Creation and Schrodinger's Equation

Gene H. Barbee

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Abstract

The solution to a Schrodinger equation is the basis of a broad theory. The Dirac equation superseded the Schrodinger equation because it is relativistic and has 4 components that accurately represent half spin particles like the electron and quarks. This paper presents a way of making the Schrodinger equation relativistic. It has many components and is complex enough to represent the neutron, proton and electron but is general enough to help us understand nature. Our goal is to find clues related to creation.

The Schrodinger equation described by MIT as unitary evolution [20] has a simple solution: Probability P=1 in the left hand side (LHS) of the Schrodinger equation is equal to the multiple of complex conjugate terms exp(iEt/H)*exp(-iEt/H) in the right hand side (RHS) where i is the imaginary number, H=Planck's constant, E is field energy and time t is the time around a quantum circle at velocity C. (exp(iEt/H) stands for the natural number e to power iEt/H).

Observation is fundamental to quantum mechanics and the Copenhagen interpretation indicates that we can only describe the probability of an event within certain limits. Shannon's definition [9] of information (information = -natural logarithm(probability) will be used to explore the relationship between information and energy.

Has something been separated in the multiple exp(iEt/H)*exp(-iEt/H)=1? The number 1 has been separated into two expressions that represent waves, but it is a dynamic separation; it repeatedly comes back to 1 as time moves forward. The idea that nature originates as a series of separations is an old idea, for example, recall that Genesis contains the words "So God made the expanse and **separated the water** under the expanse from the ... as **Genesis** 1:7 ends with the phrase 'from the **water** above it [the expanse]'. Another phrase from Genesis is "in the beginning was the word".

Consider a beginning with zero energy. This avoids the endless argument that things are made of other things, ad infinitum. Meaningful equal and opposite energy pairs come into existence at the same time but represent zero overall. Also consider probability one as a beginning condition. It simply means the universe exists.

Background

The work below derives relationships that obey energy zero and probability one initial conditions. Everything will be created through separation. One result is a model of the neutron, proton and electron that provides insights into physics and cosmology [10][11][19][21].

Restrictions: P=exp(-i Et/H)*exp(i Et/H)=1 where Et/H=1. This means we deal with the unitary point where the wave function collapses on a quantum circle. The time (t) to circle radius R=HC/(2piE) is t=2 pi R/C, where E is field energy and H is Planck's constant (4.13e-21 MeV-sec). These restrictions may mean we are not dealing with translation of particles that involve x,y and z like the Dirac equation.

Components of P=1

The RHS of the Schrodinger equation will have pairs of complex conjugates exp(iEt/H)*exp(-iEt/H). Each pair of components will represent waves moving through time cycles. A sinusoidal wave is

represented on a circle with a vertical imaginary axis and a real horizontal axis (exp(i theta)=cos theta +i sin theta). If there is mass and kinetic energy in the circles with balanced forces they are orbits with real vertical and horizontal axis. Looking ahead, four orbits in the proton mass model represent four fundamental interactions. The P=1 constraint and the E=0 constraint are further defined below.

Probability= 1 constraint

The probabilities contain exponential functions exp(N). The fraction 0.431=1/3+ln(3)-1.

1=p1*p2/(p3*p4)

N1=13.431	N3=15.431
N2=12.431	N4=10.431

p1=1/exp(13.431)	p3=1/exp(15.431)
p2=1/exp(12.431)	p4=1/exp(10.431)

1=1/exp(13.431)*1/exp(12.431)/(1/exp(15.431)*1/exp(10.431))

These N values represent P=1, but it has four probability components.

Review of natural logarithms: We will take the natural logarithm (ln) of both sides of an equation. If the equation is p=exp(a)*exp(b), and p=1, the equation becomes 0=a+b. Adding logarithms of values is equivalent to multiplying the values and ln(value)-ln(value) is equivalent to dividing values. Also recall that an exponent changes its sign when it moved from the top of an equation to the bottom of an equation. We will take the anti-logarithm as shown below to recover the original values.

P	p1*p2=exp(-i Et/H)*exp(i Et/H)	
	with Et/H=1	
multiply by adding the logarithms		
ln P	ln(p1*p2)=-i+i=0	
P	exp(0)=1	

Example of exponent sign change:

exp(2)=7.39=1/exp(-2)

Evaluate the RHS of the Schrodinger solution

Energy= 0 constraint

Apply the constraint: Energy components have overall zero energy. Mass and kinetic energy are positive and field energy is negative. It will be shown that the Schrodinger equation becomes relativistic, like the Dirac equation with P=1 and energy=0. The example math below is similar to Dirac's development with Et/H=1. It allows us to separate energy terms from time terms.

Constrain Energy to zero

1=exp(itE/H)*exp(-itE/H)

take the natural log and divide boths sides by i

0=itE/H-itE/H

0=t/H*E-t/H*E

take the square root. Since Et/H=1, E=1/(t/H)

0=(E-E)*(t/H-t/H)

0=E1-E1

Example:

a=1/b	a=.5	b=2
ab-ba		0
(a-a)*(b-b)=0	(0.5-0.5)*(2-2)=0	

The example math above is expanded to give the energy =0 constraint with four components, each with matching complex conjugates.

1=exp(itE1/H)*exp(-itE1/H)*exp(itE2/H)*exp(-itE2/H)*exp(itE3/H)*exp(-itE3/H)*exp(itE4/H)*exp(-itE4/H)

The natural log of the RHS is:

0=(itE1/H)+(-itE1/H)+(itE2/H)+(-itE2/H)+(itE3/H)+(-itE3/H)+(itE4/H)+(-itE4/H)

Using the square root procedure above with each t/H=1/E, we only need the energy terms that are equal and opposite. The square root also has a (t/H-t/H)= 0 solution that contains inverted terms.

E1-E1+E2-E2+E3-E3+E4-E4=0

E1+(E3+E4-E1-E2)+E2-E3-E4=0

Evaluating E

Next evaluate E. Looking ahead, there is another meaning associated with P=1. Overall the initial condition of the universe is probability 1, meaning it does indeed exist. There are many protons, each with mass that make up the universe. Specifically:

P= 1= probability of each proton* number of particles=1/exp(N)*exp(N). The probability of each proton is 1/exp(N). The proton itself is made of improbable components like quarks. We can evaluate the probability of particles that makes up the proton if energy is itself a probability, i.e. p=e0/E=1/exp(N), where e0 is a small constant.

p=e0/E=1/exp(N), i.e. E=e0/p.

With p=1/exp(N), E=e0*exp(N).

E1-E1+E2-E2+E3-E3+E4-E4=0

Identify E as E=e0*exp(N), using the same N values as the LHS.

0=eo*exp(13.431)-eo*exp(13.431)+e0*exp(12.431)-e0*exp(12.431)+e0*exp(15.431)-e0*exp(15.431)+eo*exp(-15.431)+eo*exp(10.431)-e0*exp(-10.431)

Mass plus kinetic energy will be defined as positive separated from equal and opposite negative field energy. E1 is the only mass term, E3 and E4 are field energy and the remainder is kinetic energy.

E1+(E3+E4-E1-E2)+E2-E3-E4=0 (rearrange)
E1 is mass, (E1+E4-E1-E2)+E2 is kinetic energy.
E3 and E4 are equal and opposite field energies
mass1 + kinetic energy- field energy3-field energy4=0

Probability 1 in the LHS gives the probability of finding mass1 with kinetic energy at the collapse point on the circle defined by exp(iE1t/H)*exp(-iE1t/H)*exp(iE2t/H)*exp(-iE2t/H), etc,.

Quarks

The Schrodinger unitary evolution equation with four parts, probability 1 and energy 0 will be shown below to represent one of the quarks. The pre-exponential value e0 was calculated from the known mass of the electron (0.511 MeV) and its N= 10.431-3*ln(3/e)=10.136 (e0= 0.511/exp(10.136)=2.02e-5 MeV).

The four N values discussed above and their associated energy is called a quad. I place the E values E=e0*exp(N) in a box to the right of each N value. The key to distinguishing mass from kinetic energy and two fields is shown below. The positions are not interchangeable.

Mass	Field 3
Kinetic Energy	Field 4 (G)

		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

E1=2.02e-5*exp(13.43)=13.79, E2=2.02e-5*exp(12.43)=5.08, E3=2.02e-5*exp(15.43)=101.95, E4=2.02e-5*exp(10.43)=0.69 (all in MeV).

Energy zero construct					
	E3+E4-E1-E2				
E1 mass	ke	E2 ke	E3 field1	E4 field2	Esum
mev	mev	mev	mev	mev	
13.80	83.76	5.08	-101.95	-0.69	0.00

Overall, above: E1+(E3+E4-E1-E2)+E2-E3-E4 =0= (E1-E1)+(E2-E2)+(E3-E3)+(E4-E4). These separations are inside a quark. The energy (E) values are exponents in the MIT version of the Schrodinger equation solution. This means with probability 1 that mass E1 (a quark) with kinetic energy (E3+E4-E1-E2+E2) is orbiting field energy E3 and mass+ke is also orbiting field energy E4. Field energy E4 is a component of the gravitational field energy. The energy E2+E2= 10.15 MeV is fundamental to atomic fusion and expansion of the universe.

> Note: Study of mesons and baryons [17] indicated that the above quark mass 13.8 MeV transitions to mass 2.49 MeV + 11.31 MeV of kinetic energy. The quark masses agree with Particle Data Group (PDG) [4] data. Two quarks have mass 2.49 MeV and one has mass 4.36 (multiples of 0.622 MeV from Quad 5).

Prove that P=1 and E=0 constraints are relativistic

If an equation satisfies the famous relationship E^2= (mC^2)^2+P^2C^2 it is relativistic. P=momentum=mV and gamma is a shift into the time dimension with velocity. The above equation can be used to define gamma.

Gamma= (1-(V/C)^2)^0.5=m/(m+ke) (mass 13.78 MeV is already mC^2).

