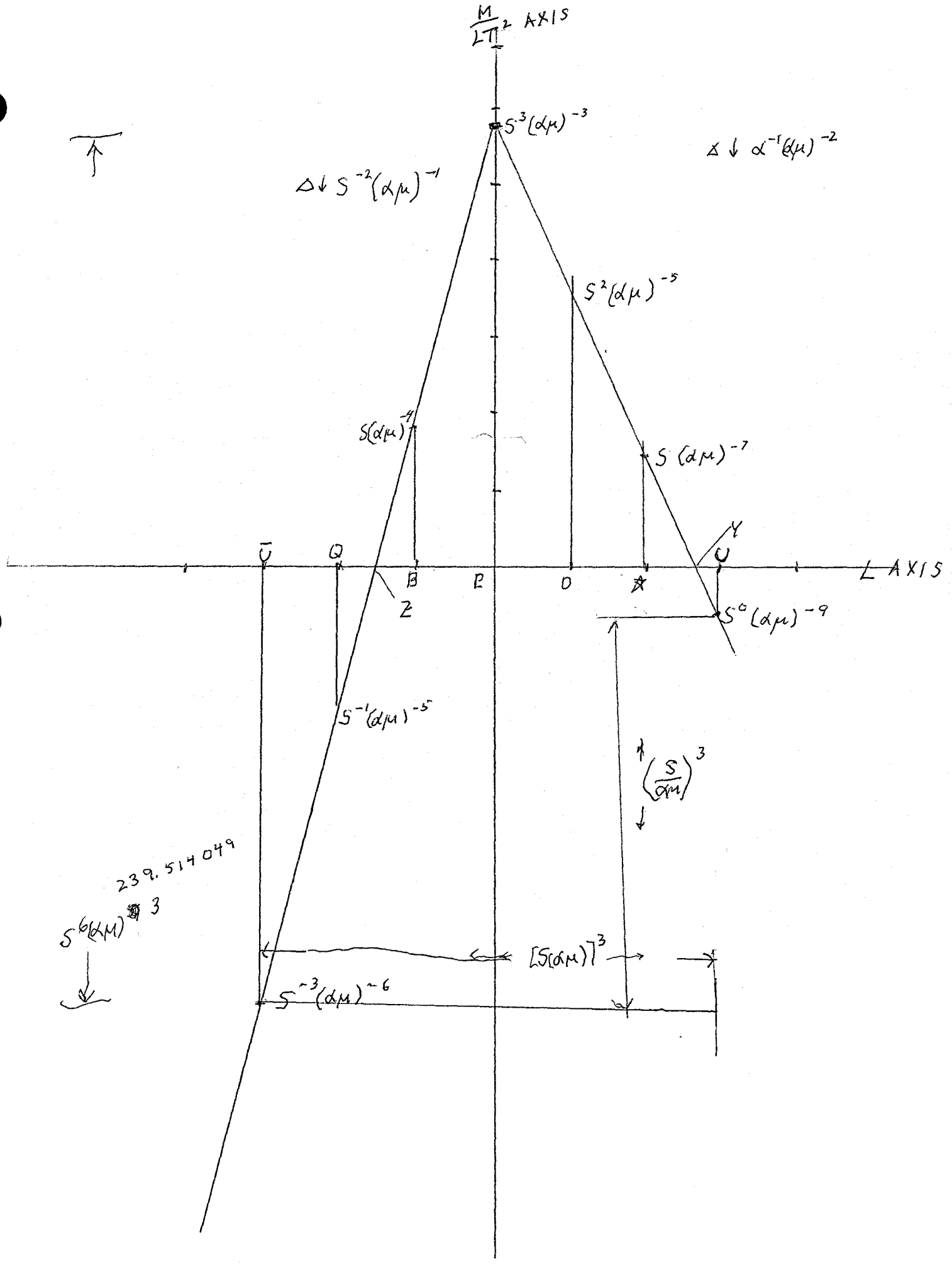
$P = -32.791341$

$D = -12.550068$

$S = +7.691205$

$U = +27.932478$

A WILSON


$\frac{M}{LT^2}$ AXIS
$S^{-3}(\alpha\mu)^{-3}$
$\Delta \downarrow S^{-2}(\alpha\mu)^{-1}$
$\Delta \downarrow \alpha^{-1}(\alpha\mu)^{-2}$
$S^{2}(\alpha\mu)^{-5}$
$S(\alpha\mu)^{-4}$
$S(\alpha\mu)^{-7}$
Y
V
Q
B
P
O
U
L AXIS
Z
$S^{0}(\alpha\mu)^{-9}$
$S^{-1}(\alpha\mu)^{-5}$
$\left(\frac{S}{\alpha\mu}\right)^3$
239.514049
$S^{6}(\alpha\mu)^{3}$
$[S(\alpha\mu)]^3$
$S^{-3}(\alpha\mu)^{-6}$

faith, but through striving after rational knowledge."
"Molecular photography captures a world invisible to the naked eye. It opens the mysteries to molecules and cells."

