Analysis of five galaxies with flat rotation curves

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Flat galaxy rotation curves are unexpected observations. Differences between expectations and observations allow us to learn. Most cosmologists today attribute the difference between observed flat and calculated declining Newtonian velocity curves to dark matter despite decades of failed efforts to identify it.

This paper examines data for five galaxies. Physics for flat galaxy velocity curves is proposed that preserves Newtonian gravitation and explains the flat velocity profiles. The proposal shows that there are two components to the redshift (gamma) measured to determine velocity. One component is the normal kinetic energy gained as a particle falls toward a galaxy. The kinetic energy component obeys Newtonian velocity that decreases with distance from the center of the galaxy. But potential energy increases with distance from the center and the two energy components add to a constant value. We measure this constant energy associated with constant velocity across the galaxy toward the edge. The kinetic energy component is a vector but the potential energy component is a scalar. Both components change gamma and allow us to measure the velocity from time0; i.e. t2/t1*t1/t0=t2/t0. Our observations are based on gamma that does not distinguish the two gammas involved. The calculation procedure is straightforward and matches data for five galaxy data sets examined. Dark matter is not required in this approach.

Background

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 10.15 MeV and orbits central gravitational field energy 2.801 MeV with radius 7.045e-14 meters. These specific values allow the gravitational constant to be calculated. As kinetic energy decreases and potential energy increases each cell expands. Kinetic energy inside each of exp(180) cells is related to pressure acting outward on the surface. This expands the universe. Important cell properties quoted above originate in a Schrodinger based mass model of the neutron (that decays to a proton, etc.) [Appendix 1 and 2].

Cellular Cosmology

Cells are defined by equating a large surface area with many small surface areas. 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, v and m for cellular space) that 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 small cell orbits and large scale cell orbits.

The source of space and time

The neutron mass model is the source of space, time and the gravitational field energy -2.801 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/(2.801*2.801)^.5=7.045e-14 meters			
Fundamental time=7.045e-14*2*PI()/(3e8)=h/E=4.13e-21/2.801			
Fundamental time	1.476E-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 7.045e-14 meters and time 1.476e-21 seconds are fundamental to space and time. These never change. Coupled with these values kinetic energy (10.15 MeV/proton) from the Proton model is used in the calculations below that determine the gravitational constant.

Calculating the gravitational constant G

The column below determines the gravitational constant [6][7][11] based on the cell above containing one neutron with kinetic energy 10.15 MeV. The neutron at Velocity V= (2*10.15/1.67e-27*1.6e-13)^0.5= 4.4e7 meters/sec circles the small radius 7,045e-14 meters producing inertial force f=3.78e-38 Nt opposing the 2.801 MeV gravitational field. The gravitational constant G= F R^2/(M/g)^2 = 6.69e-11 [10]. G is almost constant throughout expansion of the universe except for small effects related to gamma.

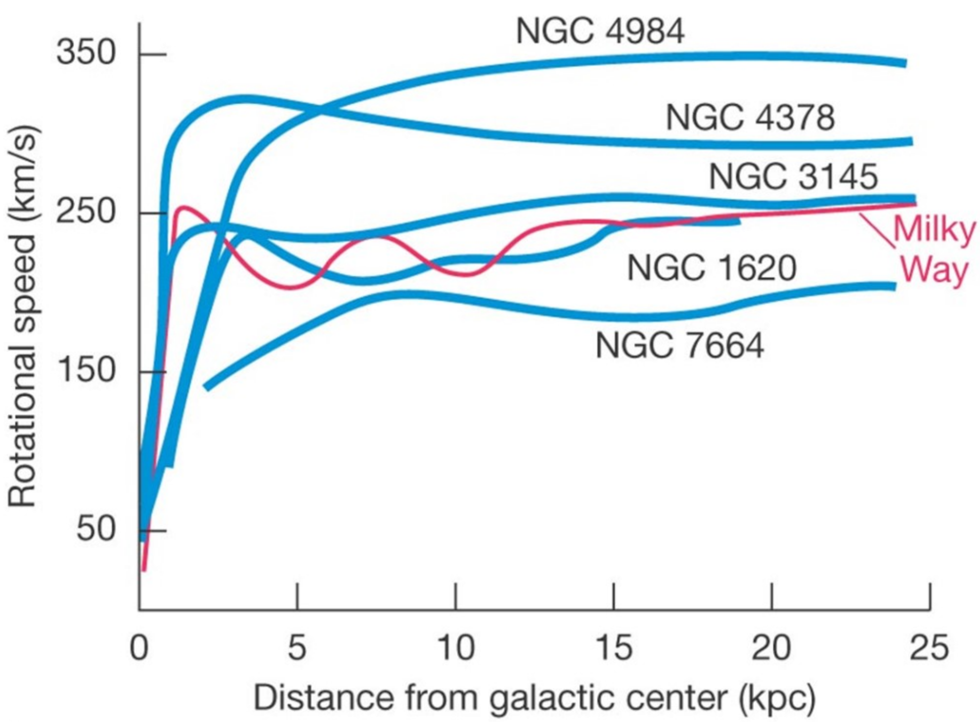
GRAVITY	0.028	**expanded**
	neutron	
Neutron Mass (mev)	939.5654	**939.565**
Neutron Mass M (kg)	1.675E-27	**1.675E-27**
Field Energy E (mev)	2.801	**2.801**
Kinetic Energy MeV Ke=10.15*r/7.045e-14	10.151	**0.001**
Gamma (g)=939.56/(939.56+ke)	0.9893	**1.0000**
Velocity Ratio v/C=(1-g^2)^0.5	0.1458	**0.0015**
Velocity (meters/sec)	4.383E+07	**4.41E+05**
R (meters) =(HC/(2pi)/(E*E)^0.5	7.045E-14	**7.045E-10**
Inertial Force (f)=(m/g*V^2/R)*1/EXP(90) Nt	3.784E-38	**3.784E-46**
Calculation of gravitational constant G		
G=F*R^2/(M*m/g)=NT m^2/kg^2	6.621E-11	**6.693E-11**
Published by Partical Data Group (PDG) [10]		**6.674E-11**

Note: as expansion occurs KE decreases with R'/R and gamma (g) becomes 1.0. G was slightly lower at the beginning but approaches the value above.

