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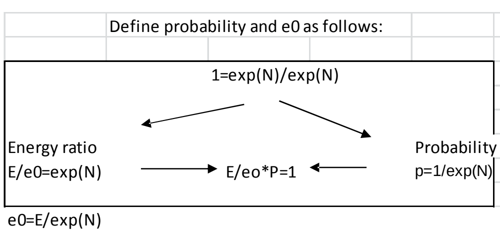
Title: A top-down approach to fundamental interactions

Abstract

This paper proposes that the Standard Model [4] [5] and Einstein's general relativity theory can be unified by introducing probabilities similar to the field of information theory developed by Claude Shannon [16] and others. Accurate estimates regarding the number of neutrons in the universe are now available due to the WMAP [8] project. The author noted that there are approximately the natural number e (2.71828) to the power 180 (exp(N)) protons in the universe (Technical endnote 1) and explored the possibility that the number is fundamental to physics. Considering the probability of one neutron as 1/exp(180) a "top-down" model lead to a direct calculation of the gravitational constant and a uniform method of evaluating fundamental forces.

Methodology

Information theory and thermodynamics define probability P and uncertainty S as shown in the following table. The terminology and methodology involves the use of the natural log (ln). This proposal will seek meaningful quantities associated with N, where N will be derived from the value 180. Subsequently the relationship E=e0 exp N will be used to give energy after the pre-exponential can be clearly defined. The current Standard Model is based on symmetries [5][12]. The author explores symmetries that are information theory operations on the logarithms N=180, N=90, etc. and related to probabilities by the equation P=1/exp(N). Information theory probability and energy are defined together [13] as follows: As an energy ratio E/e0 increases, probability decreases to retain E/e0*P=1.



Comparison		
Information Theory	S= -ln P	S is called uncertainty
		P is a probability
Thermodynamics	S= -ln P	S is called entropy
		P is a probability
Proposal	E=e0 exp N or N=ln E/e0	
	N= -ln P	N is called N
		P=e0/E=t/t0=1/exp(N)
		P is a probability

Modern physics accurately describes many aspects of nature but requires the insertion of many constants. The Standard Model [4][5] makes the Higgs energy the source of particle mass but its energy has not been verified experimentally. A proposed value for the Higgs energy is derived from the number 90 and its energy is calculated from measurable quantities.

Operations 1, 2, 3, 4, 5 and the Higgs

The work below is a result of "cracking nature's code". Eight information operations were discovered, the first of which is simply, divide the number 90 by 4 to give four values of 22.5 each. The author associates these values with what will be called the Higgs N value (see Technical endnote 1 under the column entitled N). The author also associates these values with four equal dimensions.

								Probability	
		Operation 1	Operation 2&3	Operation 4		Operatior	Fundamental N values	P=1/exp(N)	
Higgs X dimension		22.5	10.167	5.167	15.333	0.0986	15.432	1.99E-07	
			12.333		12.333	0.0986	12.432	3.99E-06	
Higgs Y dimension		22.5	10.167	3.167	13.333	0.0986	13.432	1.47E-06	
			12.333		12.333	0.0986	12.432	3.99E-06	
Higgs Z dimension		22.5	10.167	3.167	13.333	0.0986	13.432	1.47E-06	
			12.333		12.333	0.0986	12.432	3.99E-06	
			0.667		0.667	0.0750	0.075	9.28E-01	
Time		22.5	11.500						
			10.333		10.333		10.333	3.25E-05	
Total		90	90		90		90	8.19E-40	

The third, fourth and fifth operations are arithmetic operations on the number 90 as shown in the table above. The number 0.666 in the second column above is related to charge as indicated in operation. The author will show how the numbers in the table specify parts of the neutron. After each operation, the number 90 is maintained as the sum. Each part has a probability 1/exp(N) associated with it and the total probability 1/exp(90)=8.194e-40 is the multiple of these probabilities.

