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Research Article

Progress toward a unified theory December 2025

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Introduction

Some are wondering if a unified theory will converge using ideas of the 20th century. Scientists use quantum mechanics but say it is incomplete. Cosmologists use general relativity but are frustrated with attempts to reconcile large scale gravity with small scale physics. Astronomers and astrophysics continue to gather data with missions like WMAP, PLANCK, James Webb, and the Vera C. Rubin Observatory. But there are unresolved problems related to early observation of fully formed galaxies and Hubble measurements. There is no consensus regarding dark matter and dark energy. Progress toward a unified theory occurred when scientists discovered that fundamental particles occur in families. Physicists developed a Standard Model that includes the Higgs, Z, W+, and W- bosons but where these particles originate is unknown [1]. There is still much to learn and this paper proposes requirements and progress toward a unified theory to help researchers work toward a common vision [2]. A unified theory will gain acceptance if it satisfies these requirements:

Agrees with particle data reported by the Particle Data Group, maintained by University of California at Berkeley and NIST (National Institute of Standards and Testing) [3,4].

Accurately models the mass of the neutron and its decay to a proton, electron, and anti-electron neutrino.

Provides a source of constants for the four forces.

Unites quantum mechanics and Newtonian gravity.

Models atomic binding energy data.

Models measured abundances of the elements.

Models mass for short lived baryons, mesons, and their decay times.

Explains the Standard Model of Particle Physics.

Explains the origin of energy.

Explains time and space.

Provides the number of neutrons in nature.

Explains the Heisenberg and Pauli principles.

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Explains the double slit experiment.

Consistent with EPR measurements.

Presents the correct cosmology expansion curve.

Explains accumulation of mass in clusters, galaxies, and stars.

Explains early black holes, dark matter, and dark energy.

Provides a basis for progress regarding thought and life.

Explains evolution of life and development of the body.

Why should a unified theory explain life? We need a plausible creation "story" even if we do not know its origin. Science is a potential source of answers regarding difficult long-standing questions.

Part 1 Energy Data and the Proton Model

Even one disagreement between prediction and measurement can discredit a theory. Features of nature have been measured for centuries. High energy experiments at labs throughout the world gather data that is detailed and voluminous [3,4]. In general, it is difficult to correlate but the author found information values labelled N in the data that allows the mass of the neutron, proton, electron, and other fundamental particles to be simulated [5,6,7].

		Particle Data	Energy Es	N details
Identifier		Group energy	Es=e0*exp(N)	
ν means neutrino	N=ln(E/e0)	E (MeV)	(MeV)	e0=2.025e-5 MeV
taon ν		<15.5		
electron ν		2.20E-06	0.048	
N component	0.0986			ln(3)-1
N component	0.16667			.5/3
muon ν		< 0.17	0.0695	
E/M Field E	0.296	2.720E-05	2.72E-05	3*.0986=.296
ELECTRON	10.136	0.51099891	0.511	10.136=10.432-3*.0986
N component for qua	10.333		0.6224	10+1/3
N component for W	10.408		0.671	90-remainder
Grav field compo	10.432		0.687	10.432=10+1/3+.0986
Grav field compo	10.507		0.740	10.408+.0986
Energy difference Neutron-Pro		1.293		0.622+0.671=1.293
Graviton	10.432 & 10.507	6.00E-26	2.801	3*0.687+.74
Up quark Mass	13.432	2.16	2.490	4*0.622 MeV
Kinetic Energy f	12.432		5.076	10.432+2
Down quark Mas	13.432	4.67	4.357	7*0.622 MeV
Down quark KE	15.432	93	92.507	101.947-9.44 (quarks)
Down Strong Fie	15.432		101.947	
Charmed Quark	17.432	1275	1273.37	15.432+2
Strange Strong f	17.432		753.291	
Bottom Quark M	19.432	4175	4175.27	17.432+2
Top Quark Mass	21.432	17276	17261.00	19.432+2
W+,w- Boson	22.106	80445	80668.71	22.5-4*.0986
Z Boson	22.234	91188	91757.6	22.5-.0985-.167
HIGGS Boson	22.530	125300	123340.7	22.5+2*.0986-.167

Figure 1 Particle Energy Correlation With N Values

The values of N (Figure 1, column 2) form a series. The up and down quark data masses do not fit the series, but their proton model masses move to lower values while conserving KE in their path to decay in short lived mesons and baryons. This is documented [8]. Column 3 is data from accepted sources and column 4 uses the relationship E=2.02e-5*exp(N) to correlate N with the data. It supports an exponential relationship between particle or boson energy E (MeV). The pre-exponential, e0= 2.0247e-5 MeV is evaluated from the electron N=10.4319-0.296=10.1362 (e0=0.511/exp(10.1362)=2.0247e-5 MeV). Many N values contain the fractional value xx.432= 1/3+0.0986. The value 0.0986 = ln(3/e), where e is the natural number 2.718.