Example calculations for quark2:

Quark 2	Energy zero	E1+	(E3+E4-E1-E2)+	E2	-E3-E4=0	
		13.797	83.76	5.08	-102.63	0.000

Quark 2							Energy=102.63 MeV
g=m/(m+ke	V/C	P	PC (mev)	P^2C^2	M^2	P^2C^2+M^2	E^2
1.34E-01	0.99092316	3.39242E-07	101.7021847	10343.33438	190.357	10533.692	10533.6918

gamma=13.8/(13.8+83.8+5.07)=.135

P=mV=m/gamma*V/C*C/C^2	
m is in mev	

It is proven above that P^2C^2+(MC^2)^2=E^2. The square root of E^2 is 102.63 MeV, the total energy in the quad E3+E4. The energy 0, probability 1 constraint makes the Schrodinger equation relativistic. It also defines the relativistic equation E^2=(MC^2)^2+P^2C^2.

Neutron and proton model

The author developed a neutron model (that decays to a proton, electron and anti-neutrino) approximately 25 years ago and applied it to important natural processes. More recently it was discovered that it is supported by relativistic wave equations with the restrictions probability 1 and energy 0. Details of the neutron model are in Appendix 2.

						Mass, Kinetic Energy and Fields for Neutron=0					
	N for Neutron Energy Interactions								Expansion		Gravitational
	mass	Energy	S field	Energy	Mass	Difference I	Weak KE		KE	Strong field	Field
	ke	MeV	G field	MeV	MeV	MeV	MeV	MeV	MeV	MeV	MeV
Quad 1	15.43	101.95	17.43	753.29	101.95	652.03				-753.29	
	12.43	5.08	10.43	0.69							-0.69
Quad 2	13.43	13.80	15.43	101.95	13.80	88.84				-101.95	
	12.43	5.08	10.43	0.69							-0.69
Quad 3	13.43	13.80	15.43	101.95	13.80	88.84			10.15	-101.95	
	12.43	5.08	10.43	0.69		-30.45	10.15		10.15		-0.69
Quad 4	-10.33	0.00	-10.33	0.00							
	10.41	0.67	10.41	0.67				0.671	t neut ke		-0.67
Quad 5	10.33	0.62	10.33	0.62		0.62				-0.62	
	0.00	0.00	0.00	0.00							
	90.00	sum	90.00	sum	129.54	799.87	939.5654133	0.671	20.30	-957.81	-2.73
							NEUTRON MASS		Total m+ke	Total fields	
									Total positi	Total negative	
									960.54	-960.54	
									MeV	MeV	

The left hand side of the neutron mass model above defines N values for four probabilities for each of three quarks (quads 1, 2 and 3) and N values that lead to the electron (quads 4 and 5). The right hand side of the table below describes the Energy= 0 constraint.

The box to the right of the vertical solid line labelled "Mass, Kinetic Energy and Fields for the Neutron" give energy for five quads required to define the neutron and its decay to a proton, electron and anti-neutrino. Field energy is shown in the two columns on the right side of the table. Difference energy for Quad1=652.03=753.29+0.69-101.95 MeV. Mass with kinetic energy orbits in the field energy. An additional separation occurs which is 6 times 5.08 =30.45 MeV kinetic energy. This kinetic energy is associated with fusion energy (10.15 MeV) and expansion energy (20.15) MeV. This model shows 129.54 for the mass of the quarks.

There are many other conserved quantities, for example: N's are conserved in each quad, i.e. 15.431+12.431=17.431+10.431. The five quads sum to N=90 at the bottom of the table for Mass and Kinetic energy and N=90 for Field Energy.

Number of neutrons in the universe

Overall the probability of the universe is 1. There are many neutrons→proton+ electrons+ aen and each is highly improbable. The probability of a particle is p=e0/E=1/exp(N). The components total N=90 for mass+Ke and N=90 for field energy [Appendix 2, "N values for neutron components"]. Mass and fields both exist in each neutron and this means its overall probability is 1/exp(90)*1/exp(90)=1/exp(180).

P= 1= probability of each particle* number of particles=1/exp(N)*exp(N)=1/exp(180)*exp(180).

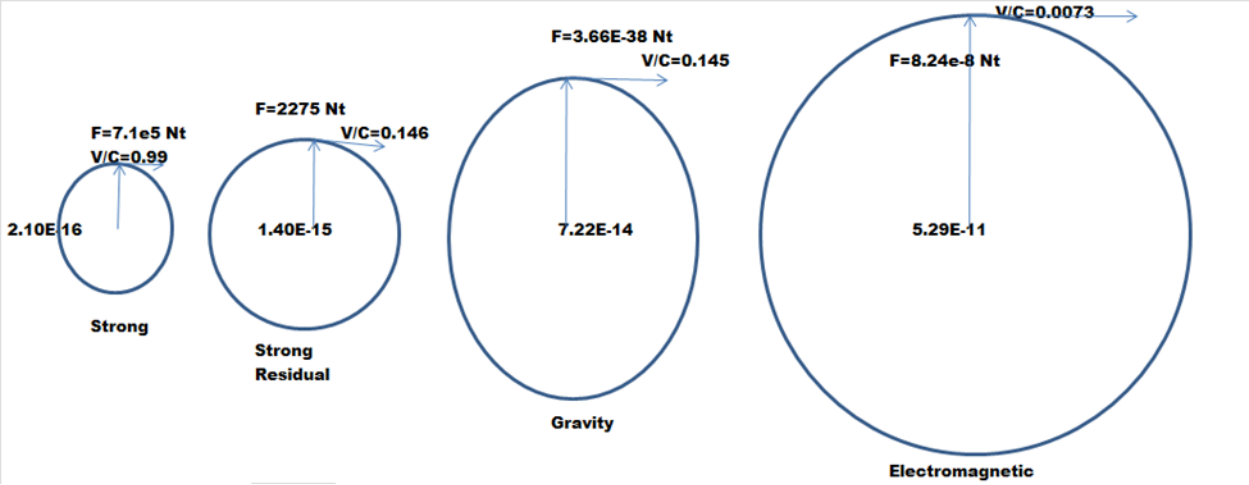
Number of neutrons =exp(180). (This agrees with the cosmology review in Appendix 1.)

Energy for the entire table is 960.54 MeV for both mass plus kinetic energy and opposite fields. Quad4 produces a neutrino (kinetic energy and properties) with spin -0.5. Spin of the three quarks total 0.5 balancing the table to zero spin [see discussion on spin in the section entitled "Why are there many mesons and baryons"].

The neutron energy 939.5654 MeV is constant and agrees with the PDG data to many significant digits. The author discovered the N values with the help of data from sources reviewed in the section below entitled "Data Check".

Orbits in the neutron model

The neutron model obeys probability 1, energy 0 constraints and contains the following orbits. The radius of each orbit is R=hC/E where E is the field energy from the model. Velocity of each orbit is V/C=(1-gamma^2)^0.5 where gamma=m/(m+Ke) from the model. The circles are labelled Strong (E3), Strong Residual (with -20.3 MeV field energy). Gravity field energy is the sum of E4 for four quads (3*-.69-.67= -2.73 MeV). Appendix 3 discusses unification of forces [10] based on mass with kinetic energy separated from field energy. The electromagnetic orbit is in the section entitled "Perception and the electron".



Why are their many Mesons and Baryons?

I spent a year studying and modeling 2016 Particle Data Group (PDG) data [17] that lists measured properties of 180 mesons and baryons. Baryon and meson properties are based on the proton energy values and there are many due to tunneling and combinations of quark properties. I found that quark properties are Schrodinger based quantum circles that obey conservation rules involving Charge, Parity and Time (CPT) and Fields (F). Parity is handedness (information). Charge (C) and spin (T) are related to time. Charge is a state related to electromagnetic field energy and it will also have the value -1. Spin is angular momentum but we will use Et/H=1 as the spin property with time moving around the circle. The Quantum Mechanics Standard Model assigns quarks spin number 0.5 (T) and the strange quark fractional charge -0.33 [17]. The diagram shown below shows that parity or spin conjugation changes the charge to 0.67 (a change of 1). The strange quark conserves CPT (meaning C+P+T) = 0.67.

Strange quark			
initial charge= -0.33			
spin number= 0.5			
parity number =0.5			
add and subtract numbers		conjugated Strange	
Charge	-0.33	0.67	0.67
Parity	0.5	-0.5	0.5
Time	0.5	0.5	-0.5
CPT conserved	0.67	0.67	0.67

(Use your hands to illustrate this. Your left hand has parity 0.5 and your thumb is charge down. Spin (T) is positive when it comes into the tip of your fingers).

Each quark also has a strong Field (F) state. The strong field energy is opposite quark mass energy and often larger. It can also be assigned the value Et/H=1 but its Field number is -0.5. Mesons always contain one quark (Q) and one anti-quark (q). According to my analysis, the 130 mesons in the 2016 PDG Particle Physics Booklet [17] all conserve CPTF=0. Some baryons contain three quarks (QQQ) with at least one Up or Down quark. The remaining baryons contain three anti-quarks (qqq) with at least one up or down anti-quark. Baryons must have isospin (I) to balance the three quarks -0.5 fields and the up and down quarks contribute this property. The 50 baryons in the PDG tables conserve CPTFI=0.

The property diagrams below represent the neutron and proton. Parity conjugation changes the proton quark (Down, Up, Up) properties into neutron quark properties. The properties below the table are the sum of the individual quark properties.