E/V E/V

VERTICAL $\left[\frac{M}{LT^2}\right]$, INTERVAL = 4.609620 $= (\alpha\mu)^2 S$

Q = −45.010 972 = $S^{-1}(\alpha\mu)^{-5}$

B = +34.847 175 = $S/(\alpha\mu)^4$

P = +114.665 261 = $S^3/(\alpha\mu)^3$

D = +73.055 670 = $S^2/(\alpha\mu)^5$

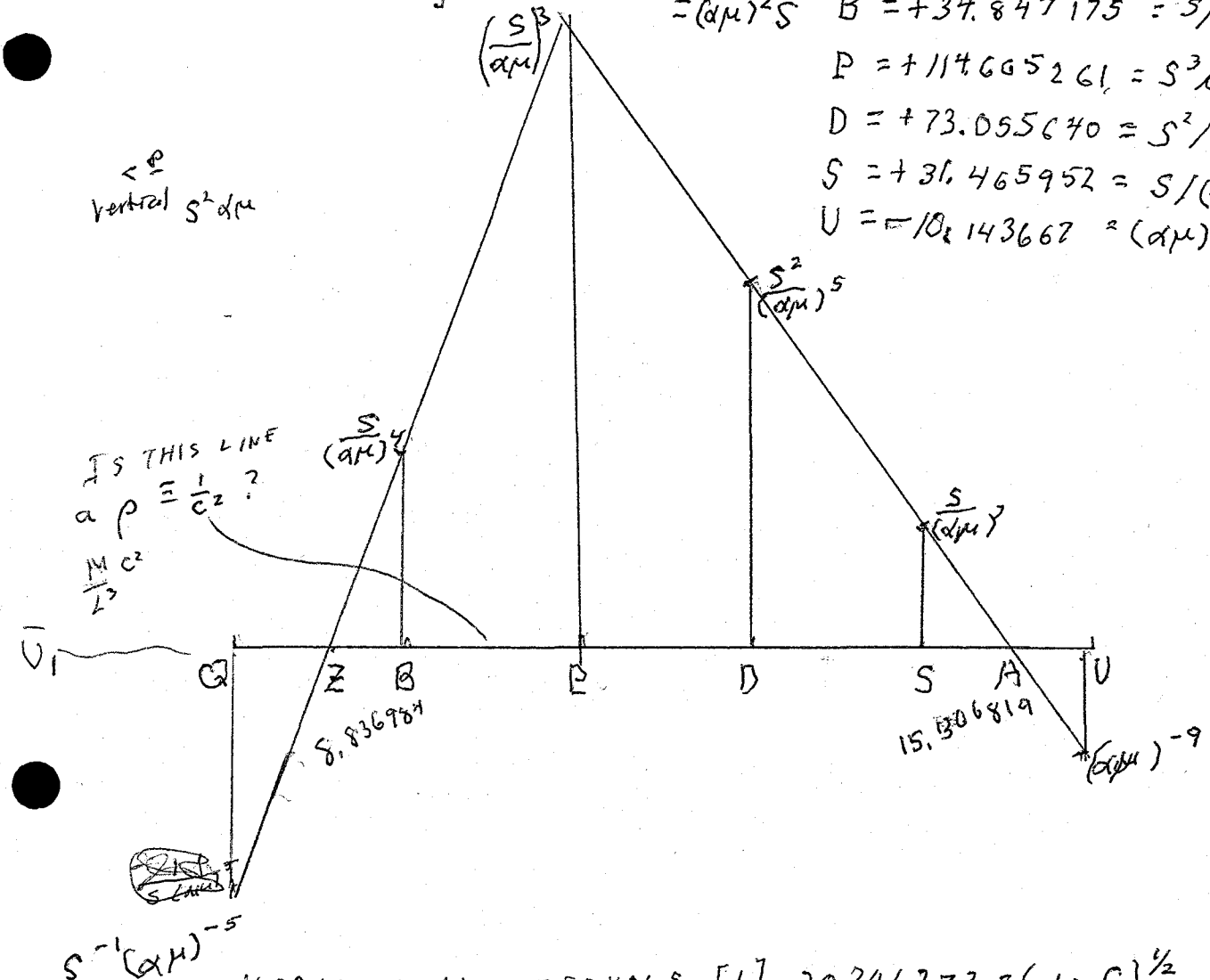
S = +31.465 952 = $S/(\alpha\mu)^7$

U = −10.143 667 = $(\alpha\mu)^{-9}$

$S(\alpha\mu)^2$

$S(\alpha\mu)^2$ → $S^{-2}(\alpha\mu)^{-1}$

< P vertical $S^2\alpha\mu$



HORIZONTAL INTERVALS [L] 20.241273 = $(\alpha\mu S)^{1/2}$

Q = −32.791 241 ? or +7.691540

B = −12.550 068

P = −32.791 341

D = −12.550 068

S = +7.691 205

U = +27.932 478

$S(\alpha\mu)^2$ =

SLOPES

✓ LEFT 79.818 ≐ $(\alpha\mu S)^2$

RIGHT ↘ 41.599 ≐ $(\alpha\mu S)$

Total 121.418 ≐ $(\alpha\mu S)^3$

left ≐ 2 × right

	M	L	E/V
U	52.680	27,932478	−10.143667
A	48.040 431	22.998024	0
Z			
Q			
R	−4.662		

	M	L	E/V
U			

E/v = P/A

$\frac{ML^2}{T^2} / L^3 = \frac{M}{LT^2} = \frac{ML}{T^2} / L^2$

cf $\left(\frac{S}{\alpha\mu}\right)^3 = 114.685191$

$\Delta = 0.019930$

2-24-11

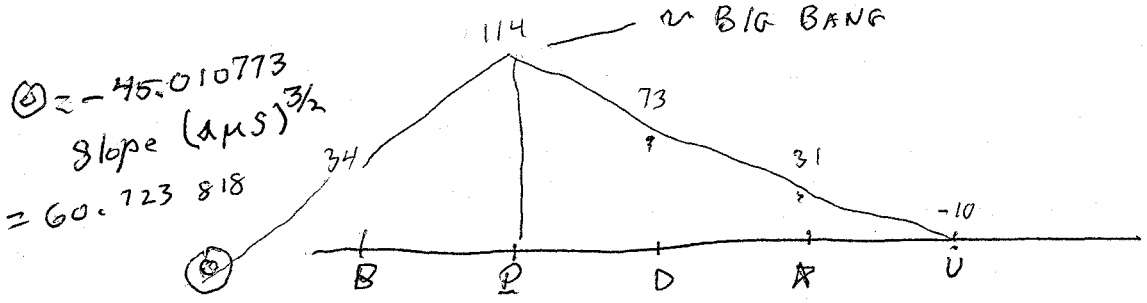