Operation 6 Energy

The numbers 15.43, 13.43 and 13.43 will be associated with sub-particles in the neutron/proton and the author found meaningful energies associated these numbers. That association is found with the number 10.333 - 3*0.0986=10.136. The number 10.136 represents the electron.   Data label PDG in this document is from the Particle Data Group [4].

e0=E/exp(N)

Find the value e0 by solving the above equation with E=.511				e0= 0.511/exp(10.136)		
Electron mass (mev)	mass of electron (mev)	0.51099892	mev	2.025E-05		mev
	(best value from PDG)	0.510998918	mev	2.025E-05		mev
Note that 3*.0986=.296	0.296	E=eo*exp(.2958)=2.72e-6 mev			2.722E-05	mev
The electric field energy of the electron is known to be:			2.72E-05 mev			

All subsequent energies are evaluated with the constant e0: i.e. E=eo*exp(N), where e0=2.025e-5 mev. The Higgs energy can be determined with the equation E=2.025e-5*exp(22.5)=119671 mev. This value for the Higgs published on July 4 2012 is 125300 and was within the range identified [5].

Operation 7 Energy interaction

The author calls operation 7 an "energy interaction". Operations 2, 3 and 4 created four sets of numbers and the set identified as N=13.431 and N=12.431 will be used below for demonstration. The energy interaction adds the number 2 to 13.431 to give 15.431 while at the same time, the number 2 is subtracted from 12.431 to give 10.431. Each number in the interaction has a specific place and a specific meaning described below:

E1 will be identified as a mass (a quark for the strong interaction)
E2 is identified as a kinetic energy (ke) addition to energy E1.
E3 is identified as field energy (strong potential energy for this N).
E4 is identified as a gravitational energy component.

The total energy across the interaction is conserved at zero with mass (E1) + ke (E2) +ke difference (E4+E3-E2-E1) balancing field energies (E3+E4 shown as negative). Values are placed in a table to the right of the basic interaction.

N1	E1 mass	N3	E3 field1			ke (difference ke)			E3 field1	
N2	E2 ke	N4	E4 field2		E1 mass	E3+E4-E1-E2	E2 ke			E4 field2
	mev		mev		mev	mev	mev		mev	mev
13.432	13.797	15.432	101.947		13.797	83.761	5.076		-101.947	
12.432	5.076	10.432	0.687							-0.687
					E1+difference ke+E2		102.634		E3+E4	-102.634
					Energy is conserved since 102.634=102.634					

This energy interaction has powerful implications resulting from the addition and subtraction of the number 2. The interaction creates orbits based on E=ke and are special case Lagrangians (technical endnote 2). The interaction involving E1 can be read E1 is given exp(2) of energy to become E3 . Since the numbers (N) are exponents (recall that E=eo exp(N)), the number 2 can be associated with a fractional divisor for the original energy . The number 2 is evaluated as 1/exp(2)=0.135. After the interaction, energy 13.78 mev becomes 101.947 mev since 13.79/0.135=101.947 mev. This is identical to the concept of gamma in relativity. Gamma is the fractional divisor that increases the kinetic energy of a fast moving mass involved in the Lorentz transformation. The definition required is: ke=m/gamma-m.
Operation 2 proposed that the Higgs N value is associated with each of four dimensions. Three of the dimensions are distance (think x,y,z) while the other dimension is time (t). Gamma is a measure of how far mass moves into the time dimension while distance changes by an incremental amount due to kinetic energy. Since the dimensions are equal, x/t is a constant (C, the speed of light). Furthermore, the dimensions are orthogonal, meaning that they cross each other at right angles (90 degrees). The above information leads to the famous Einstein energy momentum relationship [13].
(Etotal^2=Emass^2+(pC)^2, where p is momentum).

Operation 8 Waves

Wave/particle duality is fundamental in physics and operation 8 describes everything as waves by multiplying the probabilities and associated energies defined in operation 6 by the quantities exp(iv dt) and exp(-iv dt). The symbol i designates an imaginary number, v is frequency and dt is differential time. However, it is possible to maintain a simple approach by limiting our evaluation to times when exp(iv dt)*exp(-iv dt)=1.
After operation 8, we can use the concept of frequency (v=1/time) and use the well known relationship E=Hv, where H is Planck's constant. Planck’s constant lets us relate conventional time (sec) and energy (mev).

The R equation

Technical endnote 2 shows development of the equation R= (HC/(2pi)/(E*m/g)^0.5. This known equation for orbital radius [14] tells us that the energy interaction establishes an orbit. Mass (m) with velocity (gamma) orbits field energy (E) at radius R. The author calls this the R equation.