Proton D-U-U

Original parity	0.5	-0.5	-0.5
Parity P	0.5	-0.5	-0.5
isospin I	0.5	-0.5	-0.5
Charge	-0.33	0.67	0.67
spin (T)	0.5	0.5	0.5
name	DOWN	UP	UP
Mass	4.35685114	2.49	2.49
MeV			
CPT invariance	0.67	0.67	0.67

Isospin	-0.5
Proton charge	1
Proton parity	-0.5
Proton spin	1.5
CPTI	1.5
Fields	-1.5
CPTIF	0

Neutron D-U-U (parity changes charge)

Original parity	0.5	-0.5	-0.5
Parity P	0.5	-0.5	0.5
isospin I	0.5	-0.5	-0.5
Charge	-0.33	0.67	-0.33
spin (T)	0.5	0.5	0.5
name	DOWN	UP	UP
Mass	4.356851	2.49	2.49
MeV			
CPT invariance	0.67	0.67	0.67

Isospin	-0.5
Neutron charge	0
Neutron parity	0.5
Proton spin	1.5
CPTI	1.5
Fields	-1.5
CPTIF	0

Quarks are simple quantum circles that can change states by 1. The sum of states is conserved. The question is why does spin or parity change the charge? When you look down at the top of the parity -0.5 (right hand) circle, spin is clockwise (into your fingertips) and charge is up but if you turn your hand over, both charge and spin are opposite the original values. Quantum circles for quarks are like coins with two sides and looking down at a stack of quarks it contains some "heads and tails". Other coins (parity conjugated coins) have the same right hand face on the top but a left hand face on the bottom. Charge direction is up on one side and down on the other but spin is unchanged (put your hands together with fingers matched but one hand turned over). Quark quantum circles are two sided "objects" and orientation changes charge.

The proton consists of quantum circles but the quantum circles are related to time ratios. All properties are just different properties of time. The sum of the properties represented by these quantum circles is zero. Quantum circles have properties separated from one another in a creation event. Although each circle is just time, the proton becomes a useful building block. Its spin, charge and parity allow the electrons be attracted to form complex chemicals.

Mesons and baryons obey the laws built into the proton and neutron but combine them into different particles. There are many particles but they simply reflect different ways of expressing the neutron energy separations and the Schrodinger equations.

Neutron decay

Without the electron the universe would appear very differently. Electrons and related properties provide the complexity required to produce the chemistry of life. The electromagnetic quantum circle surrounds each atom. The electromagnetic interaction colors our world and makes rocks solid.

Quads 4 and 5 transition as shown below: The result is decay of the neutron to a proton, electron and anti-electron neutrino. There are three neutrinos but they are properties and kinetic energy only. The kinetic energy 0.111 MeV plays a special role as the "barrier" for fusion. It is also associated with temperature 8.6e8 K where the Saha equation for He4 fusion approaches unity [21].

			-0.296	-2.72E-05							
			equal and opposite cha		0.00	-5.44E-05					
Quad 4	-10.33	0.00	-10.33	0.00				0.67	v neut ke		
	10.41	0.67	10.41	0.67	0.00	-0.67		0.67	t neut ke	-0.62	-0.67
	Neutron separates here to form proton and elec				**129.54**	**798.58**	938.2720733	**1.34**	**20.30**	**-957.81**	**-2.73**
Quad 5	10.136	0.51	10.33	0.62	0.51	0.11		2.47E-05	e neutrino ke		
	0.197	2.47E-05	0.296	2.72E-05	ELECTRON	KE mev			960.54	-960.54	0.00E+00
									Total m+ke	**Total fields**	

After decay, a new separation has occurred. The electron has negative charge and the proton has positive charge.

Data Check

Let's review what led the author to assign N values to mass and energy values in the neutron model: Here is a list of data used, source and an analysis of how well it fits the assigned N values:

Particle data comparison with model N values

unifying concepts.xls cell aw48			Proposed	IS Hughes
		Particle Data	Energy	Bergstrom
		Group energy	E=eo*exp	Randall
Identifier	N	(Mev)	(Mev)	energy
			e0=2.02e-	(Mev)
0.0986	0.0986			
e neutrinc	0.197	2.00E-06	2.47E-05	3.00E-06
E/M Field	0.296	0.0000272	2.72E-05	
	(3*.0986=.296)			
ELECTRO	10.136	0.51099891	0.511	
mu neutri	10.408	0.19	0.671	less than 0.2
Graviton*		1.75E-26	2.732	
Up Quark	11.432	1.5 to 3	1.867	1.5 to 4.5
vt ?	12.432	18	5.076	less than 35
Down Qua	13.432	3 to 7	13.797	5 to 8.5
Strange q	15.432	95+/-25	101.947	80 to 155
Charmed	17.432	1200+/-90	753.29	1000 to1400
Bottom Qu	19.432	4200+/-70	5566.11	4220
Top Quarl	21.432		41128.30	40000
W+,w- bos	22.099	80399	80106.98	81000
Z	22.235	91188	91787.1	91182
HIGGS	22.575	125300	128992.0	105000
* sum of 3 Ns of 10.431+10.408 (2.73/exp(60)=2.4e-26 mev)				
Mw/Mz	Weinberg radians		sin^2 theta	
0.87275	0.509993	0.48817152	0.23831	

The above table supports an exponential relationship in energy for the fundamental particles. The model N values compare favorably with data from various sources. The Down and Up Quark are notable differences but it was discovered and reported in reference 22 that these quarks originate at higher mass but decay into mass plus kinetic energy. Many proposed N values contain fractional value 0.431. This is 1/3+0.0986 but what is 0.0986? This N value may refer to "3 something" as shown in the table below:

Fundamentals of 0.0986, 0.2958, 10.431 and 10.1358					
P=exp(iet/h)*exp(-iet/h)					
P=1/3*exp(1)/(1/3*exp(1))					
ln P=ln(1/3*exp(1))-ln(1/3*exp(1)))					
0=ln(1/3*exp(1))-ln(1/3*exp(1)))				0	
	N		Probability eacl	Probability	ln P=N
LN((1/3)*EXP(1))	N=-.0986		1/3*EXP(iet/h)	0.906i	neg 0.0986i
(LN((1/3)*EXP(1)))*2	N=-0.098-0.098		(1/3*EXP(iet/h)	0.821i	neg 0.1972i
(LN((1/3)*EXP(1)))*3	N=-.098-.098-.098		(1/3*EXP(iet/h)	0.744i	neg 0.2958i
3*0.0986	0.2958				
10+1/3+0.0986+0.0986	10.4316				
Electron 10.431-0.2958	10.1358				

Note in particular N=3*0.0986=0.2958. By the equation E=2.02e-5*exp(0.2958)=27.2e-6 MeV. This is the exact field energy of the electromagnetic interaction. The electron gets it field energy because N=10.431-0.2986=10.1358. (The electron mass =2.02e-5*exp(10.1358)=0.511 MeV). This means that "3 something" is related to charge for mass terms.

Criticism of the Schrodinger equation is that "it doesn't give x, y and z dimensions. But maybe it does, what N would be added to a kinetic energy N to make it 3 dimensional? (velocity is a vector and has direction).

If the probability of being on one dimension is 1,				
what is the probability of being on one of three				
dimensions?				
Probability one dimension=1		**1=1/EXP(0)**	**N=0**	
Probability of being on one of three =1/3			**1/3=1/exp(N)**	
			3=exp(N)	
			N=ln(3)=1.0986	
		check =1/exp(1.0986)=.333		
Adding 1.0986 to zero represents 1/3 probability per dimension				

With a better understanding of charge and dimensions, we can guess how N=90 was divided and rearranged into fundamental N values for the neutron. We can start with the Higgs boson. It has energy 128992 MeV. N=ln(128992/2.02e-5)=22.575. This is very close to 22.575-22.5= 0.075. There is a 0.075 in the table. The other bosons are variations of N=22.5. Dividing 90 by 4 seems straightforward and dividing 22.5 into pieces is a good guess. After we add 0.0986 for charge and 1.0986 to make kinetic energy 3 dimensional, the remainder of 12.167 is split among the other N values. The N values for mass and kinetic energy represent field energy adding and subtracting N=2. The rearrangement does not increase the overall probability since N=90 is conserved but the results simulate the particles we have been able to measure.

	Add across →			Fundamental N m+Ke		
Split 90/4	Split 22.5	Rearrange	Add charge to mass		Fundamental N	
		12.167	Make Ke 3 Dimensional		Fields	
	11.167	4.167	0.0986	15.432	17.432	Quad1
22.500	11.333		1.0986	12.432	10.432	
	11.167	2.167	0.0986	13.432	15.432	Quad2
22.500	11.333		1.0986	12.432	10.432	
	11.167	2.167	0.0986	13.432	15.432	Quad3
22.500	11.333		1.0986	12.432	10.432	
				-10.333	-10.333	Quad 4
			0.075	10.408	10.408	
22.500	10.333			10.333	10.333	Quad 5
	12.167			0	0	
90.000	90.000			90.000	90.000	Sum

Compare the neutron, proton and electron masses with NIST and the Particle Data Group [4] data:

Compare the above values for the neutron and proton with measured values.								
931.4940281	nist		0.510998946					1.30E-07
931.4940955	pdg	548.5799095	0.51099895	0.5110003		-1.33148E-06		2.40E-07
simple cell g67	Data		Data (mev)	Calculation (m	calculation	Difference	Difference	measurement
			Particle Data Grou	Present model	(amu)	(mev)	(amu)	error (amu)
		(amu)		(mev)				
Neutron	nist	1.008664916	939.5654133	939.5654133	1.0086649	2.253273E-10	2.67158E-10	6.20E-09
Proton	nist	1.007276467	938.2720814	938.2720733	1.0072765	8.028782E-06	8.58522E-09	6.2E-09
Neutron/electron	1838.683662		939.5654133	939.5654133		2.2532731E-10		
Proton/electron	1836.152674		938.2720814	938.2720733		8.0287820E-06		

Cosmology data: Appendix 1 extracts energy values from the neutron model and applies them to current cosmological questions. The results appear to answer some of the current questions.

Creation

Conclusion 1: The Schrodinger equation is fundamental. The probability is 1 that a quark will be found at the collapse point on the quantum circle. The Schrodinger equation created this relationship and it incorporates laws of nature that would not exist without the equation. Without the relationship, we would not know about the quark circle because it creates it.