Information values N, in the data above, were used to construct math models that match nucleon (neutron and proton) mass within 1e-6 MeV [3]. The model supports the Standard model's three quarks inside each neutron and proton. Gluons are force carrying entities for the four interactions (forces). The bosons below are consistent with the standard model, and the neutron and proton models below start with dividing N=90 into four parts. It is converted into two Higgs particles (N=22.53), a Z boson (N=22.235), and a W boson (N=22.106) in the second column. According to the Standard Model, the Higgs particle (N=22.530) is the source of field energy. The W and Z boson components are involved in neutron decay.

	Higgs=22.53		
	Z =22.235	Z components	
Split 90/4	W=22.106	W components	Action of W-
22.500	**22.530**		
	-0.1972		0.197
	0.167		5.167
22.500	**22.530**		
	-0.1972		0.197
	0.167		3.167
22.500	**22.235**	-10.4316	
	0.0986	**10.507**	0.197
	0.167	10.333	3.167
22.500	**22.106**	-10.4316	
	0.3944	**10.408**	
		10.432	
			12.092
90.000	90.00	22.50	
		22.50	

Figure 2 The Higgs, W and Z Bosons

The column on the right leads to Figure 3. The bosons are split into subsets of four N values for each quark, N=10.432+17.432=12.432+15.432. The neutron and proton models below consist of four sets of these subsets that add to N=90 at the bottom of the model.

Neutron				Proton				
N values for mass	E=e0*exp(N)	N values for fields	E=e0*exp(N)	N values for mass	E=e0*exp(N)	N values for fields	E=e0*exp(N)	
12.432	5.076	10.432	0.687	12.432	5.076	10.432	0.687	X
15.432	101.947	17.432	753.291	15.432	101.947	17.432	753.291	
12.432	5.076	10.432	0.687	12.432	5.076	10.432	0.687	Y
13.432	13.797	15.432	101.947	13.432	13.797	15.432	101.947	
12.432	5.076	10.432	0.687	12.432	5.076	10.432	0.687	Z
13.432	13.797	15.432	101.947	13.432	13.797	15.432	101.947	
Z components	E=e0*exp(N)	N value for Z Field	E=e0*exp(N)	W components	E=e0*exp(N)	N values for W fiel	E=e0*exp(N)	
-10.432		-10.432		-10.432		-10.432		
10.507	0.740	10.507	0.740	**10.408**	0.671	10.5069	0.740	2.80113
10.333	0.622	10.333	0.6224	10.136	0.511	10.333	0.622	
				0.2958	2.72E-05			
90.000		90.000		90.0000		90.000		

Figure 3 Neutron and Proton Model

Tables above show W and Z components and details of neutron decay to a proton, electron, and anti-electron neutrino. The models are based on two constraints, probability one and zero energy.

Energy =0 constraint.

Position Code from Mass, Kinetic Energy, and Fields

mass	E1		field1	E3
kinetic energy	E2		field2	E4
mass=E1			field1	E3
Kinetic energy =E2+(E3+E4-E1-E2)			field2	E4

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Figure 4 Energy Zero for One Quark

Values of N from Figure 3 are inserted below:

		N	E=e0*exp	N	E=e0*exp(N)	
kinetic energy		12.43195	5.075635	Field1	10.43195	0.686913
mass		15.43195	101.9469	Field2	17.43195	753.2911
Difference KE			646.9555			
			753.978			753.978

Probability =1 constraint.

P=1/exp(12.432)*1/exp(15.432)/(1/exp(10.432)*1/exp*17.432))=1

N values for the quark strong field are N=2 higher than quark mass N (for each of 3 quarks).

Probability= 1 and overall energy= 0.

1. The Proton Model and Unification Energy Values

Energy values from Figure 3 (E=e0*exp(N)) above are arranged into columns in Figure 5. The components above total the mass of the neutron and proton below marked in red below (accuracy vs PDG data is shown). It is a particle-space model because it includes initial neutron expansion kinetic energy 10.15 MeV and expansion potential energy10.15 MeV. The energy E2+E2= 10.15 MeV is fundamental to atomic fusion and cosmological expansion. The neutron decays to a proton, electron, and anti-electron neutrino shown on the right.