Operation 9 The neutron

The concepts are now in place to understand the value 90 in a different way. Recall that the probability of one neutron is P=1/exp(90)*1/exp(90). There were 8 operations on the logarithm N= 90 that set up at least three orbits. The table below is an overall energy balance comprised of the various components of the value 90. The mass and kinetic energy value 939.56 mev is the mass of a neutron and compared to the measurement error for a neutron in the section below entitled "Data Comparisons". We can name the energy components of the neutron using Technical endnote 1. It contains one quark of mass 101.97 mev that is called the strange quark and two quarks of mass 13.8 mev called down quarks. The quarks are in orbits around strong fields shown in the column labeled Strong Field. They have kinetic energy shown in the column labeled Difference Ke. Note that a third interaction is shown below the quarks. It adds 0.622 mev to the neutron mass, is later involved in the decay of a neutron to a proton and contributes negative energy to the right hand side of the balance. The author identifies the total energy 2.683 mev as the gravitation field energy. The kinetic energy 20.3 mev (4*5.08) is set aside for expansion [2]. A diagram of the neutron is shown. The three quarks are confined within a range less than 2.01e-15 meters and contain 798.6 mev of kinetic energy. The "bundle of quarks" is held in a larger orbit with kinetic energy 10.15 mev by the field energy 20.3 mev. This field energy is a result of the overall energy balance and the force is called the strong residual force. The value of this energy is the difference between the neutron mass 939.56 mev and the (negative by convention) sum of the strong field energy 957.18 mev. The overall spin of the neutron is known to be 0.5 (spin is a measure of angular momentum) and the spin components are shown in the spin column which obeys the exclusion principal disallowing two down quarks to be one orbit unless they have opposite spin). The overall charge of the neutron is zero and the column labeled Charge shows the components.

	Unified.xls cell g191				Mass and Kinetic Energy						Field Energy	
	mass	Energy-mev	S field	Energy	Mass	Difference KE	strong residual ke	Neutrino	Expansion	Strong field	Gravitation	spin
Charge	ke		G field	mev	mev	mev	mev	mev	KE	energy mev	Energy mev	
0.667	15.432	101.95	17.432	753.29	101.947	641.880				-753.29		0.5
	12.432	5.08	10.432	0.69							-0.69	
-0.333	13.432	13.80	15.432	101.95	13.797	78.685				-101.95		0.5
	12.432	5.08	10.432	0.69							-0.69	
-0.333	13.432	13.80	15.432	101.95	13.797	78.685				-101.95		-0.5
	12.432	5.08	10.432	0.69							-0.69	
							10.15		20.303			
	10.408	0.67	0.075		0.000	0.000						
	-10.333											
	10.333	0.6224	0	2.02E-05	0.6224	0.000		2.02E-05		-2.02E-05		
	0	2.02E-05	10.333	0.6224							-0.6224	
					130.163	799.251	**939.5653485**	2.02E-05	20.303	-957.185	-2.683	Totals
	90.000	sum	90.000				**NEUTRON MASS**		Total m+ke	Total fields		
									Total positive	Total negative		
									959.868	-959.868	0.000E+00	0.500

Note that the energy 2.02e-5 is a neutrino that carries away 0.5 spin. This allows the neutron/neutrino system to maintain overall zero spin.

The neutron decays to a proton and electron in about 881.49 seconds (PDG). The decay process starts with a separation in the interaction mentioned above containing the value E=e0*exp(10.33)=0.622 mev. Zero separates into minus 10.33 and plus 10.33 and the 10.33 moves outside the proton to form the base for the electron. Charge components involve another separation, zero= 3*0.0986-3*0.0986. Recall that the electric field energy 27.2 electron volts=e0*exp(0.296). This gives the electron and the proton their opposite but equal electrical field energies as shown in the column labeled Charge. The electron is formed by the energy interaction near the bottom of the diagram below. Nature maintains another zero. It allows an electron to be created if and only if an anti-particle in the lepton family is created. That particle is the energy 2.47e-5 mev named the anti-electron neutrino. Physics knows of these particles because there is missing energy in known interactions. It leaves the proton along with the 0.622 mev. Another neutrino (the mu neutrino) results from the leftovers (10.33+.075-10.33) in the proton. As it leaves it takes energy E=e0*exp(10.408)= 0.671 mev with it. (Together 0.671 and 0.622 mev make up the energy difference between the neutron and proton (1.293 mev). Again refer to measured data and compare it to the authors "model" of the proton and electron. The spin column reviews components for the proton, electron and neutrinos (all 0.5).