In three dimensions the relationships give G for the surface of a sphere (or the equivalent area of many small spheres). If not it violates the "no preferred position" principle.

Galaxy data

All of the following galaxy profiles (search Wiki for velocity curves) are nearly flat:



(b)

It is important to point out that the kinetic energy associated with 227000 m/sec was created from the “fall” into the galaxy from the expansion determined spacing of the protons that accumulate to create the galaxy. This kinetic energy wasn’t dissipated and the total kinetic energy now takes the form of potential and kinetic energy, each with velocities that add to give the flat rotation curve.

Caution about adding velocities

The example below is for a proton with kinetic energy that gains additional kinetic energy.

Kinetic energy=0.5*mV^2 and nature conserves energy. This means that we may add two kinetic energy components and calculate a correct velocity from the total but we cannot add velocity components (4e7+4e7=8e7 m/sec) and then calculate kinetic energy. Gamma associated with 4e7 m/sec yields gamma= 0.991. If there is an additional energy that also has gamma=0.991 multiplying gamma1*gamma2 yields a good approximation for gamma associated with the total energy.

m		ke (MeV)	Velocity M/sec			m^2	(PC)^2	E^2			
MeV		ke=.5mv^2								gamma=m(m+ke)	
1.67e-27/1.78e-30			Velocity M/sec	(1-(v/c)^2)^.5							
938.27		8.35E+00	4.00E+07	0.99105		880351	15973	896323		0.991	gamma1
938.27		8.35E+00	4.00E+07	0.99105		880351	15973	896323		0.991	gamma2
		add ke abc	v=f(ke)	gamma from V						0.982442	gamma1*gamma2
938.27	ok	1.67E+01	5.66E+07	0.982018		880351	32536	912886		0.983	gamma tot E

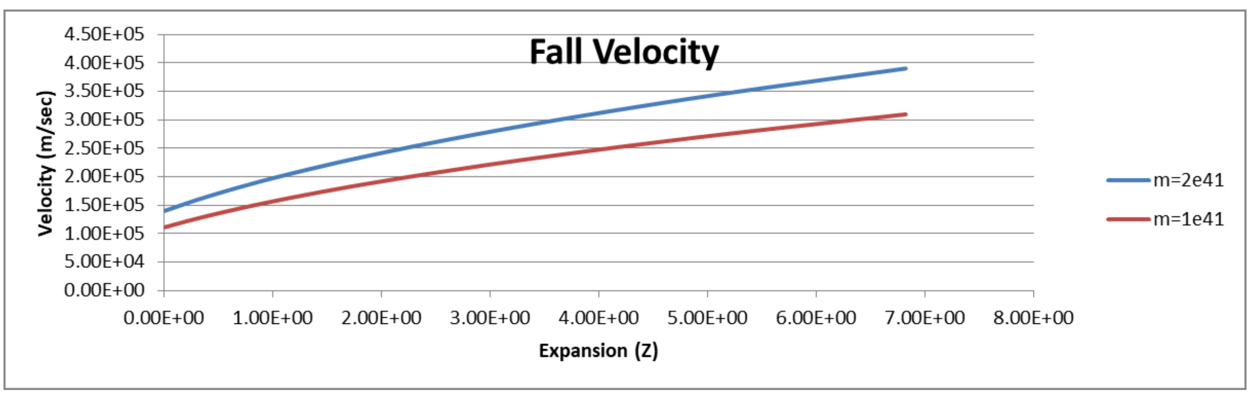
The columns on the right calculate M^2+(PC)^2=E^2 for mass 938.27 MeV (1.67e-27 kg) that gains additional kinetic energy. But two (PC)^2 components cannot be added since 15973*2= 31945 not 32536. Starting from energy to determine velocity yields accurate results.

We often measure the velocity of a mass by measuring gamma (redshift). If gamma is the result of two additive energy components we need a way of separating the individual components.

Flat velocity rotation curves for Galaxies

The analysis below is for a galaxy similar to our Milky Way. It has 2e41 Kg mass and has a flat rotation curve. The radius 2.58e20 meters is where a proton with velocity 227437 m/sec orbits according to V=(GM/R)^.5. But luminosity measurements indicate that there is mass in “improper” orbits if redshift (the gamma measurement) is interpreted as Newtonian velocity. Many have said that the velocity measurement is correct and to justify the orbits observed “missing mass” must exist in the galaxy.

The analysis below is for a proton falling due to gravitation toward a galaxy of 2e41 kg. The proton will gain kinetic energy by falling from its expansion determined position toward the galaxy.



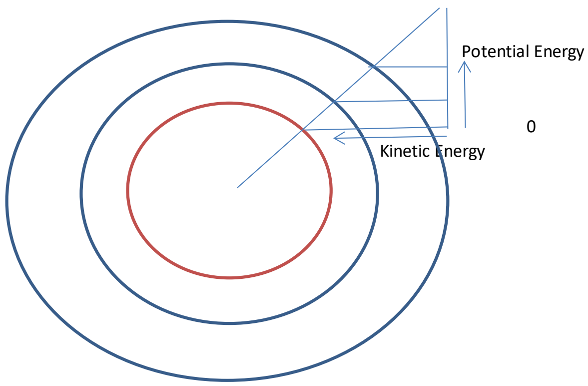
The fall starts well above the eventual orbit. The proton has been dominated by expansion and is losing expansion kinetic energy and gaining potential energy. These will be reversed by the 2e41 mass. If the proton falls to the radius where the velocity is V=(GM/R)^0.5 it will orbit there. This was reviewed above when the following equation was introduced:

(R=r0*10.15/ke*(Mgalaxy/1.67e-27)*(1/exp(90)) where r0=7.045e-14)

Orbit	10.15/ke	Mass Central K	N central	Vel m/sec	ke (mev)	cell r (m)	Orbital R (m)	1-gamma	(Mcentral/1.67e-27)*1/exp(90)
star/galaxy	3.77E+04	2.00E+41	1.57E+02	2.27E+05	2.694E-04	2.65E-09	2.60E+20	2.87E-07	9.81E+28

Again, this is another way of writing the Newtonian relationship R=GM/V^2 and r=7.024e-14*10.15/ke. The values V, ke and r are in the table above for this orbit.

