

Energy 0, Probability 1, Exchange 2

From what I have read man has always had creation myths. They are also called cosmologies and we think they are becoming more accurate with the invention of mathematics and application of the scientific method. We discuss possibilities, obtain data and attempt to fit fundamentals together because we are curious and draw meaning from nature. Over time we understand more and ascribe less to supernatural causes. Nature's beauty and size is awesome and our cosmology deserves a fresh view. On the surface, physics tells us that mass is solid and distributed throughout space but we also know this observation is mind based information.

Natural logarithms, complex numbers and a few conservation laws are all we need to understand most of physics. The topics covered include current questions regarding unification, quantum gravity and cosmology but many of the details are in references due to our 10 page limitation. The title will be explained but it is proposed that mass plus kinetic energy is balanced to zero by field energies and that the number of particles in the universe is explained by probability 1 as an initial condition.

Natural logarithms

The following "information code" was a result of correlating fundamental energy data [4][14]. I do not know why this code is used by nature but it anchors energy values. The numbers are natural logarithms. There are four sets and total 90.

Fundamental	
N values	
↓	
15.432	set1
12.432	
13.432	set2
12.432	
13.432	set3
12.432	
0.075	set4
10.333	
90	

Set 2 is used in the example below. The code doesn't represent energy until after the following arithmetic exchange on each set. Set 2 starts with the natural logarithms 13.43 and 12.43. The number 2 is added to

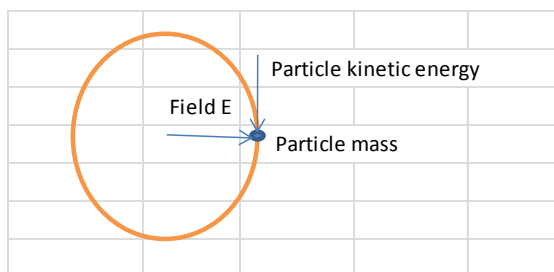
13.43 to become 15.43 and 2 is subtracted from 12.43 to become 10.43. This will be called an energy interaction and the four values of N involved in the exchange will be called a quad.

Before adding and subtracting 2				After adding and subtracting 2			
		MeV			MeV		
		$E=e0*\exp(N)$			$E=e0*\exp(N)$		
N1	13.43	13.8 E1 mass	N3	15.43	101.95	E3 field	
N2	12.43	5.1 E2 ke	N4	10.43	0.69	E4 field	

Information N is conserved ($13.43+12.43=15.43+10.43$). Each of the four positions has a specific meaning. N1 is always a mass, N2 is kinetic energy, N3 is a strong field and N4 is a component of the gravitational field. Energy is evaluated by the equation $E=e0*\exp(N)$ where $e0=2.025e-5$ MeV. E0 was determined from N for the electron ($10.136=10.333-2*\ln(3/e)$) and its known energy 0.511 MeV.

Result of Energy Interaction				
	ke (difference ke)		E3 field1	
E1 mass	E3+E4-E1-E2	E2 ke		E4 field2
MeV	MeV	MeV	MeV	MeV
13.797	83.761	5.076	-101.947	
				-0.687
E1+difference ke+E2		102.634	E3+E4	-102.634
Energy is conserved since 102.634=102.634				

Total energy is conserved to zero (102.634 MeV- 102.634 MeV) using the convention that fields are negative. The numbers represent two orbits. The 13.8 MeV mass orbits with 83.76 MeV of kinetic energy in a 101.95 MeV strong field energy and a 0.69 MeV gravitational field energy component. Here is the strong orbit:



The particle mass 13.8 MeV is one of the quarks in a neutron. The table below adds three quark energies together from quads 1 through 3. When these quads are treated the same way and added together they make the neutron of mass 939.57 MeV within measurement error [10]. Their masses total 130.163 MeV and their kinetic energies total 799.25 MeV.