	MEV Neutron Mass Components		MEV Neutron Fields		MeV Proton Mass Components		MeV Proton Field
sum	101.947	Mass	753.291	Strong Field E	101.947	Mass	753.291
129.541	13.797	Mass	101.947	Strong Field E	13.797	Mass	101.947
	13.797	Mass	101.947	Strong Field E	13.797	Mass	101.947
	5.076	Ke	2.801	Gravitational Field	5.076	Ke	2.8011
	646.955	Difference KE			646.955	Difference KE	
	83.761	Difference KE			83.761	Difference KE	
	83.761	Difference KE			83.761	Difference KE	
	10.151	Fusion KE			10.151	Fusion KE	
	-20.303	Weak Field E			-20.303	Weak Field E	
	0.622	(1.293=0.622+.671)			-0.671		
				accuracy vs PDG			
accuracy vs PDG			-0.118	-9.5866595E-06	-5.44E-05	Em Field +1	-0.118
-7.18546E-09	939.56541	Neutron mass		**938.2720814**	938.27209		
939.5654133					2.72E-05	EM Field -1	
					0.511	Electron	
					0.671	.622+.048	
					0.11141	Kinetic E	
					0.04850	ae neutrino	
	10.151	KE Expansion			10.103	KE Expansion	
	10.151	PE Expansion			10.151	PE Expansion	
	959.8680		959.8680		959.868		959.8680

Figure 5 Neutron and Proton Masses

Compare the above values for the neutron and proton with measured values.				update feb 2017					
931.4940281	nist		0.510998946	0.510998946					1.30E-07
931.4940955	pdg	548.5799095	0.5109895		0.5110011		-2.15856E-06		2.40E-07
simple cell.g67	Data		Data (mev)		Calculation (mev)	calculation	Difference	Difference	measurement
			Particle Data Group		Present model	(amu)	(mev)	(amu)	error (amu)
		(amu)		(amu)	(mev)				
Neutron	nist	1.008664916	939.5654133	939.5654135	939.5654127	1.0086649	5.629623E-07	8.71281E-10	6.20E-09
Proton	nist	1.007276467	938.2720813	938.2720813	938.2720767	1.0072765	4.620501E-06	4.98855E-09	6.2E-09
Neutron/electron		1838.683662	939.5654133	nist	939.5654127		5.6296233E-07		
Proton/electron		1836.152674	938.2720814	nist	938.2720767		4.6785007E-06		

Figure 6 Comparison of Models with PDG [3] and NIST [4] Data

Figures 3, 4 and 5 provide insight into how nature creates and accounts for energy. In the model, energy is created through an information-based separation process. This satisfies one of the criteria for a unified theory. The neutron and proton are manifestations of underlying laws and contain sub-component energy values used throughout nature.

Decay of the Proton in A Neutron, Electron, and Anti-Electron Neutrino

As a proton, the electron quad of the proton mass model contains these energies. Again all the probabilities multiply to 1. Figure 7 supports the Standard Model's description of the W and Z bosons as change agents [9,10].

Z components	E=e0*exp(N)	Z Field	E=e0*exp(N)
-10.432		-10.432	
10.507	0.740	10.507	0.740
10.333	0.622	10.333	0.6224
90.000		90.000	

W components	E=e0*exp(N)	W field	E=e0*exp(N)
-10.432		-10.432	
10.408	0.671	10.507	0.740
10.136	0.511	10.333	0.622
0.296	2.72E-05		
90.0000		90.000	

Figure 7 Decay of Neutron

Part 2 Application of Proton Model Information

This document is a compilation of work by the author over many years. Information in the models above was applied to unification topics. It is written at the college level like an engineering report. A practical approach is used that attempts to simplify nature. Data based computer modeling was used to simulate processes. Of specific interest are the topics of force unification, cosmology, and creation. It addresses concerns at the forefront of astrophysics using data from recent observations.

The following processes occur sequentially.

1. In the beginning neutrons were duplicated exp(180) times.
2. As expansion occurs gravitational kinetic energy is converted to potential energy.
3. Particles fall into each other's gravitational field and create galaxies and stars.
4. As stars form, protons fall into each other's strong residual fields and release energy. Atoms with complicated electronic structures form and a supernova eventually scatter carbon, silicon, nitrogen, oxygen, etc. that form planets.
5. Chemistry becomes complex and stable carbon atoms lead to life supporting amino acids.

Topics 1-6 discuss topics basic to science.

1. Energy Time and Space

Time and space are defined by a circle. Time moves around a circle in two directions. Schrodinger equation defines the circle with [11]

P=exp(-i*Et/H)*exp(i*Et/H)=1

Energy and time enter nature through the unity Et/H=1 where E is energy and t are time. Et/H=1 is also written r=hC/E where H= Planck's constant H/(2pi) =4.136e-21/(2pi).

Time around the circle is shorter (frequency=1/t) when energy is high. Point P=1 is the initial condition for the proton model. Shannon's [ref 43 Bell labs circa 1920] information definition S=1/ln(P) became the basis of thermodynamics and code breaking. The defining relationship between energy and probability is P=e0/E=1/exp(N). This yields the relationship between energy and N, E= e0*exp(N). The helps us understand that information underlies physical reality.