Planck value: 114.665 261 $= \frac{c^7}{G^2\hbar}$

Proton value: 34.827 244 $\Delta = \alpha\mu S^2$

STAR value 31.446 024 $\Delta = (\alpha\mu)^3$

UNIV VALUE −10.163 398 $D \cdot \bigstar = U \cdot P$

D 73.028 753



$\textcircled{B} = -45.010773$

slope $(\alpha\mu S)^{3/2}$

$= 60.723\,818$

$\left[\frac{M}{L^2T^2}\right]$

Horizontal retrieval $\left(\frac{S}{\alpha\mu}\right)^{1/2}$

slope $(\alpha\mu)^{5/2} S^{1/2}$

$= 22.495\,421$

B 34.827 244

79.838 017 $= (\alpha\mu)^4 S^2$

P 114.665 261

41.636 508

D ~~X~~ 73.028 753

41.609 619 $= (\alpha\mu)^2 S$

★ 31.446 014

41.582 739

~~41.606 382~~

U −10.163 398 41.609 412

PRESSURE VALUES $\doteq$ PURE NUMBERS $f(\alpha, M, S)$

		Δ
$\frac{S}{(\alpha\mu)^4} =$	34.847 175	0.019 931
$\left(\frac{S}{\alpha\mu}\right)^3 =$	114.685 191	0.019 930
$\frac{S^2}{(\alpha\mu)^5} =$	73.075 571	0.046 818
$\frac{S}{(\alpha\mu)^7} =$	31.465 952	0.020 938
$(\alpha\mu)^{-9} =$	−10.143 667	0.019 731

$\frac{\frac{M}{LT^2}}{\frac{S^{3+1}}{(\alpha\mu)^{3+m}}}$ = invariant = 1

or

$\frac{M}{LT^2} = k \frac{S^{3+m}}{(\alpha\mu)^{3+2m}}$

Error in G ?