	Mass and Kinetic Energy		Field energy	
	Mass	ke	Strong	Gravitational
	MeV	MeV	field energy	Energy
	MeV	MeV	MeV	MeV
Quark S	101.947	631.729	-753.291	-0.687
Quark U	13.797	83.761	-101.947	-0.687
Quark D	13.797	83.761	-101.947	-0.687
	129.541	799.251	-957.185	-2.061
	129.541	799.251	0.671	0.622
		10.151		
Neutron		939.565	Mev	

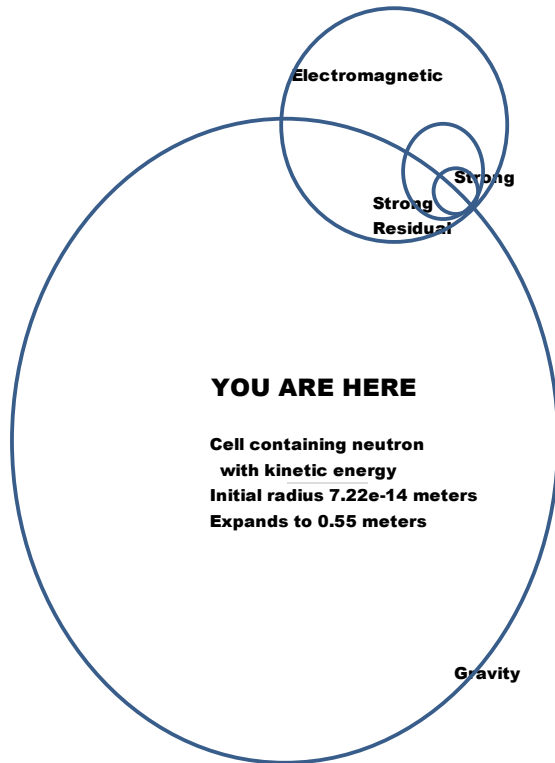
The two energies 0.671 MeV and 0.622 MeV come from quad 4 of the information code (Endnote 2: The electron quad). The logarithm 12.432 gives $E=e0*\exp(N)=2.025e-5*\exp(12.432)=5.076$ MeV. Multiples of this energy appears several times in the tables above and below (10.15 MeV and 20.30 MeV).

Neutron Model

The “Neutron Model” below lists the total mass, kinetic energy and fields associated with the neutron. Quad 4 of the code also gives us the 4th component of the gravitational field energy (-0.671 MeV) which totals -2.73 MeV.

	Mass and Kinetic Energy		Field energy	
	Mass	KE	Strong	Gravitational
	Quarks		Residual	Energy
	MeV	MeV	Field	MeV
Strong	130.16	799.25		-957.18
Strong Residual KE		10.15		
Neutron		939.57 (-20.30)		-959.92
neutrinos		0.05		
Gravitational ke		10.15		
Gravitational pe		10.15		
Total		959.92		

With one further transition in quad 4, the neutron becomes the proton [4]. The orbits are “nested”. The outer most orbit represents quantum gravity and is the source of space and time.



The values in the neutron model above unify the four forces of nature [14]. The three quarks are imbedded in strong field energy -957.185 MeV. The total field energy for the neutron is -959.92 MeV. This is lower than the neutron mass 939.565 MeV and the “missing energy” is a potential energy field -20.3 MeV within a neutrino of 0.05 MeV. A quark “bundle” in their strong field energy falls into the 20.3 MeV field energy and gains 10.15 MeV from its fall. This orbit is labelled the strong residual field above and changes in this field are responsible for the binding energy curve [8][9]. The neutron subsequently falls to a radius 7.22e-14 meters in the gravitational field -2.73 MeV. It originally had kinetic energy 20.3 MeV but when the gravitational orbit was established, the kinetic energy was 10.15 MeV and the potential energy was 10.15 MeV. As the neutron transitions to a proton, electron and anti-neutrino, the electromagnetic field -27.2e-6 MeV is established. The table energy plus the associated gravitational kinetic energy balances the total energy (959.92 MeV-959.92 MeV= 0).

Complex Numbers

Simple logarithmic arithmetic is not the only math required. Nature uses complex numbers and we interpret these as waves. Look again at the “orbit” formed by quad 2 of the information code:

The time for one cycle of the wave is $2\pi R/C$ since the wave moves at C (R is the radius of a circle).			
$2\pi R/C=1/\text{frequency}$			
$2\pi R/C=H/E$	where H=Heisenberg's Constant $4.136\text{e-}21$ mev-sec.		
Using the same orbit from set 2:			
Field energy E		101.947	mev
$2\pi R/C$	time	4.057E-23	seconds
H/E	time	4.057E-23	seconds
solve for R:			
$R=H\cdot C/(2\pi)E$		1.936E-15	meters

This “quantum circle” can be characterized by complex numbers and a “particle” is the point where the math allows the complex numbers to be a real number. This is its source of quantum mechanics, particle/wave duality and the Heisenberg uncertainty principle. The Copenhagen interpretation makes quantum mechanics an information science “...the only information we can have about a particle position is probabilistic”.