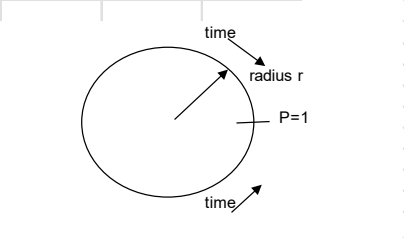

Figure 8 Space Model

Time and space are defined below with the equation R=hC/E where E = gravitational field = 2.801 MeV (field components from the proton model = -0.69+ -0.69+ -0.69+ -0.740 = -2.801 MeV). This defines time and space. R= circle radius=

HC/2pi=1.973e-13/2.8011=7.045e-14 meters.

Identify the radius and time for the gravitational orbit with 2.801 MeV
Fundamental radius=hC/E=1.97e-13/2.801=7.04e-14 meters
Fundamental time= 7.04e-14*2*pi()/3e8=1.47e-21 seconds

The gravitation constant G, the subject of Topic 3, depends on this radius. In the straight-line expansion model time progresses by repeating increment t= 1.47e-21 second. The proton model [Figure 5] represents protons in time and space with P=1 and E=0 overall.

2. Expansion Models

Quantum mechanics describes small scale nature, but it is not being used for the big bang. Instead, physicists say that physics breaks down at a singularity. Physicists believe that there was an early brief period of expansion called inflation. It was supposed to keep different areas uniform that are more than C away from one another. But new maps show huge voids and non-uniformities. The Lambda Cold Dark Matter (LCDM) expansion model is the current model [12,13]. It is based on a Friedmann equation which expands space as r'=r(time'/time)^(2/3). It produces unverified percentages of matter, dark matter, and dark energy.

The author studied and documented a straight-line expansion model based on information from the proton model [Figure 5] [14]. It agrees with currently accepted radius and age of the universe. In this model, dark matter is pushed into Zel'dovich pancakes by perturbations in normal matter [15,16]. This results in the cosmic web and explains the micro-temperature perturbations measured as the Cosmic Microwave Background (CMB). The cosmic web explains how mass is partitioned between galaxy clusters, voids, walls, long and short filaments and galaxies.

Straight-Line Expansion Model

The Initial Number of Neutrons in Nature

Overall, the N values of the left-hand side neutron components equal 90. Written as a probability p= 1/exp(90). The equal but opposite left-hand side components are also p= 1/exp(90). They occur at the same time, multiplying the probability to 1/exp(180). To re-establish P=1 for such an improbable particle, there must be a vast number. Specifically, P= 1= probability of each neutron* number of neutrons= 1/exp(180)*exp(180).

In three dimensions, exp(60) scales small r to large R=r*exp(60) meters. Each small sphere is expanding outward. Outward velocity for large R is lightspeed, C (it is also lightspeed around the circumference since time and distance are a fixed ratio). The straight-line model advances time across the expansion radius in increments of fundamental time (1.47e-21/(2*pi) seconds) [14,16]. An exponential relationship is used with initial time=2.35e-22*exp(60) sec but is currently 2.35e-22*exp(90.384)=4.21e17 seconds (13.35 B years). It starts with initial R=r*exp(60) = 7.045e-14*exp(60)= 8.05e12 meters. Small r expands with elapsed time r=r0+elapsed time*C/exp(60). Current small r=1.106 meters and large R=1.106*exp(60)= 1.26e25 meters. The current radius is determined by the Cephid variables Hubble constant, H0= 2.375e-18/sec (which is 1/4.21e17 sec) [17]. Other H0 values have been reported [Hubble Space Telescope] [13].

The model maintains the gravitational constant G with the equation above, kinetic energy KE= 10.15*7.045e-14/r. Since KE is inversely proportional to r, kinetic energy is also linear.

Straight-line cosmology	cell bj162	beginning Mass+Ke	beginning	current expansion Mass+Ke
N exponent for number of time cycles		60		90.384
Field Energy E (MeV)		2.8011		2.8011
r across circle=hC/E=1.97e-13/2.801=7.045e-14 meters		7.045E-14		1.106
time around circle=2*pi*7.045e-14/C (seconds)		1.47644E-21		2.65E+18
E*t/H=1	2.801*1.476e-21/4.136e-21	1.00E+00		1.00E+00
R=7.045e-14*exp(60) meters		8.05E+12		1.263E+26
time across radius=time around/2pi*exp(60) seconds		2.68E+04		4.21E+17
Kinetic Energy (MeV)	KE=7.045e-14*10.15/R	10.1513		6.47E-13
conserved E=PE+KE (MeV)		20.300		20.3
Gamma (g)	m/(m+ke)	0.9893		1
Velocity Ratio	v/C=(1-(g)^2)^.5	1.4592E-01		
V=gamma*C		4.3745E+07		11.13
Inertial F=1.67e-27*4.4e7^2/7.045E-14 Nt		45.855		1.87E-25
F=6.6742e-11*(1.67e-27*exp(9(Nt		45.845		1.86E-25