$S = f(G)$

$\left[\frac{M}{LT^2}\right]$ set $\frac{C^7}{G^2\hbar} = \left(\frac{S}{\alpha_M}\right)^3$ [0] from $\frac{M}{LT^2} = \sqrt{\frac{\hbar c}{G}\frac{c^3}{G\hbar}\frac{c^{10}}{G^2\hbar^2}} = \frac{C^7}{G^2\hbar}$

114.665 261 = 114.685 191

$\Delta = 0.019930$

$$S = \frac{\alpha_M \hbar c}{G m_p^2}$$

$$(\alpha_M)^3 \frac{C^7}{G^2\hbar} = \frac{(\alpha_M)^3 \hbar^3 c^3}{G^3 m_p^6}$$

$$G = \left(\frac{\hbar}{c}\right)^4 \frac{1}{m_p^6}$$

$G = -7.155368$ X

W -7.175296

Δ 0.019928

$a_0 = -8.276399$ $\quad hc = -16.500103$

ALTERNATE TIMES $\quad 77.211616$

$\frac{M}{LT^2}$ $\quad T^2 = \frac{G^2M^2}{C^6} \rightarrow \frac{1}{ML}\frac{C^6}{G^2}$ $\quad \chi^2 = \frac{L^3}{GM} \rightarrow \frac{GM^3}{L^4}$

B $\frac{C^7}{\hbar G^2} = 114.665\,261$ [SAME as with $T = \frac{L}{C}$] | same for T, and χ

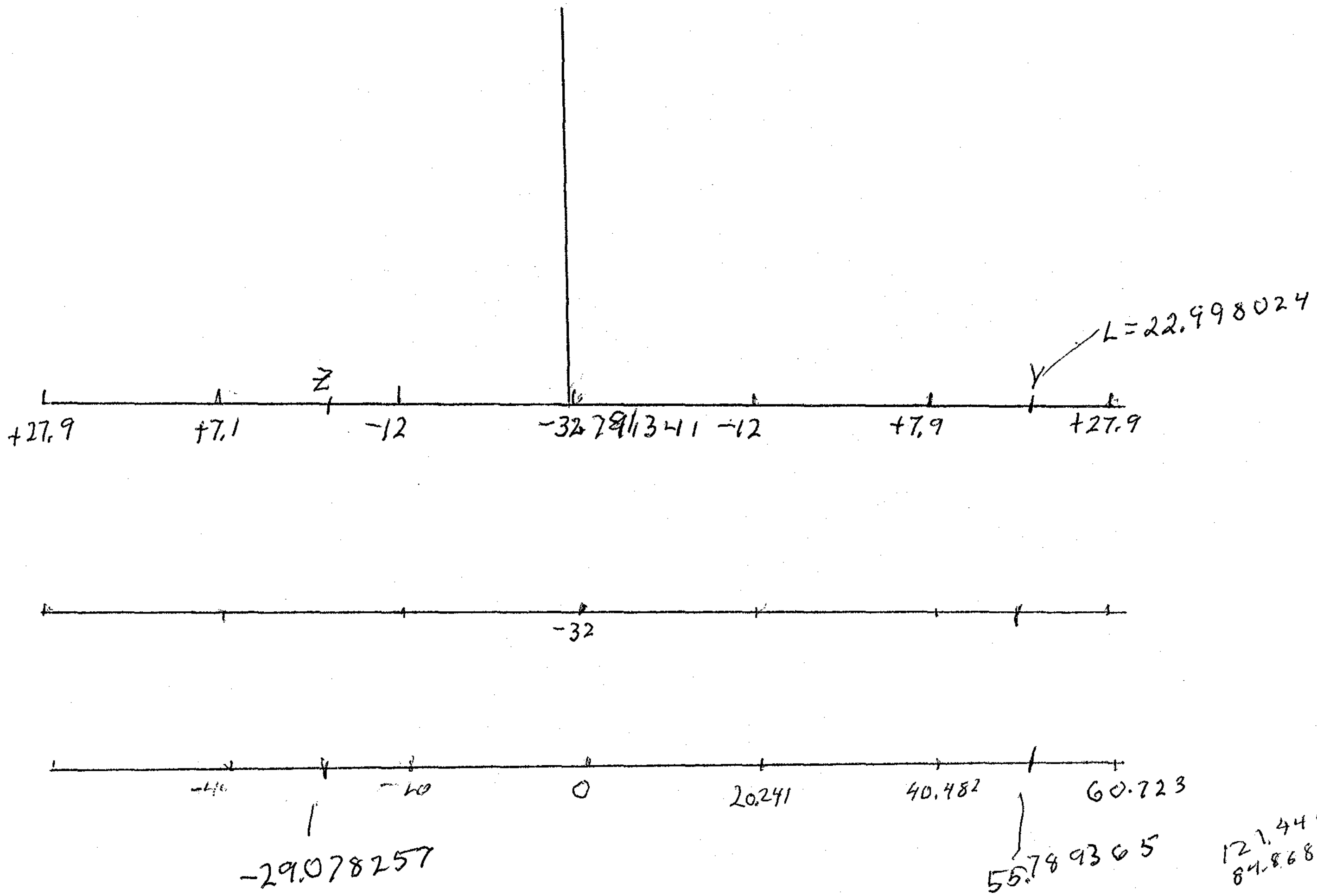
B 113.988192 $\quad 34.827\,244 = \times 3$ $\quad +x_2$ $\quad$ B -4.528227