The situation is diagrammed as follows:



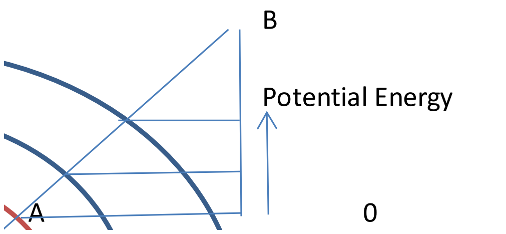
The red orbit is in the table above; V= 2.27e5 m/sec. With this velocity a proton will follow this curvature. It is a proper (Newtonian) orbit. The curvature is due to mass. Its potential energy due to the mass is zero at that point. (Distinguish "due to mass" and "expansion potential energy).

There will also be mass in the outer circles and we would expect the Newtonian velocity to decrease with distance away from the center (V=GM/R). But measurements indicate that velocity curves around galaxies are flat. Our goal is to understand these measurements. This analysis does not assume dark matter, nor does it violate Newtonian gravitation.

In the table below the distance from the center of the galaxy to edge is shown vertically. The bottom line is the orbit at 2.58e20 meters that everyone agrees should have 228000 m/sec. The kinetic energy column is for Newtonian orbits. If the potential energy is zero for that orbit increasing radius increases potential energy. In fact, since there is no friction, the potential energy plus kinetic energy is constant. We can assign gamma to energy with the equations: gamma1=m/(m+ke) and gamma2=m/(m+pe). If gamma is our measurement, we can assign a velocity to the measurement.

multiples of 2.58E+20	ke	pe	ke long 1-gamma	ke redshift	PE redshift	gamma meas	V
10	**2.71E-05**	2.44E-04	2.87E-08	2.89E-08	2.60E-07	2.89E-07	228131
9	**3.01E-05**	2.41E-04	3.19E-08	3.21E-08	2.57E-07	2.89E-07	228131
8	**3.39E-05**	2.37E-04	3.59E-08	3.61E-08	2.53E-07	2.89E-07	228131
7	**3.87E-05**	2.32E-04	4.11E-08	4.13E-08	2.48E-07	2.89E-07	228131
6	**4.52E-05**	2.26E-04	4.79E-08	4.82E-08	2.41E-07	2.89E-07	228131
5	**5.42E-05**	2.17E-04	5.75E-08	5.78E-08	2.31E-07	2.89E-07	228131
4	**6.78E-05**	2.03E-04	7.18E-08	7.23E-08	2.17E-07	2.89E-07	228131
3	**9.04E-05**	1.81E-04	9.58E-08	9.64E-08	1.93E-07	2.89E-07	228131
2	**1.36E-04**	1.36E-04	1.44E-07	1.45E-07	1.45E-07	2.89E-07	228131
1	**2.71E-04**	0.00E+00	2.87E-07	2.89E-07	0.00E+00	2.89E-07	228131.0

The question that remains is “why is a portion of the gamma signal potential energy?”

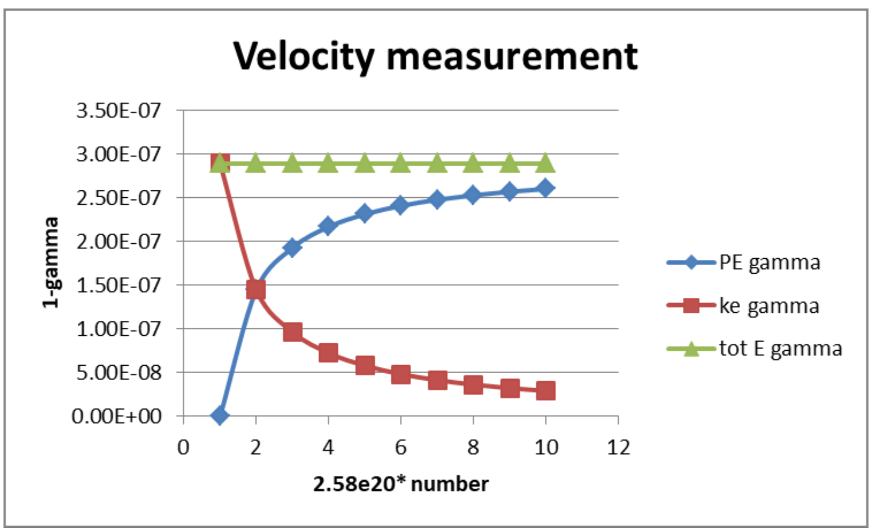


The potential energy is proportional to the radius of the circles, represented by the line A-B. There is a component of this energy in the vertical direction labelled with the Potential Energy arrow. Less curvature (toward the outside) increases the potential energy component and decreases the kinetic energy component. We measure a Doppler effect of the kinetic energy along a vector (the arrow). But recall what gamma is.

Gamma 1= to/t1 and gamma 2=t1/t2. Overall gamma= gamma1*gamma2=t0/t2.