Conclusion 2: Everything is information. There is a relationship between probability and energy. P= 1= beginning condition= probability of each particle* number of particles=1/exp(N)*exp(N). This means that the energy of a particle is itself related to probability, i.e. p=e0/E. Probability p=e0/E is information by Shannon's formula. Information on the left hand is P and e0/E on the right hand side is the ratio p=e0/E. Information= -ln P and information= -ln (e0/E).

We can write the RHS of Schrodinger's equation with E=e0*exp(N)=eo/p because probability is also 1/exp(N). A low divisor simply means low probability raises Energy=e0/p to a high value.

0=eo/p1-eo/p1+e0/p2-e0/p2+e0/p3-e0/p3+eo/p3+eo/p4-e0/p4

Question 1: If, in the beginning p1=1, p2=1, p3=1, etc. we must ask the question how and why did p1, p2, etc. become low probabilities like p=1/exp(13.43)? Again, this is opposite thermodynamic entropy where probabilities of a system approach 1 over time (reducing information). Neural networks can produce low probability thoughts. A possible conclusion is that the LHS operates like a network.

Question 2: In reading the table below recall that p=1/exp (N). Why is the total the nice round base 10 number 90?

0=eo/p1-eo/p1+e0/p2-e0/p2+e0/p3-e0/p3+eo/p3+eo/p4-e0/p4

0=1/p1-1/p1+1/p2-1/p2+1/p3-1/p3+1/p4-1/p4

Question 3: Are the two equations above clues regarding creation? They are equal except multiplication by e0 represents energy since e0/p=e0*exp(N). Was energy created by this? A possible answer to this is low probabilities are created in the LHS and apply to the RHS, creating energy.

Conclusion 3: With P=1 and E=1, the Einstein's relativistic equation is satisfied at the collapse. Neutrons exist with three quarks and neutrons decay to protons, electrons and anti-neutrinos as the process is duplicated for 5 sets of probabilities.

Where are the laws of nature?

Scientists discover, describe and mathematically model the laws of nature. But they do not know where the laws reside. I believe the neutron that decays to a proton and electron is the repository of nature's laws. The information based Schrodinger equation is used to observe things made out of these particles. This is similar to a colored lens being placed in front of your eyes; you cannot help but see colors. Information (LHS) is what you receive about particles (RHS) through your "colored" lens. One might say that we are "inside" the Schrodinger equation because we are made of the same stuff. This allows us to interface with electrons and light to observe the position of particles but energy interactions in our body and mind may use other properties.

Creation and Consciousness

Forward time by several billion years; gravitation has created stars and planets. Simply stable particles like protons have become atoms based on the residual strong force formed at creation. Atoms are now bonded into chemicals based on the electromagnetic force. There are now places where life can exist. You may be wondering about P=1 since it is constant for fundamental particles. Components of P=1 are a "big deal" for life. Their relationship with consciousness will be discussed.

Observation and the electron

Changes in electromagnetic field energy with base 27.2e-5 MeV is associated with absorption and emission of light. This occurs as the electron orbits change by quantum amounts. Color vision [12] is an excellent example of the Schrodinger equation in action. In the P=1, E=0 constraint below kinetic energy is changed by 2.02e-5*exp(N), where N is 1,2,3 or 4 times 0.0986. The result is a series of peak wavelengths related to color vision [12]. For example if 3*0.099 changes to 2*0.099 the E2 change (inside the E= 0 constraint) is the wavelength for green light.

Energy zero	E1+	(E3+E4-E1-E2)+	E2	-E3-E4	
Energy zero	5.11E-01	-5.11E-01	2.46614E-05	-3.53E-05	-0

			-0.295836866	4	3	3.00E-05	2.72E-05	2.82E-06	439.52	scotopic
		5.110E-01	1.51E-05	3	2	2.72E-05	2.47E-05	2.56E-06	485.07	green
2	2.02e-5*exp(N)	2.466E-05	2.025E-05	2	1	2.47E-05	2.23E-05	2.32E-06	535.34	blue
N=.0986,.197,.296,.394		10.14	10.33	1	0	2.23E-05	2.02E-05	2.10E-06	590.82	red
		0.197	0.00E+00			2.02E-05	1.83E-05	1.90E-06	652.05	

With Schrodinger's equation we can be specific about the peak colors we experience. The LHS of Schrodinger's equation is P= 1 but the components mean, green, blue or red depending on absorption of light in the RHS. Probabilities like the ones below could be words, similar to DNA code. Shannon's formula may be involved; information= -ln(1/exp(0.197)= 0.197. Simply put 0.197 means green. A synapse may store 0.197 waiting for a match to fire.

P=1 green	1/exp(10.13)*1/exp(0.197)/(1/exp(10.33)*1/exp(0))
P=1 blue	1/exp(10.13)*1/exp(0.0986)/(1/exp(10.33)*1/exp(-0.0986))
P=1 red	1/exp(10.13)*1/exp(0.00)/(1/exp(10.33)*1/exp(-0.197))

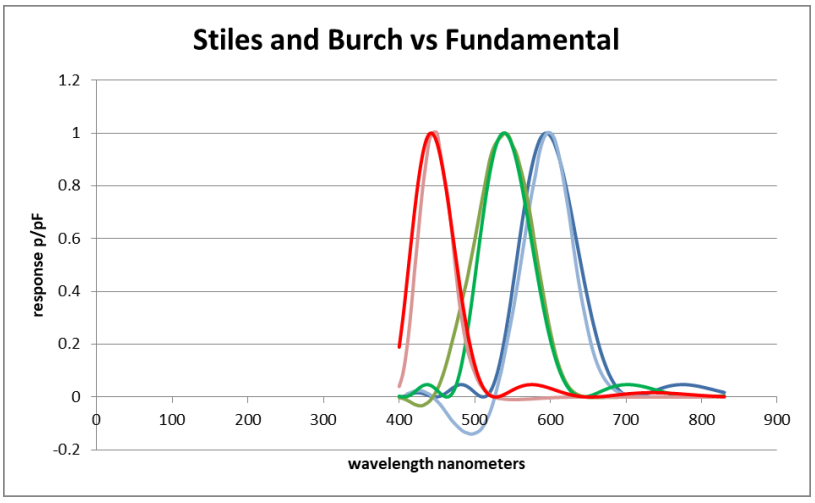
Another quantum mechanical equation determines the off peak probabilities. The equation of interest for absorption is a wave function for molecules that have internal freedom and vary back and forth between frequency (f) values.

Psi=mu e/h (1-exp i (f-F) t/ (f-F))

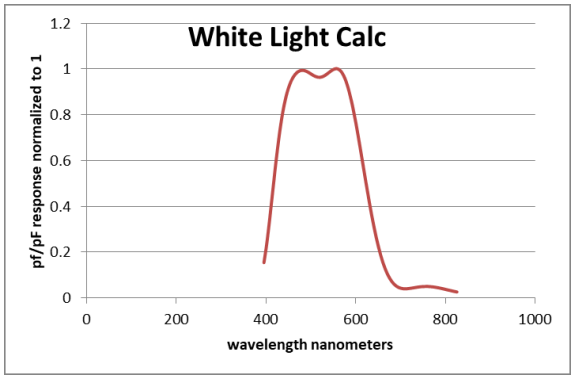
This quantum mechanical equation is found in The Feynman Lectures on Physics, Volume III page 9-13 [3]. The basic equation for a probability pf can be divided by PF at peak frequency F to form a ratio normalized to make the peak response equal to unity.

Pf/PF=(sin((f-F)t/2))^2/((f-F)t/2))^2 Where f=frequency and t=time interval.

Electron orbits are slightly changed by light absorption and create the Pf/PF function [3]. With Feynman's equation we can mathematically simulate color vision with our computer. The peak responses and off peak responses is shown below compared with reference 7 color vision data on the human eye.



Probabilities neatly represent white light when three colors are combined.



The mental experience of color vision is proof of a link between P in the left hand side of Schrodinger's equation and E in the right hand side of the equation. I do not pretend to understand this completely. The chemical Rhodopsin absorbs the light and there is some processing involved in the way the signal adds and subtract leading to three absorption curves. Signals are transmitted as energy pulses transmitting ions against a voltage (about 70 millivolts). But the processing somehow is based on three colors that we find in the E=0, P=1 constrains. Both peak and off-peak responses "output" probabilities. This strongly suggests that observation is a left hand side process. Certainly the image in our visual cortex is not light…..it's dark in there. Our senses evolve with our body and improve the input our brain receives. It also receives contextual clues regarding distance and time and is adept at forming an internal image of reality around us. It is not hard to believe that multiplying the complex conjugates and interpreting the probability language completes the perception process. Again, the Schrodinger equation is "information (LHS) about particles (RHS)".

Networks

The LHS internal experience is enhanced with memory, the ability to record observations and use them in the future. Our memory is based on networks. Recognizing that every particle in nature consists of probability in the LHS means that networks are easy to create. When atoms and molecules are incorporated in the brain energy adds (RHS) the (LHS) probabilities multiply. DNA is a good example of a long line of useful information. When atoms chemically bond with one another the LHS is a long line of probabilities. Memory consists of nerve fibers between synapses. A neural network is a flexible interpreter and manipulator of probabilities. It feels like our brain searches before it remembers. It could be selecting probabilities for wave function collapse. It is not hard to believe that the LHS supports consciousness.