D

U -3.401156 $\quad -10.143667$

$+$

-13.544823 $\quad$ U -13.544560



121.446
84.868
36.578

84.867622$^{1/2}$
3.944 ($\alpha\mu$)

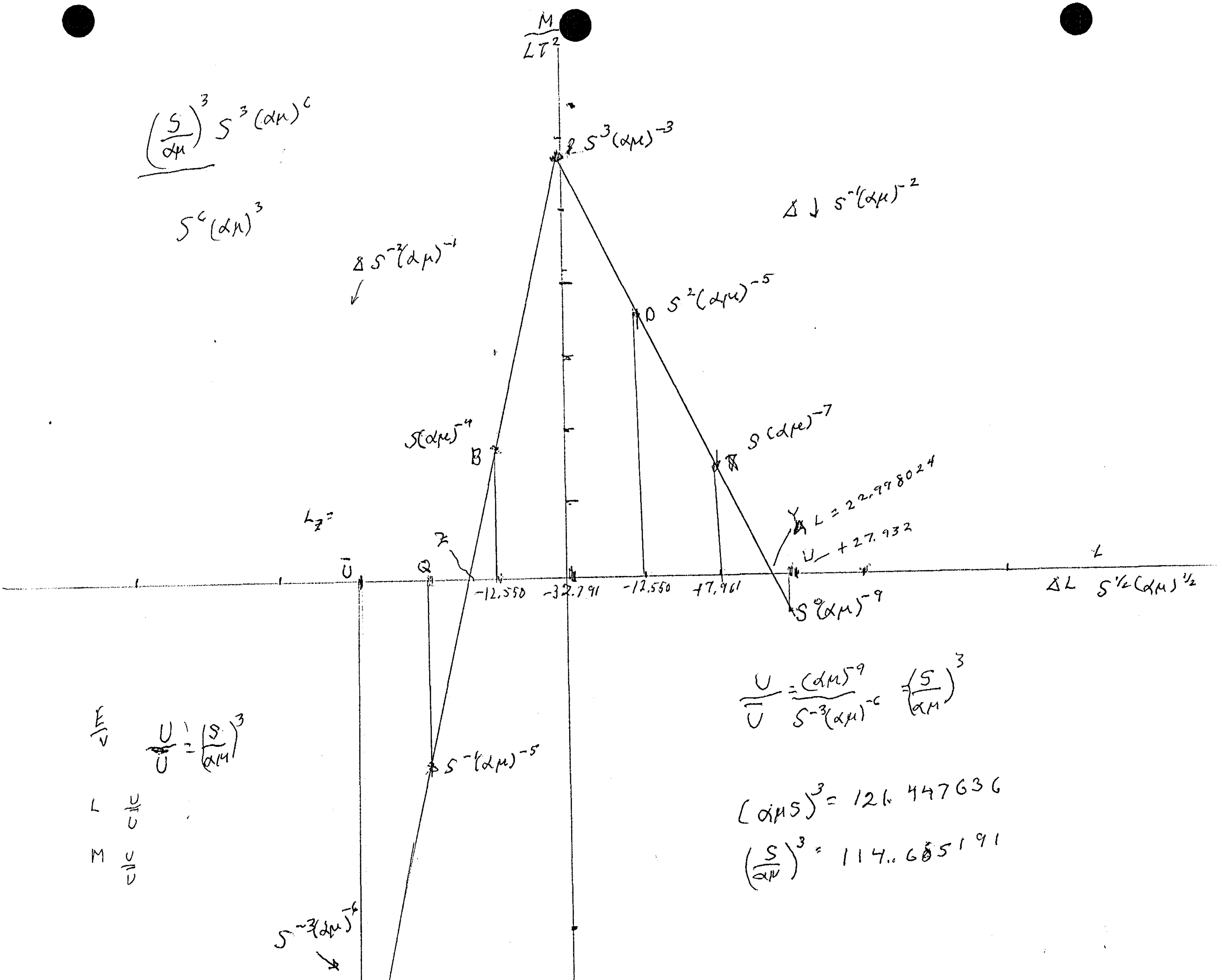
80.923
80.964 = $(\alpha\mu s)^2$
= $S^2(\alpha\mu)^{1/2}$