Figure 9 Straight-Line Expansion

The column on the left of Figure 9 contains values for the beginning of expansion. The beginning is high temperature and nucleons are primarily neutrons. They decay to protons, energy 1.293 MeV/neutron is released. The column of the right contains current values. The model is zero net energy as 10.15 MeV kinetic energy is converted to potential energy, resulting in current kinetic energy 6.5e-13 MeV/proton. The total ke+pe=20.3 MeV/nucleon is constant. The gravity column of Figure 11 explains the force balance, but small r is an orbit maintained throughout expansion.

WMAP and PLANCK mission analysis was based on the Lambda Cold Dark Matter (LCDM) expansion model [12,13,17,18,19]. Figure 10 compares the two expansion models [14,16].

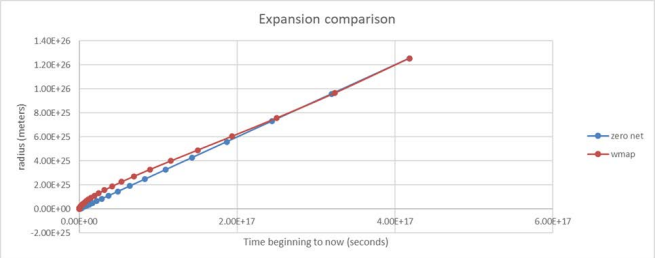

Figure 10 Comparison of Expansion vs Time Models

1. The straight-line expansion model explains many troubling observations. James Webb telescope observations are finding formed galaxies well before they are predicted. The straight-line expansion model are close to the WMAP values for age (13.4 billion years) and radius (1.26e26 meters) [13]. Early formation of galaxies is possible in the relatively high densities of the straight-line expansion model [20,21]. In addition, a particle without kinetic energy appears in the model that aids black holes formation [22]. It appears that dark matter forms black holes at equality. It is a proton without kinetic energy and according to the Jeans criteria cannot resist accumulation. Early black holes and red spots have been observed. Early black holes also help explain early observation of galaxies. This helps explain troublesome early observation of galaxies.
2. The concept of critical density is not supported in straight-line expansion [23]. WMAP presented cosmology parameters for their belief that an acoustic wave was responsible for the CMB spot they measured as 0.0104

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radians [13].

3. The straight-line model is energy based. Initial KE=10.15 MeV/proton. Expansion reduces kinetic energy triggering primordial nucleosynthesis at KE=0.11 MeV adding 7.07*0.29=2.03 MeV/proton. The history of energy vs time suggests that the CMB may be over-written. CMB and the LCDM model lead to unsubstantuated percentages of normal matter, dark matter and dark energy. Star densities in the cosmic web may be the source of CMB variations [24].
4. The source of the cosmic web was analyzed, and it was concluded that its features are being measured as the cosmic microwave background (CMB).
5. The concept of dark matter halos appears to be incorrect [25]. Space associated with each proton can both expand and contract. Small r decreases during mass accumulation and is masking true Newtonian behavior of stars velocity. Galaxies form with most of their mass and light emission near the center of the galaxy. The cause of this distribution is the gravitational influence of black holes on galaxy formation. Based on this, there does not appear to be any missing matter. This may help explain dark matter and Hubble tension [25,26].

3. Force Unification

The Planck scale is currently accepted as the source of the gravitational constant. Literature reviewed below reviews the Planck scale [15].

Compton mass M=(hC/G)^0.5=(6.582e-22*2.998e8/6.67428e-11*1.6022e-13)^0.5=2.176e-8 kg (1.221e22 MeV).

G=6.582e-22*2.998e8/2.1765e-8^2*1.6022e-13= 6.6742e-11 N m^2/kg^2.

This is the accepted derivation of G at the Planck scale.

For reference, Particle Data Group G=6.67428e-11 N m^2/Kg^2 [3].

There is a mass in the proton model related to the Planck scale Compton mass.

mass = 101.947+13.797+13.797+0.622=130.16 MeV (2.23e-28 Kg)

G=6.582e-22*2.998e8/(exp(90)*2.23e-28*1.67e-27)*1.6022e-13= 6.6742e-11 N m^2/kg^2.

(exp(90)*2.23e-28*1.67e-27)^0.5=2.1764e-8 kg (Compton mass)

The constant exp(90) multiplied by proton scale masses is the minimum mass for small scale orbits [27]. The inertial force in the bottom line of Figure 11 is equal to the Newtonian force.

F=G *exp(90)*m*m/7.045e-14^2=45.93 N.