Information gain

Signals in the brain are electrical/chemical nerve impulses networked with synapses. The synapse network yields information when certain criteria are met. Potential observations become real observations through this mental process. Our senses are energy based and provide data through light, sound, taste, touch, etc. Our brain is very good at creating internal models. The image we view is a combination of an internal model and sensed information. Much of the information entering the visual cortex is from the cerebral cortex. It helps process external and internal signals and presents an image to our visual cortex [8]. It is also known that neural networks [8] have feedback loops that adjust probabilities based on expectations (similar to fuzzy logic). Integration of senses, memory and expectations create our reality. There is information gain associated with the path the action potential takes. If the path taken is improbable, the information gain is large. Many possible pathways are stored and improved but their function is to provide temporary information in our consciousness. Above it was suggested that DNA is a long line of probabilities associated with molecules. DNA builds structure but as the brain develops, freedom for each individual to be different emerges because networks are not "hardwired". Consciousness emerges [19] based on the LHS probabilities associated with processing

data. Time advances and consciousness is challenged to improve its model of reality. Neural networks select out of memory the information it wants or needs. An organism with information about the things around it can exploit its environment. It can recognize patterns and survive threats [2]. As the body, brain and its senses evolve there is a vast array of potential thoughts available. It is reasonable to suspect that our evolved brain enhances reality. But mental processes increase information, something that cannot be over-emphasized. Thermodynamic entropy is a process that destroys information. Information gain is improbable and structures that contain networks will survive if they can replicate. DNA is stored evolutionary information that codes for the body, brain and sense components of the nervous system. But conscious experience in the LHS is the essence of life. It is not hard to believe that our minds experience nature through Schrodinger based probabilities.

Information gain, molecular cooperation and niche exploitation across deep time leads to earth's thriving and replicating network of life. This should be surprising to us because it is improbable. Darwin taught us to understand improbable organisms. I wonder what he would say about improbable physics.

Interpretation and review

It is not unreasonable to believe that the "big bang" was a Schrodinger based process. Energy 0 is a good starting point if there is a process that can separate mass energy + kinetic energy and field energy. Probability 1 is also a good starting point. But after separations occur particles exist that encode the laws of nature. Particles are based on low probabilities but many particles maintain the overall initial condition P=1. The LHS of Schrodinger's equation has spoken the word "let there be energy in my image" (using my probabilities) and the RHS becomes law based particles. The moment of energy creation described above is information transitioning to energy ratios that are different forms of information. Apparently the probabilities that add to N=90 for the 5 quads pre-existed. The proton is on the surface of a cell related to gravity that defines cosmological space and time.

It appears that we are part of a very large universe but each proton/electron is simple and can be represented by small circles. The circles, in turn, are sinusoidal waves of time (with a vertical imaginary axis and one real horizontal axis) moving in opposite directions. Honestly, there is not much there. Duplication of circles outside one another and expanding is perceived as large complex space. But it is also simple. We start to understand nature when we learn what causes our minds to see particles made out of neutrons, proton and electrons. The result appears spectacular because the neutron was duplicated many, many times. It started with simple probabilities (information) but we observe stars orbiting in galaxies that are very real. It is reasonable to believe that we are late comers able to interact with nature that pre-dates us. Most of us agree that we should not confuse mathematical models with reality but the P=1, E=0 model contains the potential for both. Sir James Jeans said, that "the universe begins to look more like a great thought than a great machine". This emphasizes the role of thought but perhaps he should have said "it is a great thought and a great machine". Another way of saying this is "information (LHS) creates nature's laws (RHS)". They are inseparable according to the equal sign between information and nature's energy laws.

Finding what caused the improbable neutron P=1/exp(180) is a new challenge. From a quantum mechanics standpoint duplication of exp(180) particles may have entangled all particles. Maintaining unity may make everything a network. This work simplifies issues by insisting that we only deal with wave function collapse. It is now generally accepted that reality is created by collapse of a wave function regardless of distance (Bell's inequality has been proven). If indeed we are "inside" Schrodinger's equation we should not be surprised by quantum mechanics. Entangled quantum states connect at E=0 and P=1 but zero and 1 can represent quite complex separations. Networks like the brain can create new thoughts and make important but less evident observations. The process requires selecting pathways through a network that have low probability. This is the only process known that creates information. But

life as we know it did not exist for billions of years after the big bang but as we awaken, we become observers. We need to separate pre-existing information from results we achieve with thought. We could be participants in a network that we do not fully perceive. We produce an internal reality that replicates by trial and error what we believe is external reality but we must be cautious about assuming it is a perfect replica. There are parts of nature that we do not detect.

The Schrodinger equation may have preceded everything. It supports creation and provides information that we use to observe the particles around us. We hope that we are participants in an inclusive information network that values and preserves.

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Appendix 1 Cellular Cosmology

If mass is distributed uniformly within a sphere the mass toward the outside will be in a preferred position. Since Newtonian gravity is based on central mass, the mass toward the outside will move toward the center. This is an unstable universe and gravitational laws are not uniform throughout the sphere. A model with no preferred position places the mass on the surface of a sphere. But it doesn't have to be a large sphere. It can be many small spheres that have the same surface area. The author developed a concept called cellular cosmology that defines space as N=exp(180) spherical cells each with a proton. Furthermore, the proton has initial kinetic energy 9.87 MeV and orbits central gravitational 2.73 MeV field energy with radius 7.22e-14 meters. This allows cellular cosmology to obey the rule "there can be no gravitational preferred position for mass" because all mass is on the equivalent of a large sphere. The number of cells in large R (representing the universe) is exp(180) [Appendix 2].

Area=4*pi*R^2
Area=4*pi*r^2*exp(180)
A/A=1=R^2/(r^2*exp(180)
R^2=r^2*exp(180)
r=R/exp(90) surface area substitution
M=m*exp(180) mass substitution

For gravitation and large space, we consider velocity V, radius R and mass M as the variables (capital letters for large space and lower case r and m for cellular space.) V applies to large and cellular space. These variables determine the geodesic (the radius with balanced inertial and gravitational force). The mass substitution is M=m*exp(180) and the surface area substitution is R=r*exp(90) for G large space= G cellular space.

At any time during expansion		
Large space		**Cellular Space**
		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)**

The extremely small value 1/exp(90) is the coupling constant for gravity. When measurements are made at the large scale to measure G, the above derivation indicates that we must multiply cellular scale values (r*v^2/m) by 1/exp(90) for equivalent G. Geometric and mass relationships give the cell "cosmological properties". Velocity V=V for both surfaces. Velocity V is inside the cell and the velocity it has relative to other cells. In cellular cosmology an operative word is "equivalent" meaning there is a mathematical relationship.

The neutron mass model (Appendix 2) is the source of gravitational field energy -2.73 MeV. The radius of a quantum circle with this field energy is:

Identify the radius and time for the gravitational orbit described above			
Fundamental radius=1.93e-13/(2.732*2.732)^.5=7.224e-14 meters			
Fundamental time=7.224e-14*2*PI()/(3e8)=h/E=4.13e-21/2.732			
Fundamental time	1.514E-21	seconds	

Above, 1.92e-13 MeV-meters is hC, where h is Planck's reduced constant (6.58e-22 MeV-sec). The quantum radius 7.22e-14 meters and kinetic energy (10.15 MeV) from the Proton model are used in the calculations below.

Calculating the gravitational constant G

> Note: The cellular expansion model (The subject of Problem 3) is referred to in the following calculations. The reader may have to move back and forth in this document to understand the results. Also, the work below slightly modifies earlier work by the author regarding gravity [9][13][17].

We will calculate the gravitational constant for the current time 13.8 billion years because we measure it at the current time. The expansion model was used to determine the cell velocity V and radius r for the inertial force (the basis of gravity) f=mV^2/r*(1/exp(90)). The mass is 1.673e-27 Kg (the mass of a proton). Velocity V and cell radius r at 13.8 billion years (4.3e17 seconds) are in the rightmost column. Velocity (from ke) was reduced by expansion to 50.47 meters/sec. The expansion model can determine the beginning gravitational constant including the effect of gamma (g). The gravitational constant is now 6.6743e-11 [23].

GRAVITY		V (m/sec)	4.378E+07	50.48
			proton	4.3e17 seconds
Neutron Mass (mev)			938.2721	939.565
Proton Mass M (kg)		1.00E+00	1.673E-27	1.673E-27
Field Energy E (mev)			2.732	2.732
Kinetic Energy/neutron ke (mev)			10.112	1.330E-11
Gamma (g)=939.56/(939.56+ke)			0.9893	1
Velocity Ratio v/C=(1-g^2)^0.5			0.1456	0.000
Velocity (meters/sec)				50.477
R (meters) =(HC/(2pi)/(E*E)^0.5		E=2.732	7.185E-14	5.347E-02
Inertial Force (f)=(m/g*V^2/R)*1/EXP(90) Nt			3.695E-38	6.531E-62
Calculation of gravitational constant G			6.674E-11	
G=F*R^2/(M/g)^2=NT m^2/kg^2			6.67449E-11	6.6744E-11
Published by Partical Data Group (PDG)			6.6741E-11	6.6743E-11

Cosmology and expansion

A first principles cellular expansion model [21] with the following capabilities was developed and used to understand cosmological observations.

1. Early history of helium formation including Deuterium, Helium3 and Lithium7 residuals.

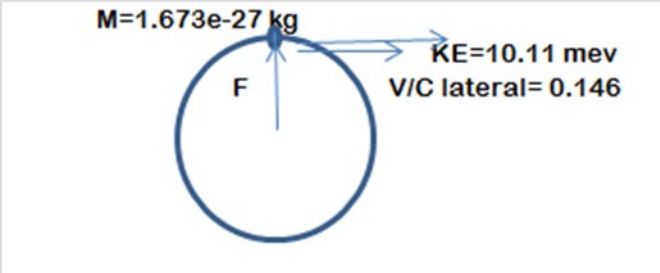
2. History of the period from equality (matter and photon density) to decoupling (clearing of the plasma and cosmic background radiation pictures).
3. History of energy additions during expansion.
4. Star formation and its effect on expansion.