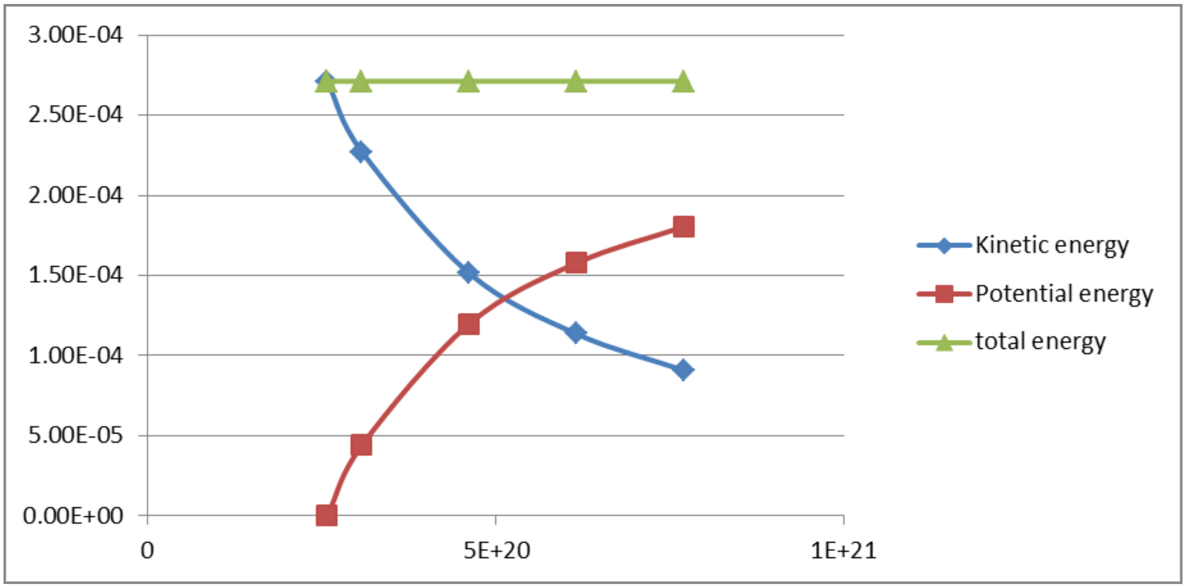
The potential energy component is not a vector. This means that the kinetic energy gamma is a time ratio of a time ratio already modified by potential energy. If we are trying to measure the height of a mountain we start from ocean level, not partway up the mountain. The direction of the vector (other side of the galaxy) becomes a blue shift but is sent from the same modified time base.

When the proton (star) is in orbit around a distant star we measure gamma not realizing that there are two components. We interpret the signal as a flat velocity curve.



In the example above we observe (1-gamma)= 2.89e-7. If we trust Newtonian gravity, we know gamma ke (based on Newtonian velocity Vn=(GM/Rn)^.5) and can calculate the potential energy gamma. Gamma pe=gamma total/gamma ke.

In the graph below, mass has fallen into orbits outside the “proper” position. But there are many possible Newtonian orbits. The flat velocity associated with the constant kinetic energy agrees with measurements.



The data and analysis above is plotted below. The top line (in green is the flat velocity curve we measure). Appendix 3 contains data and analysis for five galaxies with flat rotation curves. They all follow the physics above and this resolves the flat velocity curves for galaxies. Dark matter is not required.

Equivalent cells that maintain G

Understanding that the gravitational constant G can be calculated with ke0= 10.15 MeV/proton of kinetic energy in a cell of radius r= 7.045e-14 meters allows further development of cellular cosmology gravitational relationships (small m below=1.67e-27 Kg).

G remains constant during expansion			
ke0=10.15 MeV/neutron			
r0*V^2/m=r*v^2/m			
(mv/mV)^2= (r/r0)			
ke/ke0= (r/r0)			
r=r0*10.15/ke			

Using relationships from cellular cosmology, the orbital radius of a central mass can be calculated.

Orbital R for galaxy= GM/V^2 where M is the central mass
substitute G=r0 v^2/m*(1/exp(90))
R= r v^2/m*(1/exp(90))*M/V^2
v^2/V^2=1 (cell v and large V equal)
m/M=m/(m*number of cells in galaxy)
R= r*(1/exp(90))*M/m
multiply top and bottom by exp(180)
R=r*exp(90)*M/(m*exp(180))
m*exp(180)=Muniverse
R=r*exp(90)*(Mgalaxy/Muniverse)
r=r0*10.15/ke=7.04e-14*10.15/ke
R=7.04e-14*10.15/ke*exp(90)*(Mgalaxy/Muniverse)
R=r0*10.15/ke*(Mgalaxy/1.67e-27)*(1/exp(90))
R=7.04e-14*10.15/2.74e-4*(2e41/1.67e-27)*(1/exp(90))

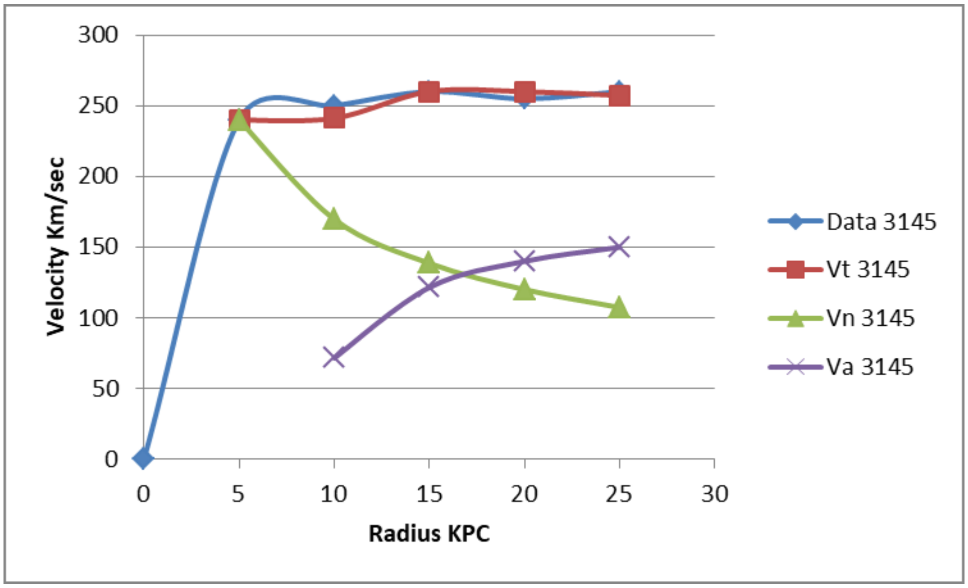
The new relationship R=r0*10.15/ke*(Mgalaxy/1.67e-27)*(1/exp(90)) where r0=7.045e-14 is another way of writing R=GM/V^2 but it provides an understanding of the cosmology involved. From a gravitational viewpoint, the central mass is orbited by one proton (1.67e-27 Kg). The quantum scale r=r0*10.15/ke is the cell radius as the universe expands. Maintaining G equivalence between the large scale and cellular scale requires multiplying small scale values by (Mgalaxy/1.67e-27)*(1/exp(90)). A cell is the proton and its gravitational space but it can be quite large. Radius R defined by a large central mass (R=GM/V^2)^.5 is the gravitational equivalent of one proton moving at velocity V.