Unification Table	cell ax74	Gravity	Strong (comb	Weak	Electromagn
		MeV	MeV	MeV	MeV
Mass M (kg)					
Field Energy E (MeV)	E=2.801/EXP(90)	2.8011	957.18	20.3	2.72173E-05
R (meters) hC/E=1.97e-13/E		7.045E-14			7.2501E-09
Particle Mass (MeV)		938.272	129.54	4.357	0.511
Mass M (kg)		1.673E-27	2.31E-28	7.77E-30	9.11E-31
Kinetic Energy (MeV)		10.15	797.34	749.62	1.361E-05
Gamma (g)	m/(m+ke)	0.9893	0.1398	0.0058	0.99997
Velocity Ratio	v/C=(1-(g)^2)^.	0.1459	0.9902	1.0000	7.298E-03
V=V ratio*C		4.37E+07			
R=hC/(m/g*E)^0.5			2.095E-16	1.595E-15	5.291E-11
F=6.6742e-11*(exp(90)*1.6726e-27^2/7.045e-14^2)		45.912			
Inertial F=M/g*V^2/R)		45.92			
F=E/r*1.602e-13			7.3E+05	2.0E+03	8.242E-08

Figure 11 Neutron model data for forces.

Strong Force

The strong field energy values, known as gluons or color forces, are from the proton mass table. There are three gluons, one for each quark and quarks are confined in the nucleus. In Figure 11 they are combined giving, r=hC/E equation= 2e-16 meters. The published values for the coupling constant verify the value 1.0 in color chromodynamics theory [28,29].

Electromagnetic Force

The electromagnetic force is the result of N= 3* 0.0986= 0.296 being separated from the N= 10.432- 0.296= 10.136. This becomes the electron (N= 10.136 and energy =0.511 MeV). The electromagnetic energy of the field E= e0*exp(0.296) = 27.217e-6 MeV. This is exactly the published value for the electromagnetic field. During decay, the electromagnetic energy is separated into 0=2.72e-5-2.72e-5. One half goes to the electron making it negative. The other half goes to the neutron making it positive. The electromagnetic field is the only field that can attract or repel.

The permittivity constant e' (e prime) governs electromagnetism (including charge and the electrical field). Calculation of e' is below, but there are small quantum effects not included since the electron's orbitals are very complicated.

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

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

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

q in Coulombs=1.6022e-19=F*r/27.217e-6/1e6

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

This compares favorably with PDG published value 8.854e-12 N/m^2.

Residual Strong Interaction (aka the Weak Force)

Energy with value 2*10.15= 20.3 MeV is missing in each proton and neutron. The value 10.15 MeV is derived from the N value for kinetic energy from the model. E=2*e0*exp(12.4319) =10.15 MeV. In the Unification above, the three quarks are a particle bundle with kinetic energy 10.15 MeV orbiting in field energy 20.3 MeV. This embeds 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 (the radius of the atomic nucleus). This is not new to physics, but the origin of the 20.30 MEV is new and comes from the proton mass model.

Binding Energy and Barrier Energy

The proton model (Figure 5) contains values that allow binding energy to be accurately predicted. The proton model indicates that nature uses Shannon type information theory and makes N= - ln(P) a number related to energy [6]. The fundamentals

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of binding energy appear to be based on the same probability approach [30]. In Figure 12 the familiar probabilistic approach above is applied to the fundamentals of atomic binding energy. The following calculations illustrate that the total fundamental release is the weighted contribution from the protons and neutrons.

Energy release protons Ep=10.15*exp(-2/protons)*protons MeV

Energy release neutrons En= 10.15*exp(-2/neutrons)*neutrons MeV

Weighted average BE=Ep+En/(protons+neutrons)

Li7 has 3 protons and 4 neutrons. BE=(10.15*exp(-2/3)*3+10.15*exp(-2/4)*4)/7=5.75 MeV minus retained energy =0.087=5.664 MeV (NIST =5.664 MeV).

The protons retain energy due to electrostatic repulsion. The binding energy curve is shown below with the asymptote 10.15 MeV [4].

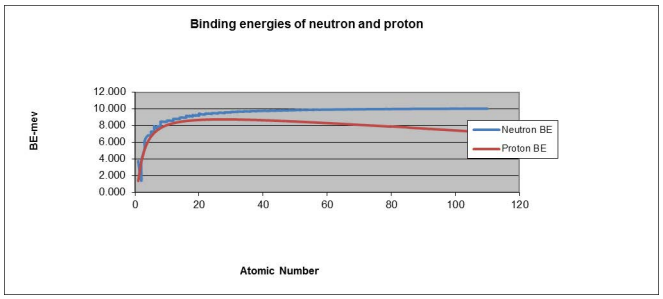

Figure 12 Binding Energy for Neutron and Proton

The decay of a neutron to a proton is shown in the models above [30]. The decay energy balance from a neutron to a proton is: 939.465-0.74-0.622=938.272 MeV. The value 0.622-0.111=0.511 MeV is the electron. KE=0.111 MeV is found in two important processes. During early expansion, KE is decreasing from the initial value 10.15 MeV. When it reaches 0.111 MeV, primordial nucleosynthesis is triggered, and free neutrons readily combine into He4 [15,31,32]. The second process that involves this value is fusion in stars [33]. Barrier energy 0.111 MeV must be provided before fusion can occur.