Time is around the quantum circle and Heisenberg’s constant is the conversion between frequency and energy. The most probable radius can be found with the following equation:

$R=H\cdot C/(2\pi)/(E\cdot E')^{.5}$ with $E'=101.947=13.797/0.1353$ MeV with $H\cdot C/(2\pi)=1.93\text{e-}13$ MeV-m. The divisor $0.1353=1/\exp(2)$. When 2 is added to N1 to become N3 in the energy interaction, it has the effect of adding energy to N1 to become a mass with kinetic energy. Dividing by 0.1353 is identical to the concept of gamma in special relativity with $\text{gamma}=\text{mass}/(\text{mass}+\text{kinetic energy})$.

Information

Information is defined by the following equation:

Information= - k ln P, where P is a probability [1].

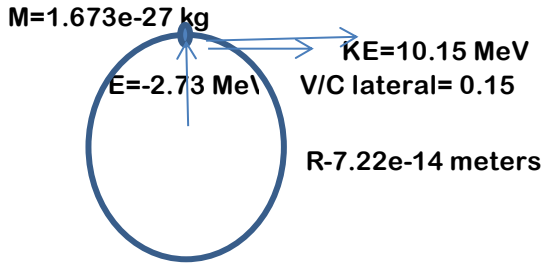
We used the equation, $E=e_0\cdot\exp N$ to model the neutron, but we can take the log of the equation and have $N=-\ln(e_0/E)$. Comparing this to the definition of information we see that N is information and e_0/E can be a probability. We also recognize that probability $P=1/\exp(N)$.

Space

The fundamentals of quantum gravity are based on the field energy -2.73 MeV (Endnote 1). The quantum radius is $7.22\text{e-}14$ meters.

Identify the radius and time for the gravitational orbit described above			
Fundamental radius=$1.93\text{e-}13/(2.732\cdot 2.732)^{.5}=7.224\text{e-}14$ meters			
Fundamental time=$7.224\text{e-}14\cdot 2\pi/(3\text{e}8)=h/E=4.13\text{e-}21/2.732$			
Fundamental time		1.514E-21	seconds

The neutron falls to this radius with 10.15 MeV of kinetic energy. General relativity extends to the quantum level [Endnote 1] and the following diagram is the origin of space and time.



Probability was 1.0 at the beginning (proof? The big bang occurred). The logarithm $N=90$ is maintained by the fundamental information code and its probability $P= 1/\exp(90)=8.2e-40$. The neutron table mass+kinetic energy values are very improbable. The fields of the quads that make up the neutron are equally improbable.

Mass & Ke		Field	
N values		N values	
↓		↓	
15.432	↘ set1	17.432	
12.432		10.432	
13.432	↘ set2	15.432	
12.432		10.432	
13.432	↘ set3	15.432	
12.432		12.432	
0.075	↘ set4	0.075	
10.333		10.333	
90		90	
P=1/exp(90)		P=1/exp(90)	
		P=1/exp(180)	

Nature appears to duplicate the neutron $\exp(180)$ times to maintain initial probability 1.0. That is, $1/\exp(90)*1/\exp(90)*\exp(180)=1.0$. The duplicate neutrons fill space simultaneously but are excluded from overlapping one another (the Pauli Exclusion Principle). There is no need to believe that the big bang was a point. The time zero radius of the universe could have been $\exp(60)*1.22e-14$ meters= $8.5e12$ meters ($\exp(180)$ is $\exp(60)$ in three dimensions). As duplication occurs, the gravitational field in the orbit shrinks by $\exp(90)$ [again Endnote 1] and expansion occurs because the kinetic energy of the neutron (10.15 MeV) represents temperature and pressure [6][14]. The kinetic energy at the present time is, by the Boltzmann equation, 2.73K after He4 primordial nucleosynthesis is considered [13].