Operation 10 The proton

	Unifying.xls cell g228		CALCULATION OF PROTON MASS			Mass and Kinetic Energy					Field Energies		
		mass	Energy-mev	strong field	Energy-me	Mass	Difference ke	Strong residual ke	Neutrinos	Expansion ke	Strong & E/M	Gravitation	spin
Charge		ke		grav field		mev	mev	mev	mev	mev	field energy	Energy	
0.667		15.432	101.947	17.432	753.291	101.947	641.880				-753.29		0.5
		12.432	5.076	10.432	0.687							-0.69	
-0.333		13.432	13.797	15.432	101.947	13.797	78.685				-101.95		0.5
		12.432	5.076	10.432	0.687							-0.69	
-0.333		13.432	13.797	15.432	101.947	13.797	78.685				-101.95		-0.5
		12.432	5.076	10.432	0.687							-0.69	
1.000	(0+1)			-0.296	-2.72E-05			10.151		20.303	expansion ke		
1.000	Total proton charge			equal and opposite charge						0.000	expansion pe		
		10.408	0.67	0.075		0.000	0.000	-0.671	0.671	v neutrino			
	-10.33	-10.333	0										
	Neutron separates here to form proton and electron					129.541	799.251	**938.272013**	**PROTON MASS**				0.5
-1.000	10.33	10.136	0.51	10.333	0.62	**0.511**	0.111				5.44E-05	-0.622	0.5
		0.197	2.47E-05	0.296	2.72E-05	**ELECTRON**			2.47E-05	e neutrino			
						130.052	0.111		0.671	20.303	-957.185	-2.683	
		90.000		90.000						Total m+ke	Total fields		
										Total positive	Total negative		
										959.868	-959.868	0.00E+00	difference

Data comparisons

Note the excellent agreement with (National Institute of Standards and Technology [15] and Particle Data Group[4].

Compare the above values for the neutron and proton with measured values.										
	931.4940281	nist		0.51099891		0.5109989	548.581341	0		1.30E-07
	931.4940282	pdg	548.57991	0.51099891		0.5109989	548.57991		-5.0496E-07	2.40E-07
	simple cell g6	Data		Data (mev)		Calculation (mev)	calculation	Difference	Difference	measuremen
		Ratio		Particle Data Group		Present model	(amu)	(mev)	(amu)	error
			(amu)			(mev)				
	Neutron		1.0086649	939.5653600		939.565348	1.00866492		-3.3522E-09	
	Proton		1.0072765	938.2720132	pdg	938.272013	1.00727647	2.16232E-10	4.78317E-10	6E-10
	Neutron/elec	1838.683661		939.5653460	nist	939.565348		-2.48904E-06		2.30E-05
	Proton/electr	1836.152672		938.2720130	nist	938.272013		-2.29784E-07		2.30E-05
	deuteron			1875.61279						

Fundamental forces (interactions)

The following table follows directly from the proton model above. The proton is a manifestation of information symmetries and contains orbits that underlie some of the fundamental forces. Gravitational mass is 129.541. Refer to the proton model above to see the source its Ke (10.151 mev) and Field Energy (-2.683 mev). The strong field energies of the three quarks are added together and orbit the true mass of the three quarks (129.541 mev). The Standard Model identifies the weak force as the fourth fundamental force but information from the proton model involves what is called the strong residual force. The strong residual field energy (-20.3 mev) is the missing energy required to balance the total to zero (negative 959.868 and positive 959.868 mev). The strong residual mass is the 129.5 true mass of the quarks plus the quark kinetic energy (799.251 mev) because of the orbits identified in the following section. From these values, gamma and a radius (R) are derived. Gamma is ke/(m+ke) and R is R=(HC/(2pi)/(E*m/g)^0.5 .

	Mass (m)	Ke	gamma (g)	R	Field (E
	(mev)	(mev)		meters	(mev)
Gravity	129.541	10.151	0.9273	1.0192E-14	-2.683
Electromagı	0.511	1.36E-05	0.99997	5.2911E-11	-2.72E-05
Strong	129.541	799.251	0.1395	2.0928E-16	-957.18
Strong resic	928.792	10.151	0.9892	1.4292E-15	-20.303

Gravitational Constant

The above information leads directly to a calculation for the gravitational constant. Physics has struggled with the reconciliation of general relativity and quantum field theory. The author believes that the energy scale for gravitation is on the order of a proton rather than the high Planck energy 1.2e22 mev [1]. This has misled gravitational theorists into believing that space is full of infinities and breaks into quantum foam. Another reason for difficulty is gravity's very low force and very long range effect. This proposal places a proton in nature with reduced force and extended range by multiplying it’s force from the proton model by the value 1/exp(90). A small energy, by the Heisenberg uncertainty principle, will have long range.