Force Unification Summary

Mass and field values are provided by the proton mass model [Figure 5]. Published values are available [29,34,35].

4. Mesons and Baryon Mass and Decay Times

The author studied mesons, baryons, baryon resonance, their decay times, and properties. Fitting data with fundamental particle values gave a tentative understanding of what these transient particles are. They are combinations of proton model components and kinetic energy that decay rapidly.

Decay time is related to a particle with kinetic energy circling once and then starting its decay if its wave function is unbalanced (Breit-Wigner theory [Wiki]).

The radius of the circle r=hC/(20.3*M)^.5 where M is the mass of the meson or baryon.

Velocity around the circle is V=C*(1-(M/(M+10.15)^2)^.5

Circle time =2*pi*r/(V)

Circle time= decay time = approximately 2e-23 seconds for most particles.

This is the case for hundreds of short lived particles observed in high energy experiments. But ther are several exceptions, for example the muon, pion, neutron and proton. Data for the bare neutron lifetime = 879.6 seconds [Wiki]. Lifetimes are related to half-life and exponential decay is initiated after one time around a circle. The kinetic energy in this circle is the decay energy-electron=0.831 MeV. The decay starts at 7.12e-22*exp(57.77)=1220 seconds and its half-life is 879 seconds. The N value 57.77=3*15.43+17.43. N values from the proton model also delay muon and pion decay.

5. Our Position in Space and Time

The proton model provides the specific gravitation energy that positions a proton on a space circle. We consist of protons and the mind's 3-dimensional viewpoint is at the proton model's X, Y and Z information/energy interface below. Gravitational energy defines a space circle with

r=hC/E with E=0.687+0.687+0.687+0.740=2.8011 MeV

r=hC/2.8011=7.0447e-14 meters.

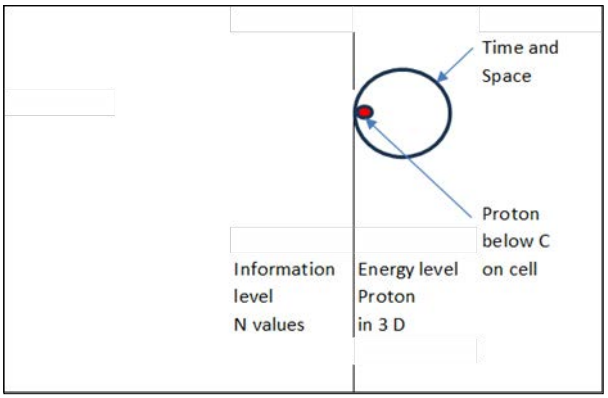

Figure 13 Information level and energy level

6. Life Processes

Nature is mathematical and uses numbers. Probabilities represent a fundamental way of describing energy without referring to other energy. Information and energy are the two sides of nature. The only stable particles are protons, neutrons in atoms, electrons, light, and neutrinos. Our body consists of these particles. Our position on the information side of the Figure 13 interface is associated with a mind having no choice about seeing other protons around it in 3 dimensions (dimensions are information, not energy). One proof of our minds P=1 position is that we are moving rapidly but our reference point stays inside our minds.

With the equation E=2.02e-5*exp(N), the proton model indicates that there are two levels to nature 1) an information level and 2) an energy level. To be clear, protons do exist, but our mind evolved by using their information level. Reality is perceived information (probabilities) about the real world around us.

Thought reality is based on probability chains. N for the gravitational energy 2.801 MeV=11.84. The associated probability p=e0/H*time=1/exp(11.84). Probability p is also p=e0/2.801=1/exp(11.84). This is speculative, but the ratio p/p=Et/H=1 means 3-dimensional space to your mind. The next probability in the chain is for objects in space at positions x, y, and z. For this example, it is information about the color of a "blob." The right-hand side of Figure 13 has a proton and an electron on the surface. A quantum number Q reduces the electron's electromagnetic field.

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E=1.36e-5/Q^2 and =3.4e-6 -1.51e-6=1.89e-6 MeV with one Q= 2 and the other Q=3.