Show me the data

Using the procedure above, Data for NGC 7664 is compared with calculations that incorporate potential energy changes.

Five galaxies with flat rotation curves

Radius (KPC)	NGC 3145	0	5	10	15	20	25	
Radius (meters)	NGC 3145	0	1.54E+20	3.08E+20	4.62E+20	6.16E+20	7.7E+20	
Data V (km/sec)	NGC 3145	0	3.84852E+15	250	260	255	260	
Vk (km/sec)=(G*1.33e41/R)^0.5/1000			2.40E+02	1.70E+02	1.39E+02	1.20E+02	1.07E+02	Vk
ke=G/2/(1.602e-13*R/((1.33e41)*1.675E-27			**1.8E-04**	**1.5E-04**	**1.0E-04**	**7.6E-05**	**6.0E-05**	ke (MeV)
pe=ke-ke funct r				2.66E-05	7.70E-05	1.02E-04	1.17E-04	pe (MeV)
Va (im/sec)=(2*pe/1.67E-27/6.24e12)^0.5/1000				71.5	121.5	140.0	150.0	Va
Vt (km/sec)=Vk+Va			240.00	241.22	260.11	260.01	257.33	Vt (m/sec)


300
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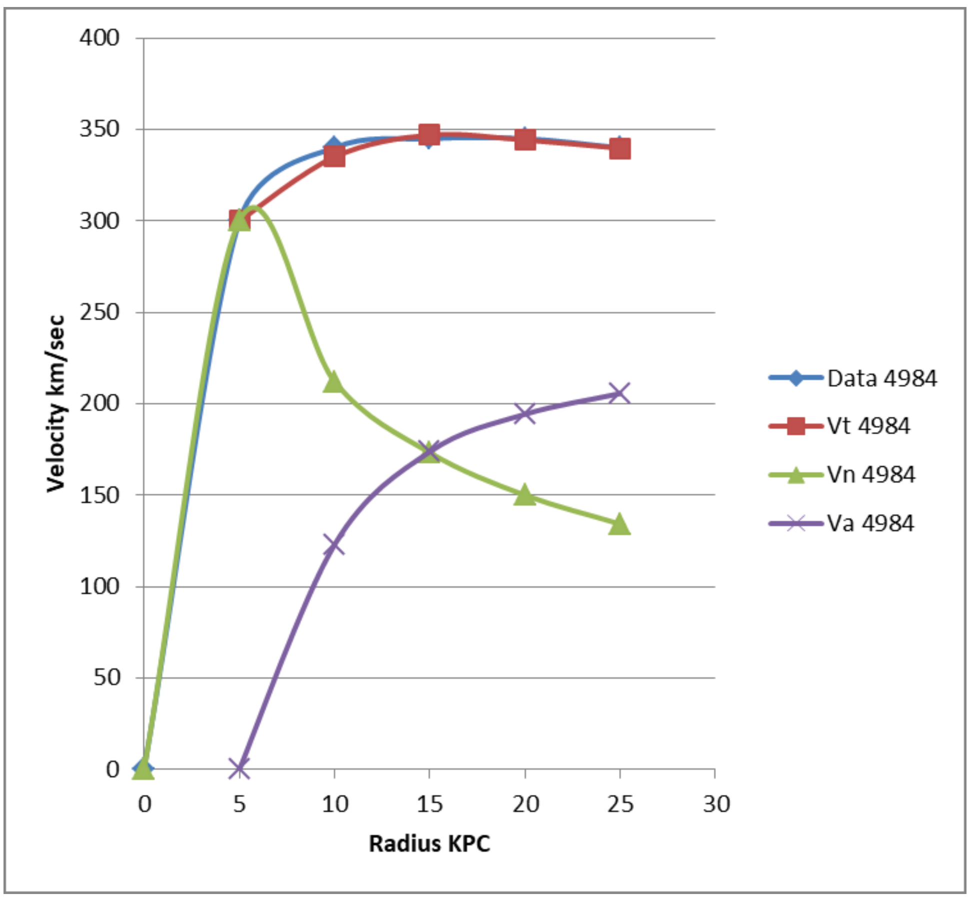
Velocity Km/sec
Radius KPC
Data 3145
Vt 3145
Vn 3145
Va 3145