A cosmology model is proposed [1][2][3] based on exp(180) cells, each containing a proton. Combined the cells make up the universe. General relativity uses the metric tensor (ds^)2. The surface area of a 2-sphere may be broken into many small spheres with an equal surface area. Let r represent the radius of a many small spheres and R represent the same surface area of one large sphere containing exp(180) spheres. The surface of the cell contains one proton (and the center of the cell probably contains a second proton like mass). The total mass is m*exp(180). The total energy will be that of 1 (or 2) protons/cell plus a small amount of kinetic energy. This energy will be constant during expansion and the energy density at a particular time in expansion will be a constant, i.e. E/Volume=constant. We will evaluate the energy density of many small cells each with the same energy density of one large sphere.

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)
M=m*exp(180)
below we place the cell r and m into the geodesic with G=constant
at any particular time in expansion

large space		proton size space with substitutions
RV^2/M=	G=G	r*exp(90) *v^2/(m*exp(180)) (rv^2/m)/exp(90)
R=r*(v/V)^2*(M/m)*1/exp(90)		

It is known that gravity is inertial as stated by the general theory of relativity. The source of information about gravity is an orbit. The sum of true mass (mass with no kinetic energy added) in the proton model is 129.54 mev. This mass has kinetic energy 10.15 mev and is attracted to a gravitational energy of 2.683 mev. The radius (by the equation R=(HC/(2pi)/(E*m/1)^0.5 is 1.056e-14 meters. The orbital velocity is given below:

				GRAVITY
				mass only
				proton+elec
Particle Mass (mev)				129.541
M (kg)				2.309E-28
Field Energy (mev)				2.683
Kinetic Energy (mev)				10.151
Gamma (g)=m/(m+ke)				0.9273
Velocity Ratio		v/C=(1-(g)^2)^.5		0.3742

Calculation of gravitational constant from Inertial Force						
Radius R (Meters)				1.0563E-14		
Mass (kg)	(proton)			1.673E-27		
Inertial Force=(m*V^2/R)*1/EXP(90)				1.6275E-36		
Gravitational Constant (g=F*R^2/M^2=nt m^2/kg^2)				6.4912E-11		
		Proton		6.4912E-11		
		End of expansion		6.73E-11	0.00858	calculated accuracy
		Published PDG		6.6743E-11	0.0001	published accuracy

Note that the best fit to the published value of gravitational constant is the proton calculation above at the end of expansion [1][2][3]. Note that definition of gravity based on this orbit gives a quantum mechanical action on the order of 1 as demonstrated below:

ke=mc^2/2			
ke=.5mc*x/t			
p=mv,x=vt			
ke=.5mc*vt/t			
ke=.5pc			
ke (mev)	10.15		
p=2 ke/c	2*10.15/C	6.77E-08	mev-sec/m
x (meters)	1.00E-14		
px=2 ke/c*x		6.77E-22	m
hr=h/(2*pi())		6.58E-22	mev-sec
quantum	px/hr=1	1.028038	

Reference [1] compares conventional theory of the gravitational constant (Planck length L= (h G/C^3)^.5 where L=1.6e-35 meters) with the above analysis. Several arguments are presented for this low energy scale source for gravity.

Force Table

Forces now conventionally are called interactions. The sources of information for this table are the neutron/proton orbits identified in the diagram above and the neutron/proton information model. Coupling constants to the proposed Higgs energy are shown since it appears to be at the top of the mass/energy hierarchy.