An expansion model [15][5] calculates the radius and temperature of the universe as a function of time. The author's model places exp(180) spherical cells into a large sphere. The initial radius of each small sphere is, as explained above, r0=7.22e-14 meters. This means that the initial radius is 7.22e-14*exp(60)= 8.25e12 meters (in three dimension, exp(180)/3=exp(60). This same sphere has a surface area =4 pi*r0^2*exp(180)= 4 pi*R^2.

The universe expands because the neutron contains a kinetic energy term that is converted to potential energy

Expansion
KE -->PE (MeV)
→ 10.15
→ 10.15
mass model

The excerpt from the proton mass model above (Section entitled "Neutron and proton model") gives one of the key energies related to cosmology (10.15 MeV/proton of kinetic energy). The proton with this kinetic energy causes an increase in radius resisted by gravity within the cell. The physical mechanism is pressure.



The universe expands because kinetic energy is being converted to potential energy. The cell expanded from 7.2e-14 meters to its current value of 0.35 meters. For convenience cosmologists use ke'=ke*(time/time')^(2/3) to model kinetic energy decrease. (Primed values mean the next value in incremental calculations across time). Cell radius increases as kinetic energy decreases r'=r*ke/ke'. Combining the relationships above, r'=r*(time'/time)^(2/3). The gravitation constant G=Fr^2/(m/g)^2 is maintained throughout expansion where lower case g= gamma= 938.27/(938.27+ke).
Potential energy (PE)= 0.5*f*(delta R)/(1.6e-13 Nt-m/MeV), where f= (mV^2/r)*1/exp(90).

The neutron model reveals nature's clock

At the small scale, the neutron is a composite of "quantum circles" where P=1 at Et/H=1 with overall energy zero. Time (t) around the circle simply repeats for neutrons (that decay to protons, electrons and neutrinos) making them small stable particles. The quantum circle that contains time is the same circle that maintains the gravitational constant G; it has field energy -2.73 MeV. The radius of a quantum circle with this field energy is:

Identify the radius and time for the gravitational orbit described above			
Fundamental radius=1.93e-13/(2.732*2.732)^.5=7.224e-14 meters			
Fundamental time=7.224e-14*2*PI()/(3e8)=h/E=4.13e-21/2.732			
Fundamental time	**1.514E-21**	**seconds**	

Above, 1.92e-13 MeV-meters is hC, where h is Planck's reduced constant (6.58e-22 MeV-sec). At velocity C this circle describes a fundamental time (1.5e-21 sec) that repeats and counts forward.

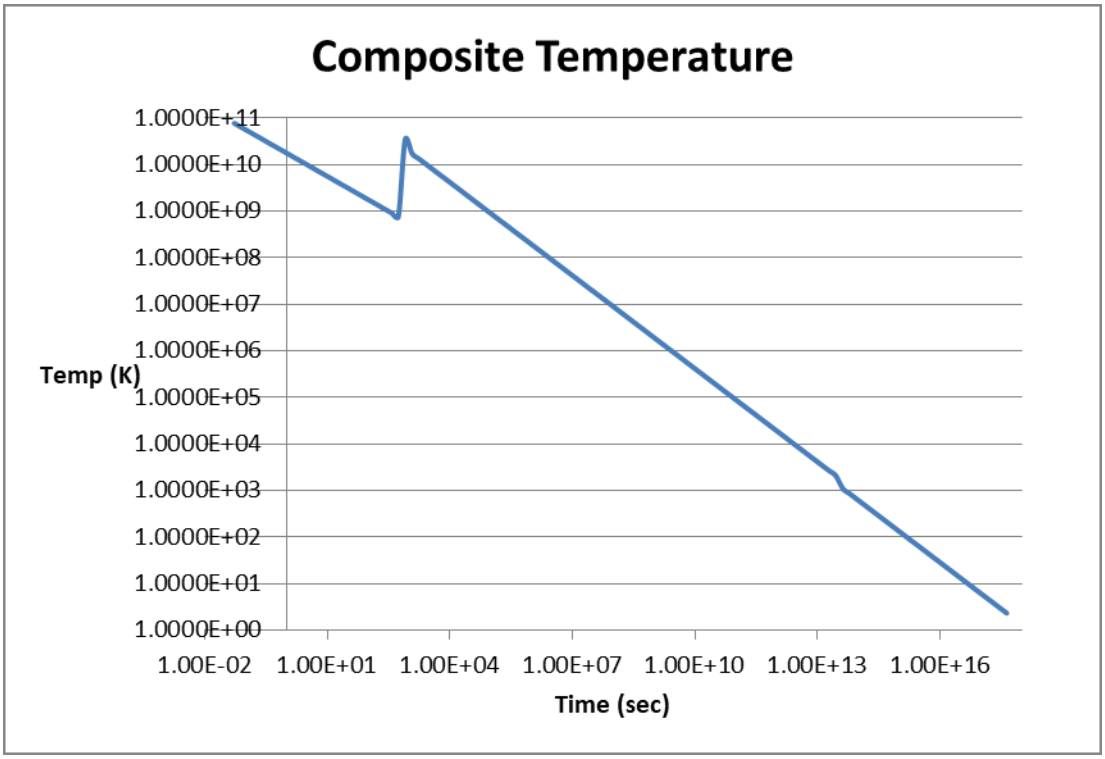
Radius and temperature history from beginning to He4 fusion

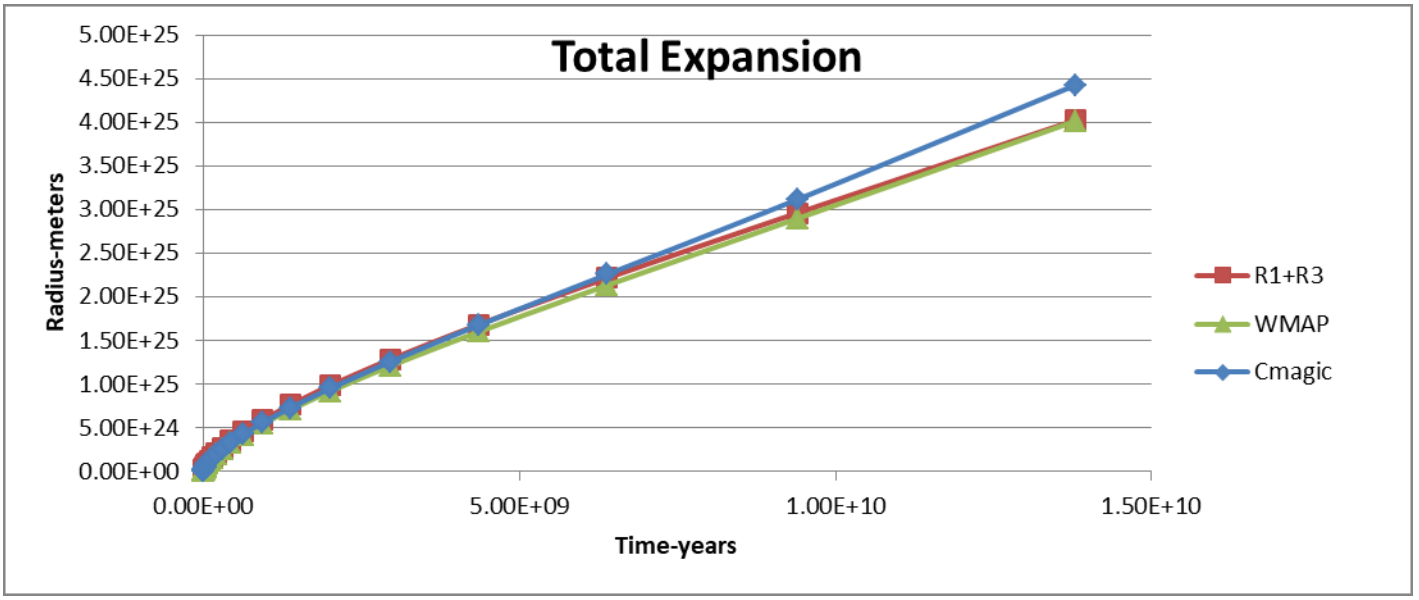
The laws of physics reside in the neutron→proton and electron. Data can be extracted by modeling the properties of these particles. The proton contains an orbit with changing kinetic energy that expands the universe and a quantum circle that controls time (a clock). A quantum circle within the proton maintains the gravitational constant G and defines space and time. The table in green below represents the kinetic energy and force balance in each cell's proton as the universe expands. Each column of the table below is a logarithmic time increment. For convenience the table starts at 0.059 seconds but the universe began at time zero. Each column simulates variables in the proton model, keeping G constant (fgrav and G, with gamma determined by ke and mass.). Kinetic energy is decreasing as the universe expands but potential energy is increasing. The total is constant (20.3 MeV). An expansion model with one cell simulates all cosmological events except ones that involve gravitational interactions.

Potential energy + kinetic energy (MeV)	20.30	20.30	20.30	20.31
Potential energy (MeV)=.5FdR/1.6e-13	10.43	12.16	13.59	14.77
r0=7.22e-14*9.872/ke	7.22E-14	8.76E-14	1.06E-13	1.29E-13
ke=9.87*(time/time')^0.5	9.872	8.14E+00	6.71E+00	5.54E+00
g=938.27/(938.27+ke)	**9.8959E-01**	**9.9140E-01**	**9.9289E-01**	**9.9413E-01**
V=(1-(g)^2)^0.5*C	**4.3148E+07**	**3.9238E+07**	**3.5674E+07**	**3.2427E+07**
fgrav=(1.673E-27*V^2/(r0*EXP(90))	3.5702E-38	2.4305E-38	1.6543E-38	1.1259E-38
time (seconds)	5.29E-02	7.77E-02	1.14E-01	1.68E-01
G=fgrav*r^2/(m/g)^2	6.503E-11	6.533E-11	6.558E-11	6.578E-11

Note: The reader may have to move back and forth in the document to understand the dynamic physics involved. The value 10.15 MeV is associated with time zero. It has changed to 9.87 MeV at 0.059 seconds.