Δ = 0.040

55.789365
29.078257
84.867622 = $S^2(\alpha\mu)^{1/2}$

$$\left(\frac{S}{\alpha\mu}\right)^3 S^3(\alpha\mu)^6$$

$$S^6(\alpha\mu)^3$$



$$\frac{U}{\bar{U}} = \frac{(\alpha\mu)^{-9}}{S^{-3}(\alpha\mu)^{-6}} = \left(\frac{S}{\alpha\mu}\right)^3$$

$\frac{E}{V}$ $\quad \frac{U}{\bar{U}} = \left(\frac{S}{\alpha\mu}\right)^3$

L $\frac{U}{\bar{U}}$

M $\frac{U}{\bar{U}}$

$(\alpha\mu S)^3 = 121.447636$

$\left(\frac{S}{\alpha\mu}\right)^3 = 114.685191$

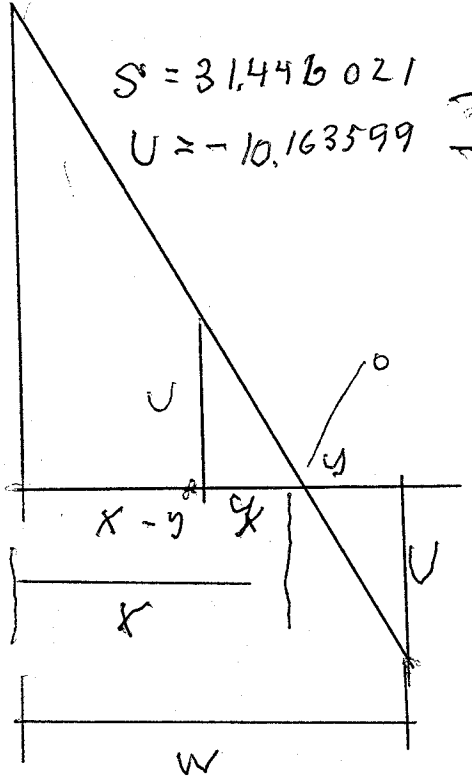
S and U

$\frac{MC^2}{L^3}$ ★ S

Energy / volume = K

$S = 31.446021$

$U = -10.163599$



I $X = \frac{Sw}{U+S}$ ✓ $\frac{636.507496}{86.246189}$ ~~86.246189~~ 41.609620

~~$X = 7.380123$~~

$X = 15.297124$

$\frac{x}{S} = \frac{y}{U}$

$y = w - x$

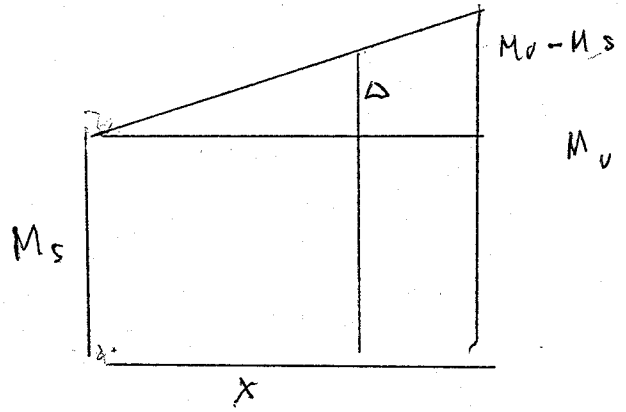
$Ux = Sw - Sx$

$Ux + Sx = Sw$

$x = \frac{Sw}{U+S}$

$L = x + \star_2 = 22.988324$

II



M_u

$\frac{\Delta}{x} = \frac{M_0 - M_s}{w}$ $\frac{x}{w} = 0.755739$