Force Unification Table		cell ax74		Strong total	Strong down	Strong down	Gravity	Electromagne	Strong Residual
Higgs energy (mev)				119671.5	119671.5	119671.5	proton		
***Field coupling to Higgs field Energy				0.00629	0.00085	0.00085			
Field Energy (mev)				753.29	101.95	101.95	2.683	2.72172E-05	20.303
Mass Coupling to Higgs field energy				0.00085	0.00012	0.00012			
Particle Mass (mev)				101.947	13.797	13.797	129.541	0.511	939.565
M (kg)				1.82E-28	2.46E-29	2.46E-29	2.31E-28	9.11E-31	1.67E-27
Kinetic Energy (mev)			646.647	651.34	88.15	88.15	10.15127016	1.36086E-05	10.151
	Rydberg energy from PDG							1.360569E-05	
Gamma (g)=m/(m+ke)				0.1353	0.1353	0.1353	0.9273	0.99997	0.9893
Velocity Ratio		v/C=(1-(g)^2)^.5		0.9908	0.9908	0.9908	0.3742	0.0073	0.1458
"R equation output"--meters				**2.6195E-16**	**1.9356E-15**	**1.9356E-15**	**1.0192E-14**	**5.291126E-11**	**1.4211E-15**
Rydberg data from PDG								5.291772E-11	
E/M radius plus proton radius=5.291627e-11+1.4287e-15								5.2913E-11	
Force	newtons	F=E/R		460733.2	8438.6	8438.6	3.5E-38	8.241498E-08	2289.0
							**Gravity	Electromagnetic	
	newtons	F=(m/g)V^2/R		460733.215	8438.623	8438.623	1.799E-36	8.241389E-08	107075.45547
Force=3.16e-26/Range^2 (nt)			3.16E-26	460733.2	8438.6	8438.6	2.5E-37	1.129E-05	15655.5
Coupling constant derived from this work				1.0000	1.0000	1.0000	7.215E+00	0.00730	1.000000
Derived c^2 mev sec		field energy=c^2/R		1.97E-13	1.97E-13	1.97E-13	2.73E-14	1.44E-15	2.89E-14
Derived c^2 joule sec				3.16E-26	3.16E-26	3.16E-26	4.38E-27	2.31E-28	4.62E-27
Derived exchange boson (mev)				753.291	101.947	101.947	19.360	0.0037	138.86
	boson from published range			boson corrected to give same force			139.692	0.511	131.55
*published c^2 mev sec			field energy=c^2/R				1.17E-51	1.44E-15	1.56E-14
*published c^2 joule sec							1.87E-64	2.31E-28	2.5E-27
*Range	**Range for gravity equals		1.24E+25	meters				5.29E-11	1.50E-15
*http://www.lbl.gov/abc/wallchart/chapters/04/1.html								137.0251	10.40
Published coupling constant (PDG)							7.243050463	137.03599	1111.1
***	0.0063	EXP(17.432)/EXP(22.5)							1.41E+04
***	0.00085	EXP(15.432)/EXP(22.5)							0.079
***	0.00012	EXP(13.432)/EXP(22.5)				work area			

Comparison of force table coupling constants with published results

Energy components of the neutron model allow coupling to the Higgs energy to be clearly stated. From operations 2, 3, 4 and 5, we can identify the coupling that gives the field energies and quark energies. Numerically the couplings are ratios like exp(17.43)/exp(22.5)=0.00744 shown at the bottom of the above table. Strong coupling constants in the literature are 1.0 based on the field energies acting as exchange bosons (gluons). Calculated forces compare favorably with the conventional physics forces $=3.16e-25/R^2$ Newtons and the derived coupling constants c^2 compare favorably with published values (converted from Joule-sec). If the field energy 2.683 mev is divided by exp(90), the graviton energy is 1.59e-38 mev and the range is 1.014e-14*exp(90)=1.24e25 meters. Literature uses the neutral pion (131.5 mev above) as the exchange energy and the author's calculation for this boson is 138 mev [18]. The strong residual coupling 0.147 is verified by a binding energy curve constructed by the author based on 20.3 mev field energy [17]. A proton model orbital diagram allows accurate calculations to be made regarding the electromagnetic force. With a low correction to the electromagnetic field energy due to shielding, the Rydberg constant, coupling constant and electric constant agree with published values (PDG).

Exchange bosons and quantum mechanical probability:
The quantum mechanical probability (action) is equal to mx^2/t divided by Planck's reduced constant (m and x come from the Force Table above and t is the time to travel across x at V/C). The calculated action was almost exactly 1 in all cases. The current concept of gauge forces utilizes bosons moving at velocity C and exchanging inertia to explain action at a distance. For example the strong residual energy is described historically by the Yukawa potential and a pion exchange particle. It appears that the boson mass is "back calculated" as shown in the table above for velocity C although the actual mass and actual velocity from the proton model give the correct action. One of the difficulties with gravity is that a different explanation is offered for action at a distance because the distances are often large even at the speed of light. It is often stated that mass bends space-time and particles follow curved space. The author believes that all four forces operate the same way and that space-time is truly shaped by mass, gamma and field energy (the R equation). The reason gravity is long range is the divisor 1/exp(90). If space is curved enough an orbit is established, not only for gravity but for all the forces. The field, mass and velocity carried by the particle gives its contribution to space-time curvature. That is, when we write the equation for gravitational force$=g*Mm/R^2$ or electromagnetic force$=1/(4pi)*e0*qq/R^2$ we are describing space time curvature for the combination of energies.