400
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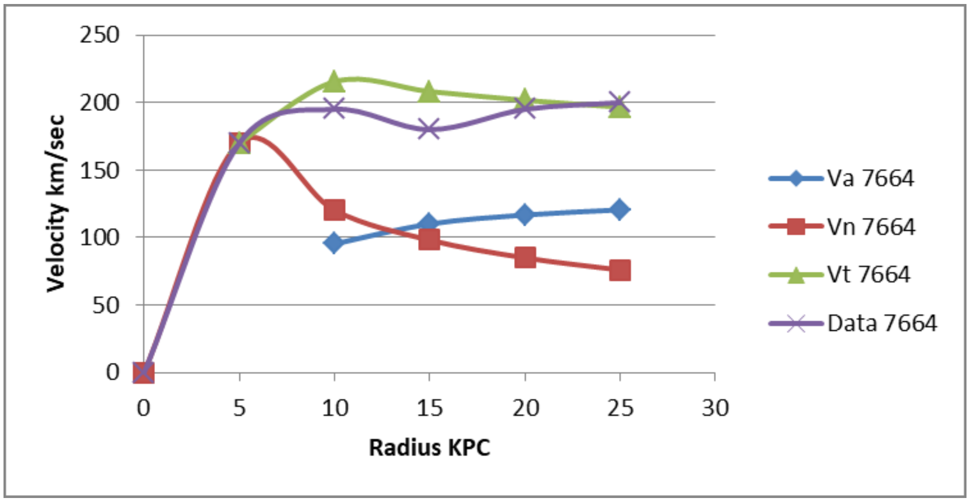
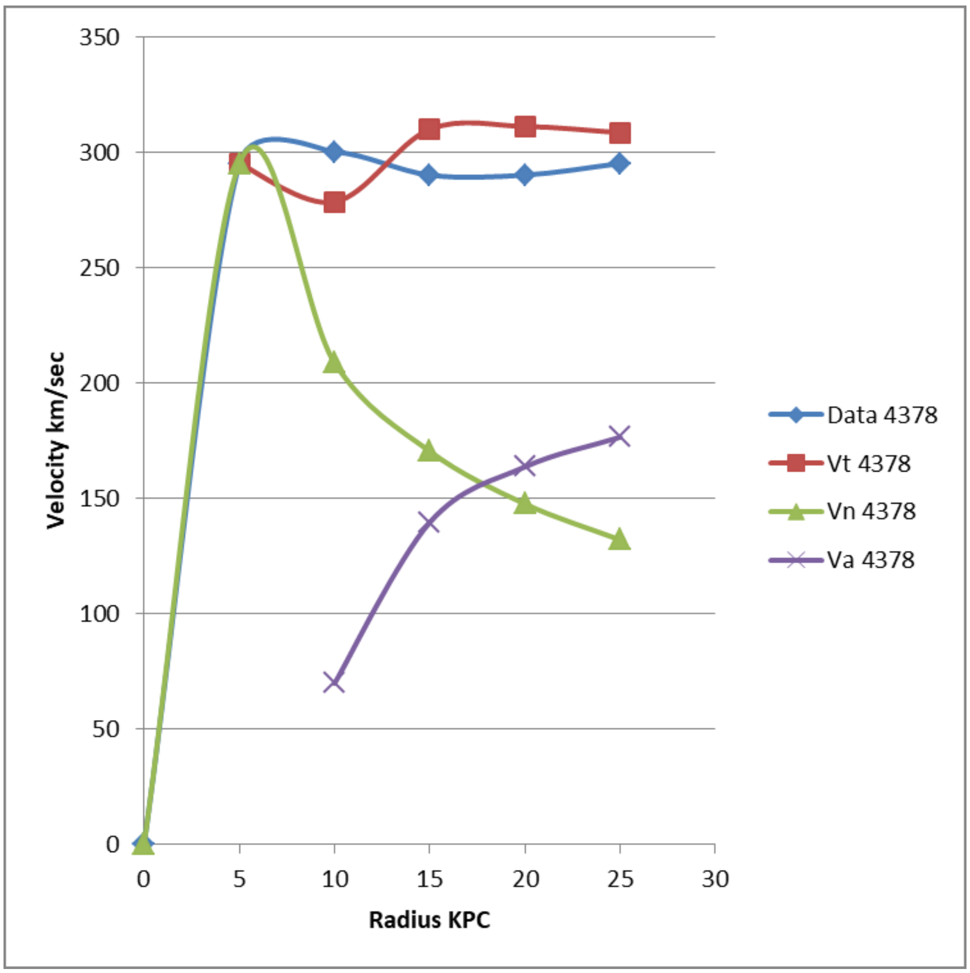
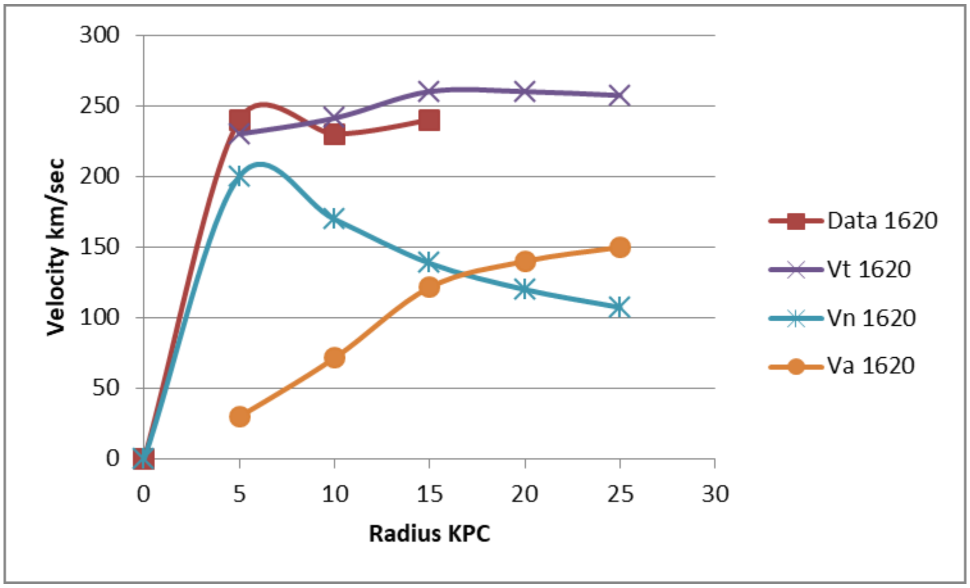
Velocity km/sec
Radius KPC
Data 4984
Vt 4984
Vn 4984
Va 4984



Velocity km/sec
Radius KPC
Va 7664
Vn 7664
Vt 7664
Data 7664



Velocity km/sec
Radius KPC
Data 4378
Vt 4378
Vn 4378
Va 4378



Problem Resolution; What is Dark Matter?