This "jump" is light that that your eye spreads into a 3 D matrix [36]. Signals proportional to the eye's absorption of light are transmitted to a neural network in the brain with a time pulse code. The electromagnetic field of the proton holds the reference wavelength (energy E=1.89e-6 MeV) for the coded pulses and forms the probability

P=t*e0/H=e0/E= 2.02e-5/1.89e-6=10.7 = MeV

For example, if the eye's absorption/reference=0.9. The probability ratio

p/p=(e0*t/H)/(e0*t/H)=0.9 is transmitted to the mind and the mind perceives a red color.

The mind sees a colored "blob" in space. Your mind adds it to the probability chain.

p/p=(0.9*e0/E)/(e0/E)

Our mind was trained to use the probability above. For example, if a baby sees a blob of red. The parent trains the baby's mind by saying "see the red ball." The baby is trained to see this probability as "a red ball" at position x,y and z in time and space.

Our information-based minds have probability-based memory, perceptions and thoughts. Space and time exist on both sides of Figure 13. On the left side probabilities build probability chains as learning occurs. They are like letters in the alphabet that represent learned words. Eventually, the mind manipulates probability chains into complex thought. Our information-based minds continue to receive input from the brain and perceive it based probabilities we call memory. It is continuously searching for p/p matches (meaning).

To be clear, energy-based nature is real, but our brain/body evolved because there was an associated mind that could perceive, remember, think and act to seek food and avoid danger. There are two levels of nature with 3-dimensional space and time in both levels.

Summary of Progress Toward Unification

Particle data was correlated leading to the discovery of a series that underlies fundamental particle energies. The energy series was combined into a mass model that matches NIST and Particle Data Group masses of the neutron, proton, and electron to within 1.6e-6 MeV.

The mass models were shown to be based on MIT's unitary solution to the Schrodinger equation [11]. The model is based on information values called N that multiply to probability= for each of 5 sub-components. The equation, E=e0*exp(N) converts each sub-component into values that define quarks with kinetic energy that were apparently separated from equal and opposite field energy during a creation process. This makes each sub-component energy zero overall.

Energy Values in the Proton Model

1. Fundamental forces. The strong forces, weak force, electromagnetic force, and gravitational force can be calculated from proton model components. Key values for gravity were the gravitational field energy 2.801 MeV that gives fundamental radius 7.045e-14 meters and Compton mass= (exp(90)*2.23e-28*1.67e-27)^0.5 kg [27].
2. Cosmology. In addition to small scale radius r=hC/2.8, the model provides the initial kinetic energy 10.15 MeV for expansion and the number of protons in nature.
3. Atomic binding energy and abundance of the elements. The familiar probability equation E=10.15*exp(-2/nucleons) is the basis of binding energy. The asymptote for energy released for the neutron is 10.15 MeV. As the neutron decays to a proton, electron and anti-electron neutrino, a proton with kinetic energy is released. It transitions at 0.622-0.511=0.111 MeV. This KE is the point that primordial nucleosynthesis begins [31,37,38]. It becomes a barrier to fusion which starts when 0.111 MeV is supplied by compression heating in stars.
4. Baryon and meson masses and decay [5,8]. Proton model components are resonances for high-energy, short- lived particles and energy 10.15 MeV is KE for circle times that correlates decay times.
5. The Standard Model Higgs, W and Z bosons are starting energies for the N pattern in the proton model.

Progress toward resolving current cosmology issues

6. A cosmology expansion model was presented based on thermodynamics. It agrees with the WMAP and PLANCK lambda CDM model but is based on proton energy components and zero net energy.
7. The thermodynamic model is an alternative to the critical density concept [39]. The critical density concept may be incorrect, leading many to search for missing matter.
8. Dark energy is identified as late-stage fusion energy from stars.
9. Dark matter measured by WMAP and PLANK may consist of black holes [22]. Accretion into massive black holes at the center of galaxies may occur very early. Unexpected flat galaxy rotation curves are a result of kinetic energy differences leading to local expansion effects.

Progress Toward A Unifying Theory

A unifying theory based on P=1 with Schrodinger complex conjugates (iEt/H)*(-iEt/H). The initial conditions for the proton model, probability =1 and net energy =0, support the concept that nature is based on separations. The data correlation between information and energy, E=2.02e-5*exp(N) indicates that there are two levels in nature. Space and time exist at each level and support mind/body interactions that produces evolution. Perception is fundamental, based on probability matches. The Information value for fundamental space is N=11.84. It was proposed that the probability match p/p=1 based on p=1/exp(11.84) is the basis for our 3-dimensional position on the information side of nature.

Understanding the role of information is important because physics deals with fundamentals. Earlier theories are discarded and replaced by theories that are more explanatory [40]. The information level is lower than Leucippus and Democritus concept's that originated atomistic theory in the fifth century BCE. The Standard Model is supported by the proton model, and provides an information basis for its particles and fields. The discovery that particles consist of information makes it easier to understand life and conscious thought.

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