Summary

Introducing information theory probabilities into physics can reconcile the Standard Model and general relativity at the quantum level for gravity. The author believes that nature's underlying laws are information laws based on the large number exp(180). The neutron, proton and the number of protons are manifestations of the underlying law and are sources of information for the four forces. This paper appears to decode some of the information laws applicable to well documented particles. A unified theory must meet other criteria to be of value. The neutrinos, electron, muon, tao, mesons and baryons should also be manifestations of the underlying laws. Although beyond the scope of this document, the author found a progression of energies underlying these particles [3]. The binding energy curve should also be explained by the theory and this is successfully demonstrated [17]. In addition a unified theory will also be fundamental to the field of cosmology. The R equation used throughout this document was modified by replacing gamma with another time ratio in the denominator, giving what the author believes is the correct expansion equation for the universe [2][3][13]. This does not contradict WMAP data since the expansion curves match. However, the new approach suggests that dark energy is a misconception related to misuse of the critical density concept [3]. Combined with the author's study of mesons and baryons it is possible that dark matter consists of particles with the mass of a neutron that only couples with gravity.

Technical endnote 1 Particle review and number of neutrons

Particle review									
unifying concepts.xls cell aw48				Proposed					
		Particle Data	PDG	Energy	IS Hughes	Bergstrom	Randall	Best	N difference
		Group energy	charge	E=eo*exp(N)	energy	energy	energy	data for	(proposal-
Identifier	N	(Mev)		(Mev)	(Mev)	(Mev)	(Mev)	N Value	best data)
0.0986 ener	0.099								
e neutrino	0.000	2.00E-06		2.02E-05	1.50E-07	3.00E-06		-2.31486941	
E/M Field	0.296	0.0000272		2.72E-05				0.295200381	0.000636485
							0.0011		
ELECTRON	10.136	0.51099891	-1.00	0.511				10.13610614	2.61223E-06
mu neutrin	10.408	0.19		0.671	less than 0.25			9.146762759	1.261563509
Graviton*		1.75E-26		2.683					
Up Quark	11.432	1.5 to 3	0.67	1.867		1.5 to 4.5	2.4	11.6829627	-0.251017081
vt neutrino	12.432	18		5.076	less than 35	18			
Down Quarl	13.432	3 to 7	-0.33	13.797		5 to 8.5	4.8	12.37610988	1.055835738
	16.432			277.120					
Strange qua	15.432	95+/-25	-0.33	101.947		80 to 155	104	15.45188486	-0.019939243
	16.432			277.120					
Charmed Q	17.432	1200+/-90	0.67	753.29		1000 to1400	1300	17.97761351	-0.545667887
Bottom Qua	19.432	4200+/-70	-0.33	5566.11	4220	4000 to 4500	4200	19.15033377	0.281611852
Top Quark	21.432		0.67	41128.30		40000	171200	21.4041287	0.027816923
W+,w- boso	22.099	80399	-1.00	80106.98	81000	80000	80400	22.10225098	-0.003638694
Z	22.235	91188	0.00	91787.1	91182	91000	91200	22.22817255	0.007
HIGGS	22.500	125300		119671.5		105000		22.54596011	-0.046
* sum of 3 N's of 10.431 and one 10.333 and graviton is 2.68/exp(90)=1.59e-38 mev.									
Mw/Mz	Weinberg radians		sin^2 theta						6.3432E-11
0.87274771	0.509993439	0.48817152	0.238311				6.674E-11		6.3263E-11

The above table strongly suggests an exponential relationship in energy for the fundamental particles. The proposed N values compare favorably with data from various sources and sin^2 theta agrees with Erler [5] figure 10.1 at low energy.