When we look at a galaxy we observe real distances and real velocities. They have flat velocity curves. If all else fails, believe the data (flat rotation curves). Also believe Newtonian gravity and consider the possibility that the know quantum effect called spin becomes angular velocity for large galaxies. The calculations presented are straightforward and allows one to calculate the flat rotation curve. I believe that the Mach Principle (galaxy rotation randomized) is obeyed overall. It is clear that velocity profiles in galaxies make them appear as spinning disks. If the velocities obeyed only Newtonian gravity the spiral arms would wrap around the center more than observed. The proposal above explains flat velocity curves without inferring dark matter.

Conclusions

Space-time is defined by the gravitation field energy 2.8 MeV

There is a Schrodinger based energy=0, probability=1 construct (Appendix 1) associated with orbits. At the quantum level a sine wave varying with time is represented by a circle with one imaginary axis and one distance axis. The Schrodinger equation is based on quantum theory and leads to a model of the Neutron. The information we need about gravity is provided by the Neutron model, cellular cosmology and the number of initial neutrons determined by probability considerations (1=exp(180)/(exp(90)*exp(90)). Cellular cosmology provides a bridge between small and large scales (M=m*exp(180) and R=r*exp(90)).

The Neutron model gravitational field energy 2.8 MeV is a quantum value and its circle defines space and time. Time is measured around the fundamental cell circumference (cycle time= 2*pi*7.045e-14/C=1.2e-21 seconds). Time counts forward by repeating this cycle. Initially space is comprised of exp(180) cells, each with the radius 7.045e-14 meters. Each cell contains a neutron (that decays to a proton). The cell radius is a balanced force orbit that establishes and maintains the gravitational constant G= 6.67e-11 Nt M^2/Kg^2. The orbital radius is a function of its original kinetic energy and kinetic energy. As kinetic energy is converted to potential energy the cell (and the universe) expands according to r0= hC/2.73=7.045e-14 meters. This is a function of (time/time')^(2/3).

Special relativity value gamma (g)= (mass+ke)/mass. When performing orbital calculations, the orbital mass is mass/gamma (a result of special relativity). Gamma is related to Schwarzschild dt=1/gamma-1. Time is slowed slightly and in this regard space-time is a proper concept. The special relativity effect gamma approaches 1.0 early in expansion. If particles gain a huge amount of kinetic energy gamma becomes significant (mesons and baryons entering our atmosphere and artificially in high energy accelerators).

Real orbits like those of orbiting stars follow curves because the protons and their gravitational space called cells are curved regardless of the number of protons.

More importantly, flat galaxy rotation curves can be accounted for by including the potential energy gamma effect. As a proton falls toward the galaxy its kinetic energy will increase and its potential energy will decrease. Both energies have an associated gamma that multiply and represent the full time effect. We measure overall gamma that includes both components. The kinetic energy component follows Newtonian (Newtonian) gravity and velocity decreases appropriately with radial distance. Overall since ke+pe=constant the velocity remains constant regardless of where the mass orbits within the galaxy. There is no need for "missing matter".

Flat galaxy velocity curves are correct and match revised expectations

References

Some references can be downloaded at http://vixra.org/ . Search at top of page Gene H Barbee.

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14.

Appendix 1 Schrodinger Fundamentals of the Proton model

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.

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 [9]. 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). We are dealing with circles that represent spheres, not translation of particles (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.

Probability 1 Constraint

1=p1*p2/(p3*p4) but each probability=1/exp(N)

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: Multiply probabilities by adding logarithms. Find the result with the anti-logarithm (exp(0)=1).

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,.

Summary

The E= 0 construct was derived using the N's from the P= 1 construct. We then took the natural log of both sides of the equation. The (LHS) natural log of P=1 equals 0. The RHS natural log converts the values to additions and subtractions, depending on their sign. We then multiplied each value by e0 which gives E=e0*exp(N) for the eight matched energy values. We rearranged the N values. We define a probability component p =e0/E where e0 is a constant and has the same units as E. This means energy is increased by a low probability, i.e. E=e0/p. Schrodinger's equation shows exp(iEt/H) with the imaginary number i. Using complex probabilities on both sides of the equation eliminates imaginary numbers. The LHS imaginary numbers are eliminated because the four complex probabilities multiply with their four conjugates (1/1*1/1=1). The RHS imaginary numbers are eliminated because the imaginary probability multiples with iE (iE*i/P). This gives E= i^2 eo*1/(-exp(N))=eo*exp(N). Energy E=e0*exp(N) can be high since it follows an exponential relationship but Et/H=1 is maintained because each time t is corresponding low.

Creation was a zero energy, probability one separation event

The Proton model is anchored by the Schrodinger equation. The equation also appears to anchor properties of all mesons and baryons. This equation described by MIT as unitary evolution [9] is the basis of a broad theory. The equation gives probability P=exp(iEt/H)*exp(-iEt/H) where H= Planck's constant, E is field energy and time t is the time around a quantum circle at velocity C.

Probability in the left hand side of the Schrodinger equation is related to energy and time in the right hand side of the equation. Probability=1 occurs at the instant of wave function collapse. Historically observation is fundamental to quantum mechanics and the Copenhagen interpretation indicates that we can only describe the probability of an event within certain limits. If we use Shannon's definition of information (Information = -natural logarithm(Probability), the left hand side of the equation yields information. Many associate quantum mechanical probabilities with the process of observation but some authors call it consciousness. Zero energy and probability 1 appear to be initial conditions [12]. This implies that creation is based on separations from zero and 1. The Schrodinger equation requires a proper set of probabilities to represent the Proton model. **The probability 1, zero energy derivation naturally transitions from probability sets (p/p'=e/e') to energy sets that describes reality through the Proton model and cellular cosmology.**

Appendix 2 The Proton model

Neutron components

The author found N values for neutron components based on the way three quark masses and their kinetic energies add to the neutron mass. The related information components total N=90 for the neutron. They are listed in Table 1 below.