Time

During expansion, kinetic energy (ke) is converted into gravitational potential energy ($pe=F*r$) over *time*. Time enters physics through cosmology. The derivation below indicates that the increasing radius of the universe and increasing time are related through expansion.

Kinetic E	Potential Energy
KE	F*r
1/2M(v)^2	GMM/r
1/2M(r/t)^2	GMM/r
1/2Mr^3/t^2	GMM
1/(2GM)*r^3	t^2
(r/r0)^3 increases as (t/t0)^2	

The above derivation contains only radius and time and is a requirement for kinetic energy conversion. If we believe that expansion occurred we must believe that time advances. Each cell is quantum (identical), expansion occurs uniformly and “fundamental time” around the quantum radius $1.22e-14$ equals $1.5e-21$ seconds. Elapsed time (additive repeats of $1.5e-21$ second) is the primary variable for the expansion equations. This cycle is established and maintained by the quantum mechanics of the gravitational field inside each neutron (the model above). Since each neutron/proton is identical and none occupy a preferred position all protons advance in elapsed time simultaneously. Special relativity is preserved by a secondary slower measure for time additive over many cycles of fundamental time. (Twins standing together in time at the end of the twin paradox trip indicate to me there are two measures for time).

Conclusions

Mathematics is fundamental to physics because it uses information to model the universe around us. The energy interaction whereby the logarithm 2 is added and subtracted from quads of information code is the “creative act” that makes us think particles are solid and form orbits. We do not know the origin of the information code, nor do we know why nature uses this information exchange to separate zero into the energy components around us. The initial conditions: energy=0, probability=1 and exchange=2 plus the exclusion principle are fundamental to creation. The math of complex numbers causes us to believe in particle/wave duality. Combined, we can partially understand what the universe was created out of and why there are so many particles separated in space. Gravity is caused by a neutron falling to a curvature like other particles fall to their respective curvatures. However to understand gravity we have to properly interpret data obtained by astronomers and astrophysicists [11][18] and use the concept of cellular cosmology [2][3][5][7].

Most of us agree that we should not confuse mathematical models with reality but what should we believe about information? It seems to me that nature is information based and we are part of it. Is it possible to participate in some small way? Sir James Jeans said, that “the universe begins to look more like a great thought than a great machine”. Based on what I presented, it appears that there was information before the big bang. I don’t have a problem ascribing this to a great mind until we can understand it more fully.

Endnote 1 Cellular cosmology and quantum gravity

In general relativity [18] the metric tensor (scholarly matrix equations from general relativity) is based on $(ds^2 = \text{three distances}^2 + (C \cdot \text{time})^2)$. Note that ds^2 is a surface area and it is this surface that we will break into $\exp(180)$ small pieces. Let small r represent the radius of a small sphere and big R represent the radius of one large sphere with the same surface area as $\exp(180)$ spheres. Position a proton like mass on the surface of each sphere and call it a cell. Using small cells of radius r to simulate a large radius R (literature would call this the radius of the universe) is critical to understanding cosmology. In this model [4], the universe is filled with the *surface* of many small cells that are equivalent to the *surface* of one large sphere. This is important conceptually because we can be inside the universe (something we all observe), each surface can be identical and the concept that there is no preferred location can be preserved. A large spherical surface offers this property but the equivalent surfaces of many small spheres also offer this property as long as we do not distinguish an edge. As such a surface model equivalent to the surface of many small cells is useful if the fundamentals of each cell are known and the neutron model contains the fundamentals.

Consider large mass M broken into $\exp(180)$ cells, each with the mass of a proton labelled lower case m below. The mass (m) of a neutron is $1.67e-27$ kg. The total energy will be that of one neutron/cell plus a small amount of expansion kinetic energy (10.15 MeV). We will evaluate the gravitational constant G of a large sphere and compare it with G of many small cells.

$$\begin{aligned} \text{Area} &= 4 \cdot \pi \cdot R^2 \\ \text{Area} &= 4 \cdot \pi \cdot r^2 \cdot \exp(180) \\ A/A &= 1 = R^2 / (r^2 \cdot \exp(180)) \\ R^2 &= r^2 \cdot \exp(180) \\ r &= R / \exp(90) \quad \text{surface area substitution} \\ M &= m \cdot \exp(180) \quad \text{mass substitution} \end{aligned}$$