Initial temperature=9.87/(1.5B)=7.6e10 K, where B=Boltzmann's constant 8.6e-11 MeV/K and T'=T*(R/R'). Temperature in degrees Kelvin (K) is directly related to kinetic energy (T=KE/(1.5*8.6e-11) in the expanding cells above. The proton provides further cosmology properties as subsequent events occur. When the temperature falls to 8e8 K, part of the fusion energy 10.15 is released to increase the radius of the cell. At this point approximately 23% of all matter is converted to He4. Later, as stars light up, their fusion energy, again part of the value 10.15 MeV, is released to once again increase the radius of the cell. Currently the temperature is 2.725 K, according to WMAP [5] and PLANCK missions.





One cell can tell us a great deal about the universe. But components of each proton are improbable (1/exp(180)) and there are exp(180) protons. In three dimensions, cell radius*exp(60) and interacting meters and big R=exp(60)*0.35=4.02e25 meters.

Current cosmology questions: What is dark matter, the cosmic web and dark energy

A neutron→proton+electron+aen mass model and cellular cosmology, both previously reported by the author, were combined into what the author believes is a first principles cosmology model that helps resolve current cosmology questions. It is successful in describing the radius and temperature as a function of time. Using the model a recent document [21] [Appendix 3] addressed and proposed answers to the following questions:

What is space-time? Quantum mechanics applies at the small scale but the general theory of relativity is large scale gravitational theory. Are they incompatible?

What is dark matter and why are baryons only 4.6% of critical density?

What is dark energy and why is it 72% of critical density?

What caused the temperature anisotropy measured by WMAP and PLANCK?

These are not easy problems to solve but cellular cosmology and values from the proton model are powerful tools. It appears that critical density is entirely normal matter. Dark matter and the cosmic web are the shaping of space that occurs as expanding cells encounter different conditions. Dark energy is late stage expansion due to pressure from stars lighting up. The paper addressed and found conditions the give baryon/photon ratios compatible with observed fractions [15] of Deuterium, Helium3 and Lithium7. The reference also addressed conditions at equality of photon and mass density and the temperature anisotropy observed at decoupling (where the plasma clears and electrons can orbit protons). The author's model is in agreement with observations. Understanding space and gravity more thoroughly than Einstein's general theory of relativity requires bridging small and large scale physics. This is a central feature of cellular cosmology.

Reference 21 presents details of the following summary. When we look at a galaxy we observe real distances and real velocities. They have flat velocity curves. As particles decouple from expansion and start to fall together, they have a great deal of velocity. As they approach a gravitational center, Jeans waves develop (search Bertin Bertinora II) and we observe great galactic spirals. Particle collision is the only process that will reduce velocity and this takes a great deal of time. The outer arms of the spiral do not appear to follow orbits required by gravitation but they are not in equilibrium. There are other affects, for example, variable pressure from black holes and Jeans waves that are regulating star formation. The weak accelerations at the distance of the spiral arms mean that lateral movement takes a lot of time. It is difficult to observe distances because cells have different sizes and may be distorted. I believe that cells are viewed with P=1 at the center. Galaxies contain many cells and have a gravitational distance that is equivalent to the radius of cells. Viewed from the center, we have to divide observed distance by pi to get equivalent gravitational distance. Those that calculate declining velocity curves are using observed radius rather than the equivalent gravitational radius. Dark matter is the inferred mass required to correct the calculation error. It doesn't exist.

Observations of light bending show streaks between galaxies. This is also attributed to dark matter. In cellular cosmology, a proton is on the surface of each cell. As mass accumulation into galaxies of stars the cells change their size. The cell radius in the space between large objects is shown in the above table ranging from 2e-9 to 2e-6. For planets the cells are about 5e-11 meters in size since the electrons repel each other and limit further contraction. Galaxies of central mass of 2e41 Kg have gravitational cell radii of 2.64e-9 M. But the radius of average cells in the thin gas is on the order of 0.2 meters. The cells throughout the planets, stars and their orbits are very small and can't enlarge with time. One can simulate this situation by placing a piece of cloth on a surface and gathering (pinching together) the cloth in spots. Distortions are formed between the pinch points. Space is deformed both by mass and differential cell sizes and curved space deflects light. This is being imaged as the cosmic web. If we were not using

cellular cosmology, we would assume that stars are formed by only protons moving through space. But space is part of each proton and the cell moves with the proton. Together they create space.

Cosmologists use measurements and models to understand the first few hundred seconds after the big bang. Specifically, when and under what conditions were He4 and residual isotopes formed? WMAP analysis accepted the astrophysics literature value of 4.4e-10 baryons/photons which is associated with the measured He4, He3 and Li7 fractions (measured uniformly throughout the universe and therefore formed with He4). The baryon/photon density equation is below: Radius R and Temperature T are both to power three. Furthermore as radius expands temperature is reduced in direct proportion to radius. This means that the baryon/photon density ratio is the same now as it was after He4 was formed. At 2.73 K (the current temperature of the cosmic background radiation) the photon density is 5.77e8/m^3 and the mass number density is exp(180)/(4/3*pi()*4.02e25^3).

Baryon/photon=(x*EXP(180)/(4/3*PI()*R^3))/(8*PI()/(4.31e-21*3e8)^3*(1.5*8.62e-11*T)^3)

WMAP analysis [2][4] reduced the baryon content **X***exp(180) of the universe to a very low value (**X**=0.046) because they did not find combinations of R and T that would meet the 4.4e-10 criteria. The reference 21 analysis showed a period when temperature and radius values give a value similar to 4.4e-10 without reducing the baryon content.

WMAP starts at a different radius and, as far as I can tell, does not add energy to account for primordial He4 formation (1.7 MeV). WMAP analysis used the astrophysics literature value of 4.4e-10 baryons/photons because it explains the measured residual isotopes. But they reduced the baryon content of the universe to a very low value (0.046) to meet the criteria. They didn't have the radius and temperature histories associated with cellular cosmology. Using cellular cosmology, the temperature and radius calculations at this transition combine in ways that yield a baryon/photon density ratio of 4.4e-10 with exp(180) baryons. X is 1.0 in the following calculation, not 0.046. The critical density is exp(180)*1.67e-27 Kg/(4/3*pi*4.02e25^3)=9.14e-27 Kg/M^3.

Baryon/photon=(x*EXP(180)/(4/3*PI()*R^3))/(8*PI()/(4.31e-21*3e8)^3*(1.5*8.62e-11*T)^3)

Overall, the baryon/photon ratio does not cause baryons to be severely limited like WMAP [5] and other documents suggest.

Observations of the universe's expansion created discussion regarding dark energy. There is consensus that late stage expansion currently is more linear than the equation R'=R*(time'/time)^(2/3). Since this equation represents conversion of kinetic energy to potential energy and is a curve, data [3] showing that late stage expansion is linear or expanding appears to violate energy conservation and require a dark (unknown) energy source. Two literature proposals (cosmological constant Lambda and quintessence) attempt to account for this unknown energy source.

Reference 21 presents calculations indicating that energy produced by stars causes the linear expansion curve. The analysis draws on the rate of star formation and the energy they release. A calculation procedure for expansion was developed that allows one to add energy and predict its effect on late stage expansion. It was surprising that a small amount of energy has a large effect on expansion. In fact, it will be shown that the energy addition is required to match the current temperature (2.73K) since the above models ended at 2.45 K. Energy produced by stars is fusion energy and provides a physical alternative to dark energy. The energy produced by stars as they light up must be considered in cellular cosmology. Delta R expansion from star energy is on the order of R3= 8e24 meters. The concept of dark energy was a place holder until the true cause was uncovered. Stars produce enough energy to explain observations. Photon energy released by stars flattens (or accelerates) the curve like the WMAP Lambda expansion component or the data reported by expansion model CMAGIC.

Concordance models use Lambda as the second expansion component but WMAP analysis concluded that there was dark energy and it was a large fraction (0.719) of critical density. The expansion curve, energy release points and associated temperature curve is presented. Analysis shows that although the density is 9.14e-27 kg/m^3, the mass fractions should be all normal matter.

Appendix 2 Application of Fundamentals to the Neutron and Proton

N values for neutron mass and kinetic components

What follows uses the restrictions discussed above and constraints, probability= 1 and energy= 0. It uses the equation E=e0*exp(N) with N values carefully selected to eliminate imaginary values by multiplication and division.

Looking ahead the column on the right hand side of the diagram below creates a fine mathematical model of the proton. The left column contains N values for mass and kinetic energy components and the right column contains N for fields. Using the discussion above, the first quad (mass, kinetic energy)/(field1, field2) is (15.43, 12.43)/(17.43, 10.43). These values describe a quantum circle for one of the quarks.

Mass Field1

Kinetic energy Field 2

There is a specific position for mass, kinetic energy, the strong field and the gravitational field component. We can view the values on the right as separations from values on the left. For example 15.432+2= 17.432 and 12.432-2= 10.432 is a separation involving N=2. Quantum circles for the three neutron quarks are represented by the first three quads. N=12.432 is the log of a specific kinetic energy. Going back to the probability 1 constraint, we will use the following quad for the first circle.

15.43 17.43

12.43 10.43

The probability 1 constraint is: p=1/exp(15.43)*1/(12.43)*exp(17.43)*exp(10.43)=1

Quad 1 key	N1	E1 mass	N3	E3 field1	
	N2	E2 ke	N4	E4 field2	
		MeV=2.02e-5*exp(N)		MeV	
Quad 1	15.432	101.947	17.432	753.291	
	12.432	5.076	10.432	0.687	
	27.864	⟷	27.864		
		N is conserved			
		N1+N2=N3+N4			
	N=ln p	(p=1/exp(N))			
p1	15.432	1.986E-07	17.432	2.688E-08	P3
p2	12.432	3.989E-06	10.432	2.948E-05	P4
	Probabilities are conserved				
	p1*p2	7.923E-13	p3*p4	7.923E-13	

The quad conserves N= 27.864 and probability P1*P2=P3*P4= 7.9e-13.