	Neutron particle and kinetic energy N			Neutron field energy N
Quad 1	15.43	quark 1	17.43	strong field 1
	12.43	kinetic energy	10.43	gravitational field component
Quad 2	13.43	quark 2	15.43	strong field 2
	12.43	kinetic energy	10.43	gravitational field component
Quad 3	13.43	quark 3	15.43	strong field 3
	12.43	kinetic energy	10.43	gravitational field component
Quad 4	10.41		-10.33	
	-10.33		10.41	gravitational field component
Quad 4'	10.33	pre-electron	10.33	
	0.00		0.00	
	90.00	Total	90.00	Total
	Table 1		Table 2	

There is a remarkable relationship between the natural logarithms 90 and the natural logarithm 180. Information (N) is a measure of how improbable an event is. It is very improbable that a single proton will form with exactly the N values listed in table 1. The probability that it will contain the particle and kinetic energy N values is: P=1/exp(N)=1/exp(90). Likewise, it is highly improbable that the proton will contain fields with the N values of table 2. Again the probability P=1/exp(90). Probabilities multiply and the probability of a neutron with these particles *and* field energies is P=1/exp(90)*1/exp(90)=1/exp(180).

But we know that neutrons exist. When we know something for certain, its probability is 1.0. Mass plus kinetic energy is equal and opposite field energy. Both exist and together they make up neutrons. Nature apparently creates mass equal to exp(180) to maintain probability=1 as an initial condition.

P=1=1/exp(180)*exp(180), where the probability of one mass with kinetic energy and its field is very low but there are many neutrons and fields. The "big bang" duplicates the zero based neutron many times. Neutrons decay to protons, electrons and neutrinos in space.

Number of neutrons in nature

There have been several missions (COBE, WMAP [1][2][4], HSST, and PLANCK [8]) and earlier work [1][5] that yield a great deal of information about the universe. Measurements and models allow astronomers, astrophysicists and cosmologists to estimate the number of neutrons in the universe [1][5]. The measurements agree with exp(180) quoted above [11].

Schrodinger's wave functions for the neutron

Details of the Proton model are in Appendix 2 but the table above labelled "Neutron components" specifies quad 2 (one of the quarks) below:

The Proton model energy values (E) are the exponents in the MIT unitary evolution equation [9] with four parts:

The E=0 construct is below with E= 2.02e-5*exp(N) MeV:

		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)=5.07, 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)

Surprisingly this means mass E1 with kinetic energy (E3+E4-E1-E2) orbiting field E3 and mass+ke also orbiting field E4 with kinetic energy E2. The energy E2+E2= 10.15 MeV is fundamental to atomic fusion and expansion.

Schrodinger equation Left Hand Side:

P= 1= (1/exp(13.43)*1/exp(12.43))/(1/exp(15.43)*1/exp(10.43))

Schrodinger Equation Right Hand Side:

P (RHS)=exp(ie0*exp(N1) t/H)*exp(ieo*exp(N2) t/H)*exp(-ie0*exp(N3) t/H)*exp(-ie0*exp(N4) t/H)

N1= 13.43, N2= 12.43, N3= 15.43 and N4= 10.43 and e0= 2.02e-5 MeV.

Proton model review

For reference the Proton model is shown below. The left hand side defines N values for four probabilities associated with three quark (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 construct. This model shows 129.54 for the mass of the quarks. Study of mesons and baryons [13] indicated that 129.5 MeV transitions to 9.34 MeV + kinetic energy. The quark masses agree with Particle Data Group (PDG) [10] data, one with 4.36 and two with 2.49 MeV (multiples of 0.622 MeV from Quad 5).

						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 neutron energy 939.5654 MeV is constant and agrees with the PDG [10] data within many significant digits.

The proton model is a manifestation of the laws of nature.

The core of the cosmology model [11] is repeated below but time and potential energy are added.

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

Time is around the gravitational orbit R=hC/2.8. Fundamental time=1.67e-21 seconds. As time counts forward, kinetic energy decreases by ke'=ke*(time/time')^(2/3).

This provides the startling insight: The information in green above is inside every proton [13]. The gravitational orbit has counted time cycles from the big bang and we experience this as increasing time. Time emanates from inside the proton. The sum of kinetic energy and potential energy remain constant over time. Temperature emanates from kinetic energy in the proton and when it reaches 8e10 K, part of the fusion energy 10.15 is released to increase the radius of the cell. It is now low, close to 2.73K. 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. The proton is the cell. Components of the proton are improbable (1/exp(180)) but there are exp(180) cells is the universe and the universe is huge (rcell*exp(60). Overall, the proton and interactions with other protons creates the universe [12]!

Appendix 3; What is the Cosmic Web?

Observations of light bending show streaks between stringy galaxy clusters. This is also attributed to dark matter. In cellular cosmology, a proton is on the surface of each cell. As mass accumulates cells change their size according to the kinetic energy regained from falling from the expansion determined radius. Potential energy + kinetic energy=10.15 MeV.

G remains constant during expansion			
ke0=10.15 MeV/neutron			
r0*V^2/m=r*v^2/m			
(mv/mV)^2=(r/r0)			
ke/ke0=(r/r0)			
r=r0*10.15/ke			

The gas between the stars is treated with thermodynamics. The protons/atoms are still associated with a cell but the relationship P=rho R T where rho=m/volume means that the volume of the gas "cells" no longer follow the relationship r=r0*10.15/ke. The cell radius in the space between large objects can be as large as 0.3 meters in the fully expanded gas down to 1e-6 meters. For cells in solid objects like planets are about 5e-11 meters in size since the electrons repel each other and limit further contraction. Yet further contraction occurs in black holes. Galaxies and the gas within are gravitationally bound and can't enlarge with time. Space continues to expand elsewhere. One can simulate this situation by placing a piece of cloth on a surface and gathering (pinching together) the cloth in spots. Ridges are formed between the pinch points indicating the distribution of mass.

Problem resolution; What is the cosmic web?

The general theory of relativity gives the deformation of space by mass but according to work above, mass has angular velocity associated with it that may bend space and affect light transmission. Curved space deflects light. This might be imaged as the cosmic web.