$\Delta = 14.945346$

$\Delta = \frac{x}{w}(M_u - M_s)$

$M_o = M_0 + \Delta = 47.011341$

$L_o = L_s + x$

III $K_o = \frac{M_o c^2}{L^3}$

$L = L_s + x$

redo $\frac{x}{L}$

$C^2 = 20.953641$

Z

P 114.665261
B 34.847175
79818086

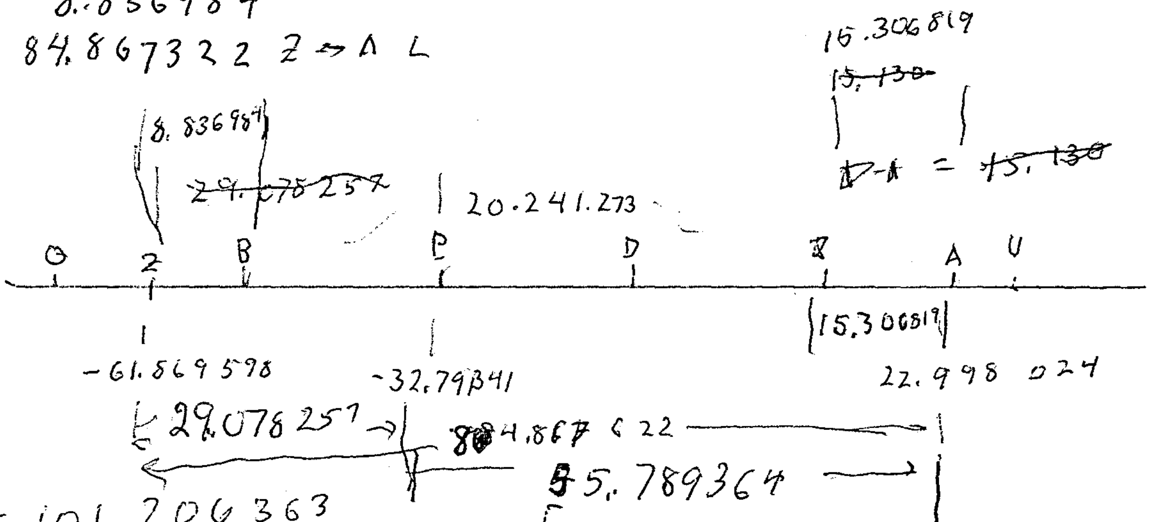
$$\frac{20.241273}{79.818086} = \frac{X}{114.665261}$$

X = 29.078257 ~~=~~ Z − P
20.241273
8.836984 = B − Z

If ↖

If B = −12
If B = −53

20.241273
3
60.723819
15.306819
76.030338
8.836984
84.867322 Z → A L



$(\alpha\mu s)^{5/2}$ = 101.206363
24.142
77.064

M_Z If L ↖ L_Z = −3.713084 L_B^3 = −11.138252 M_Z $M = \frac{L^3}{C^2}$ = −32.091893

If ↙ L_Z = −61.869598 $\hat{L}^3$ = −185.608794

$= C^2$
ρ_Z = −20.953641

C^2 = 20.953641

$\frac{M}{L}$ +25.042407 M_A = 48.040431 $\rho = \frac{1}{C^2}$

$\frac{M}{L}$ = −28.378809 M_Z = −32.091893 $\rho = \frac{1}{C^2}$

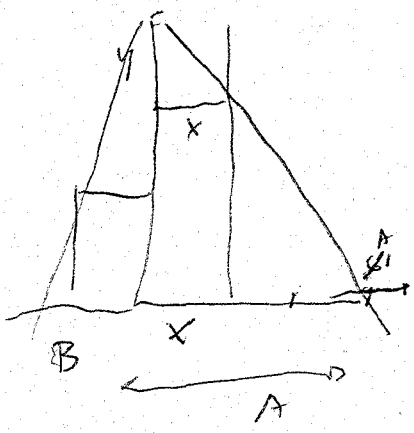
$\frac{\hat{M}}{L}$ 268.432003 $\hat{M}_Z$ = 206.502405 $\rho = \frac{1}{C^2}$