Number of neutrons

The best data is from the recent WMAP project reported [8] and the Supernova Cosmology Project [11]. Recent data indicate that there are two components to expansion [8] [11]. Critical density [9] has been used historically to predict the size of the universe and early equations like the Friedmann equation [6][7][9][10] give expansion predictions. There are questions regarding components of the critical density WMAP [8] but data indicates that 0.27 of the value represents mass, comprising dark and light particles. For purposes of estimating the number of particles half are assumed to have mass of a neutron (1.675e-27 kg).

Note: units used in this document are kilograms (kg), meters (M), newtons (nt), seconds (sec) and million electron volts (mev).

Critical Density (kg/M^3)				R final-M	N particles	ln (N)
9.50E-27	WMAP basic results Table 3			7.18E+25	1.19E+78	179.78
	N particles=	4/3*PI()*Rfinal^3*0.27*9.5e-27/1.675E-27/2				

Technical endnote 2 The R equation and Lagrangian

There is a circle associated with the concept of frequency. One (1) divided by frequency is the time required for a wave at velocity C to move around the circumference of the circle. The table below gives us the radius of the circle in terms of H and E. This circle also allows us to relate the energy interaction of operation 7 to an orbital radius R. The radius is 1.93e-15 meters when the field energy E= 101.947 mev is put into the equation R= (HC/2pi)/E. Because 101.947 mev is also equal to 13.79/0.135 and 0.135 is gamma, E is also equal to m/g. The new relationship R= (HC/(2pi)/(E*m/g)^0.5 (mass with velocity orbits a field at radius R) tells us that the energy interaction establishes an orbit because this equation is a known equation [14]. This orbit is established and maintained by the energy interaction. The last part of the following table demonstrates the relationships with values from operation 7. The author is aware that because of particle-wave duality only a probabilistic determination of radius is possible and it is noted that all results using these radii are probabilistic in nature.

The time for one cycle of the wave is 2*pi*R/C since the wave moves at C (R is the radius of a circle).								
2*pi*R/C=1/frequency								
2*pi*R/C=H/E								
Using the same example as detailed in operation 6:								
Field energy E		101.947	mev					
2*pi*R/C	time	4.057E-23	seconds					
H/E	time	4.057E-23	seconds					
convenient constant:		HC/(2*pi)		1.973E-13	mev-meters	1.973E-13	pdg value	
R=H*C/(2*pi)/E		1.9356E-15	meters	E in the equation to the left can also be:				
				E=(E*E)^.5=(E*m/g)^.5				
				because in the equation to the left, E=m/g=13.977/.1353				
				(E*m/g)^.5=E=(101.947*13.797/.1353)^.5				
Substitute (E*m/g)^.5 for E in the above equation to give an equation for radius involving mass, field energy and gamma.								
R=(HC/(2pi)/(E*m/g))^0.5		This equation represents a force balanced orbit with kinetic energy 0.5 times the field energy.						
		It is also accurate for orbits determined by energy balances as demonstrated below.						
	From operation 6 definitions and the operation 6 example.							
Field energy E		101.947	mev					
mass (m)		13.7970	mev		mass divided by g is equivalent to the field			
ke		88.150	mev		Instead of g=1/exp(2) gamma can be defined from ke			
gamma (g)	g=1/exp(2)	0.1353			g=(1-(m/(m+ke))^2)^0.5			
v/C	g=(1-(v/C)^2)^0.	0.9908						
R	meters	**1.9356E-15**	**R=(HC/(2pi)/(E*m/g))^0.5**					
	The following conversion constant converts mev to				1.783E-30	kg/mev		
	Convert mev to newton-meters with the following conversion constant:						(nt-m)/mev	
	Check the force balance:							
	Inertial:	**F=m/g*C^2/R**	**8438.623**	newtons		Ef=F*R=m+ke=m/g*C^2		
1	Field	F=E/R	8438.623	newtons				
			8438.623	newtons	Calculation with conventional equation defined in force table			

The author refers to the equation above for orbital radius as the R equation.

An orbit based on R is a special case of a Lagrangian as shown below:

E=potential energy		
KE=kinetic enrgy		
Lagrangian		
L=0=potential energy-kinetic energy		
E=ke		
1=ke/E		
1=ke/(E*E)^.5		
1=ke/(m*E/g)^.5		
1=ke/c/(h/(2pi)*hc/(2pi)/(m*E/g)^.5		
	r=hc/(2pi)/(m*E/g)^.5	
1=ke/c/(h/(2pi)*r		
	pc=ke	(p=momentum)
1=p*r/(h/(2pi)		(pr=action)

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