For gravitation and large space, we consider velocity V , radius R and mass M as the variables (capital letters for large space) that determine the geodesic. With G constant, $M = m \cdot \exp(180)$ and the surface area $R = r \cdot \exp(90)$, the gravitational constant would be calculated for large space and cellular space as follows (lower case r, v and m below are for cellular space):

At any time during expansion		
<u>Large space</u>		<u>Cellular Space</u>
		With substitutions:
		R=r*exp(90) and M=m*exp(180)
R*V^2/M=	G=G	r*exp(90)*V^2/(m*exp(180))
R*V^2/M=	G=G	(r*v^2/m)/exp(90)

For G to be equivalent between many small cells and one large sphere the geodesics (the combination of r,v and m that give G) of cells must be multiplied by the small factor 1/exp(90). This value is the gravitational coupling constant [5] for a cell that has cosmological properties, i.e. the force is shared with exp(180) particles on a surface that is 1/exp(90) of the total surface. The author documented a quantum theory of gravity [15] and proposed a proper energy scale for gravity [5]. The quantum scale was identified as radius 7.22e-14 meters. Using values for the neutron/proton mass model that the author believes unify nature's forces (14), the gravitational constant is calculated below and agrees with the published constant, G=6.674e-11 NT meters^2/kg^2.

GRAVITY		proton	neutron
Neutron Mass (mev)		938.2720	939.565
Neutron Mass M (kg)		1.673E-27	1.675E-27
Field Energy E (mev)		2.732	2.732
Kinetic Energy ke (mev)		10.111	10.140
Gamma (g)=M/(M+ke)		0.9893	0.9893
Velocity Ratio v/C=(1-g^2)^0.5		0.1456	0.1457
R (meters) =(HC/(2pi)/(E*E)^0.5		7.224E-14	7.224E-14
Inertial Force (F)=(M/g*V^2/R)*1/EXP(90) N		3.656E-38	3.666E-38
HC/(2pi)=1.97e-13 mev-m			
Calculation of gravitational constant G			
G=F*R^2/(M/g^2)=NT m^2/kg^2		6.6739E-11	6.6743E-11
Published by Partical Data Group (PDG)		6.67E-11	6.6743E-11

The gravitation constant G is calculated above from fundamentals. The coupling constant 1/exp(90) scales the quantum level to the large scale we observe around us. It has the effect of dramatically reducing the force between protons and makes gravity very long range compared to the other forces. It also unifies special relativity and general relativity [14][16] and allows nature

to use the general theory of relativity at the quantum level. The author calls this cellular cosmology.

Endnote 2 The electron quad

The neutron decays to a proton, electron and neutrinos with a half-life of 881 seconds (PDG). The decay process starts with separation between a 4th and 5th quad. Quad 5 forms when it “borrows” 10.33 from quad 4. Quad 5 changes slightly as the neutron decays; the N=10.33 borrowed from quad 4 becomes 10.136+0.196. The electron is mass E1=0.511 MeV. Charge separates giving the electron and proton equal and opposite electromagnetic field energy 27.2e-6 MeV. Details follow:

			-0.296	-2.72E-05	
			equal and opposite charge		
E1 Quad 4	-10.33	-0.62	-10.33	-0.62	E3
E2 Quad 4	10.41	0.67	10.41	0.67	E4
E1 Quad 5	10.136	0.51	10.33	0.62	E3
E2 Quad 5	0.197	2.47E-05	0.296	2.72E-05	E4

			Difference KE
E1 mass	E3 field		KE=E3+E4-E1-E2
E2 ke	E4 field		

Quads 4 and 5 use the same position identifiers and rules.

E1 for quad 5 mass is the electron 0.511 MeV.

E2 for quad 5 kinetic energy=2.47e-5 MeV is the electron anti-neutrino.

E3 is identified as field energy but is 0 for quad 4 and 5 together (0= -0.62+0.62).

E4 is the electromagnetic field energy as N=0.296-0.296 splits. E4 is 2.72e-5 MeV.

Difference energy 0.111 MeV=0.622+2.7e-5-0.511-2.47e-5.

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