ρ_E 93.711617

ρ_D 52.102000

y 41.609 617

x 20.241273



$\frac{y}{x} = \frac{\rho_E}{A}$

$A = \rho_E \frac{x}{y} = 45.586635$

ρ_E 93.711617

ρ_B 13.873602

69.345262

60.723

8.622

$\frac{W}{x} = \frac{E}{B}$ $B = \frac{x}{W} E$

W 79. ρ 838015

B = 23.758637 ✓

A = 45.586635 ✓

A+B 69.345262 ✓

G · x

$(G\mu S)^3$ 121 447638

~~A+B~~ / 121 = ~~0.570489~~

121 − 69

= 52.102376

60.723818 $(G\mu S)^{2/3}$

8.621442

$(\mu N)^{1/3}$ 8.453

IF

TIME = T

ψ

t

τ

~~Time U~~

$G\rho_U = 14.074438$

15.765048

$G\rho_{U'} = 17.455655$

only if $\frac{M}{L} = \frac{c^2}{G}$

19.146267

TIME$_U$

14

17.455655

$\rho_U = -31.117238$

$G\rho_U = -38.272534$

$\tau = -19.146267$

$\sim \tau$

PLANCK PARTICLE–BORON MUTUALITIES

It is the present hypothesis that existing entities come into being, not by uni-directional *causality*, but by some form of bi-directional *mutuality*. In the case of frequencies such mutualities are the well known phenomenon of resonance. But in other parameters some generalized form of resonance may also be operating.

The Mass–Size Mutuality

	P		B	δ		
M	-4.662199	\	-23.776602	-19.114403	=	$(\alpha\mu)^{1/2}\ S^{-1/2}$
L	-32.791545	/	-12.550068	+20.241077	=	$(\alpha\mu)^{1/2}\ S^{1/2}$

This mutuality infers that in a one dimensional world $(\alpha\mu)^{1/2}\ S^{1/2}$ planck particles would space-wise fit into one baryon. In a two dimensional world $(\alpha\mu)$ S planck particles would fit into one baryon, and in a three dimensional world $(\alpha\mu)^{3/2}\ S^{3/2}$ planck particles would fit into one baryon. In the one dimensional case the resulting mass would be 15.579278 g [a candidate for dark matter?]. In the two dimensional case the mass would be 35.880759 g, an upper bound on stellar mass, [2.65 ⊙]. In the three dimensional case the mass would be 56.062232 g, near the suspected present mass of the universe.

The Charge-Size Mutuality

	P		B	δ		
e^2= Q	-16.500103	\	-18.636938	-2.136835	=	α
L	-32.791545	/	-12.550068	+20.241077	=	$(\alpha\mu)^{1/2}\ S^{1/2}$

The Mass-Dtime Mutuality

	P		B	δ		
M	-4.662199	\	-23.776602	-19.114403	=	$(\alpha\mu)^{1/2}\ S^{-1/2}$
$(G\rho)^{-1/2}$= τ	-43.268366	/	-3.348949	+39.919417	=	$(\alpha\mu)^{1/2}\ S$

MUTUALITY INVOLVES DIMENSION

If 3 dimensions

sphere ⟷ disk ⟷ ring ⟷ particle ≡ sphere

sphere

disk

Invariant ρ's = 93.712418

R	M
$\sqrt[3]{l_0^3}$	m_0 $(\alpha\mu S)^0 m_0$
$\sqrt[3]{\pi r_e l_0^2}$	$16.076 = (\alpha\mu S)^{1/2} m_0 \cdot \pi$
$\sqrt[3]{r_e^2 l_0}$	$35.820\ (\alpha\mu S)\ m_0$
$\sqrt[3]{r_e^3}$	$56.06\ (\alpha\mu S)^{3/2} m_0$

If linear not rule

D	R	M
0	l_0	$(\alpha\mu S)^0 m_0$
1	$(r_e l_0^2)^{1/3}$	$(\alpha\mu S)^{1/2} m_0$
2	$(r_e^2 l_0)^{1/3}$	$(\alpha\mu S)\ m_0$
3	r_e	$(\alpha\mu S)^{3/2} m_0$