The energy= 0 constraint follows using N values for the neutron and energy E=2.02e-5*exp(N). The values are arranged differently in the table below. Energies E3 and E4 on the right hand side of the table represent field energy. Mass plus kinetic energy is exactly balanced by negative field energy. The quad describes a quantum circle. The mass with kinetic energy circles in a field and is attracted to a second field (nested quantum circles). Kinetic energy has two components E2 and (E3+E4-E1-E2). There are positive and negative balancing pairs of N because E1+(E3+E4-E1-E2)+E2 -E3-E4=0=(E1-E1)+(E2-E2)+(E3-E3)+(E4-E4). I haven't forgotten that the exponents are (iEt/H), but we can always find a time t that gives iEt/H=1. They are in pairs that eliminate the imaginary number.

	ke (difference ke)			E3 field1	
E1 mass	E3+E4-E1-E2	E2 ke			E4 field2
mev	mev	mev		mev	mev
101.947	646.955	5.076		-753.291	
					-0.687
E1+difference ke		753.978		E3+E4	-753.978

The above relationships are repeated below for the other two quarks in the neutron.

quad 2&3	13.432	15.432	101.947
	12.432	10.432	0.687
	25.864	25.864	

13.797	88.837			-101.947	
					-0.687
E1+difference ke		102.634		E3+E4	-102.634

The composite P=1, E=0 constraint is the neutron model shown in the text. The entire right side of the model is a P=1, E=0 constraint. The energy values represent separations.

The full model is in the text in the section entitled "The neutron model".

Appendix 3; Unification of forces

What is field energy and why do we feel gravity?

On the earth's surface you feel a force downward on your body. Einstein correctly identified this as acceleration due to the bending of space-time into a circle called a geodesic around the earth. Using the gravitational relationships we can calculate the orbit where you would feel no acceleration but you would need more velocity than you have at the surface of the earth. Orbiting objects can follow the geodesic by moving around the earth while falling. This is a simple case of finding the velocity and curvature combination that nature built into the gravitational law. It is well known that time changes as you move up and down in a gravitational field and that time slows for moving objects but these are minor effects. Nature is built on circles specified by the Schrodinger equations by the proton model. Cellular cosmology gives the relationship between the small scale gravitational orbit in a cell and large scale Newtonian orbits. At the cellular scale mass in the cell couples very poorly to the gravitational field requiring the ratio 1/exp(90) but values in the model give the gravitational constant [Appendix 1]. The relationship between the quantum scale and large scale has been missing in 21st century physics. The fundamental forces of nature are simply Force= field energy E divided by Radius (F=E/R). This makes the R equation basic to force unification.

Force table

The R equation is arranged in a column of calculations below. The inputs are: M (energy of the mass), E (energy of the capturing field) and kinetic energy. The R equation is near the center of the vertical column with inputs above and relativistic effects below the equation. The total particle mass including its kinetic energy is held in position by the four fundamental forces. These four forces are aspects of the energy interaction and are referred to as the strong force, residual strong (weak force), electromagnetic force, and the gravitational force.

Planck's reduced constant (H/(2pi) is represented by the symbol, "H" and E=Hv, where v is frequency. The R equation positions mass at a maximum probability distance, R representing the orbits' three dimensionality [Section 8 Appendix 1 topic 8.4].
For gravity R=7.22e-14 meters is of extreme interest. It is fundamental to gravity, space time and the starting point for expansion.

The field energies for three strong interactions and their associated particles are from the Proton Mass model. They are referenced to the Higgs energy since it is considered by many to be the source of field energies and particle masses. A force coupling constant is calculated to be 1.00 and derived c^2 (E*R) values are presented in MeV-m and joule-m. The author did not find published values for comparison (quarks are not independently observable). The lower hierarchy electromagnetic coupling constant is well known and the author's calculations substantially agree.

The traditional relationship F=hC/R^2 is too simple to characterize gravity since gravity involves defining a radius and a proton with potential energy falling to that radius. Justification for replacing the coupling constant with the value 1/exp(90) is presented below.

Unification Table	cell ax74	Strong		Electromagn	Gravity
Higgs energy (mev)		Combined	Strong Residual		proton
***Field coupling to Higgs field Energy					
Potential energy of proton falling into gravitational field (mev)					20.115
Field Energy E (mev)		957.18	20.303	2.72173E-05	2.732
Mass Coupling to Higgs field energy					
Particle Mass (mev)		130.16	928.121	0.511	938.272
Mass M (kg)		2.32E-28	1.65E-27	9.11E-31	1.6726E-27
Kinetic Energy (mev)		798.58	10.151	1.361E-05	10.111
Rydberg energy from PDG				1.361E-05	
Gamma (g)=m/(m+ke)		0.1401	0.9892	0.99997	0.9893
Velocity Ratio	v/C=(1-(g)^2)^.5	0.9901	0.1467	7.298E-03	0.1456
R (meters) =((HC/(2pi)/(E*M/g)^0.5)		2.0929E-16	1.4297E-15	5.291E-11	7.2238E-14
Electromagnetic R minus proton R=5.291627e-11-1.4297e-15				5.291E-11	
Force Newtons	F=E/R*1.6022e-13	732765.9	2275.2	8.242E-08	3.6556E-38
				7.250E-09	7.2238E-14
Inertial F Newtons	F=M/g*V^2/R	710992.321	2262.86246	8.241E-08	3.6556E-38
Force=HC/(2pi)/R^2=3.16e-26/Range^2 (n		721797.0	15466.9	1.129E-05	
HC/(2pi) 3.16E-26	(4.13e-21*3e8*6.24e12/(2*pi())				
F=(5.907e-39)*hC/R^2 (nt)					3.5786E-38
F=6.67428*m^2/R^2					3.5782E-38
Coupling constant derived from this work		1.0152	0.147099	137.03047	1/exp(90)
Derived c^2 (E*R) mev m		2.00E-13	2.90E-14	1.44E-15	1.19E-51
Derived c^2 joule m		3.21E-26	4.65E-27	2.31E-28	1.91E-64
Derived exchange boson (mev)		942.856	138.02	0.0037	2.732E+00
*published c^2 mev m			1.56E-14	1.44E-15	1.17E-51
*published c^2 joule m			2.5E-27	2.31E-28	1.87E-64
*Range				5.29E-11	8.82E+25
*http://www.lbl.gov/abc/wallchart/chapters/04/1.html				5.29177E-11	
Published coupling constant (PDG)		Rydberg data from PDG		137.03599	

Strong Force

The strong energy comes from the proton mass table. Together with the R equation, they define quark orbits inside the atoms. The resulting R is on the order of 2e-16 meters. There are actually three variations of the strong force because there are two types of quarks involved and three different kinetic energies. It appears to the author that they combine but there is a concept called confinement that hides the true nature of the "color" forces.

Strong Residual Interaction

Refer to the Proton Mass table again.

	Mass (m) (MeV)	Ke (MeV)	gamma (g)	R meters	Field (E (MeV)
Gravity	938.272	10.11	0.990	7.224E-14	-2.732
Electromag	0.511	1.36087E-05	1.000	5.291E-11	-2.722E-05
Strong	129.541	798.580	0.140	2.093E-16	-957.185
Strong residual	928.121	10.151	0.989	1.430E-15	-20.303

The residual strong force (sometimes called the weak force) is determined by a mass of 928.12 MeV, a kinetic energy of 10.15 and field energy 20.30 MeV. The sum of all the field energies is more strongly negative than the total energy of the proton with its kinetic energy. Energy is missing in each proton but not missing from the total 960.54 MeV. The lack of balance in energy causes an inward force we know as the weak force. We can combine the quarks and their strong residual field energy into a "bundle of quarks". The bundle acts like a particle with kinetic energy 10.15 MeV orbiting in field energy 20.3 MeV. There is a diagram of this in Appendix 1. The same is true for the neutron. When nuclei bond together in nuclear reactions, the nucleons come close enough together to "see" the deficit. This imbeds the mass 928.12 MeV in a 20.3 MeV field with 10.15 MeV of kinetic energy and determines, a radius of 1.43e-15 meters (he radius of the atomic nucleus). This is of course not new to physics, but the origin of the 20.31 MEV is new and comes from the Proton Mass model. The strong residual force F=hC/R^2= 15467 NT requires the coupling constant 0.147 and the derived c^2= 2.9e-14 MeV-m is similar to the published value 1.56e-14 MeV-m.

The atomic binding energy curve is considered to be a result of the strong residual interaction. The key value is the kinetic energy 10.151 MeV associated with the proton that is partially released in atomic fusion. Section 5 topic 5.1 describes a simple model using the value 10.15 MeV as the basis for binding energy. In this model 10.15 MeV is the kinetic energy that changes as atoms fuse. (928.121 MeV+10.151 MeV =938.272 MeV).

Electromagnetic force

The electromagnetic force is the result of N=3* 0.0986=0.296 being lost from the 10.432 particle to become the electron (N=10.136). This gives the electron its negative charge. The electromagnetic energy of the field attracting the electron is E=e0*exp(0.296) =27.217e-6 MeV. This is the published value for the electromagnetic field.

The electromagnetic force constant

The fundamental constant (a different e0 than in Section 2) that governs electromagnetism (including charge and the electrical field) is included in Section 3.3. The following table shows calculation of the permittivity constant but it must be recognized that there are small quantum affects not included since the electron's orbitals are very complicated.

F=(1/(4*pi*e0)*q^2/r^2

e0=(1/4*pi*F)*q^2/r^2

F=8.2414e-8 newtons and r=5.2911e-11 meters

q in Coloumbs=1.6022e-19=F*r/27.217e-5/1e6

e0= (1/4*pi*F)*q^2/r^2=8.853e-12 Nt/m^2

This value compares favorably with the PDG value 8.854e-12 Nt/m^2.