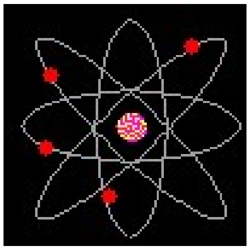
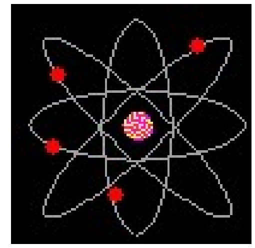


NUCLEAR GRAVITATION



FIELD THEORY

A Field Theory Demonstrating The “Strong Nuclear Force” and Gravity Are One and The Same Using Quantum Mechanics Newton’s Law of Gravity and Einstein’s General Relativity Theory

by

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Nuclear Gravitation Field Theory

Purpose

The purpose of the Nuclear Gravitation Field Theory is to demonstrate that the Strong Nuclear Force and gravity are one and the same using Quantum Mechanics, Newton's Law of Gravity, and Einstein's General Relativity Theory.

Ground Rules

1. If the Strong Nuclear Force is Gravity, then the Nuclear Gravitation Field must initially be a stronger field of attraction than the Coulombic repulsive field of the Nuclear Electric Field tending to repel Protons from the Nucleus.
2. If the Strong Nuclear Force is Gravity, then the Nuclear Gravitation Field should propagate in all directions outward from the Nucleus of the Atom to infinity.
3. If the Strong Nuclear Force is Gravity and the Classical Physics shape of the Nucleus forms a near perfect sphere, then the Nuclear Gravitation Field should propagate outward from the Nucleus omnidirectional with spherical symmetry to infinity. In this case, the Nuclear Gravitation Field intensity should drop off as a function of $1/r^2$ in like manner to Newton's Law of Gravity where r is the distance from the center of the Nucleus to the center of the Proton or Neutron being evaluated. The first equation mathematically defines Newton's Law of Gravity where F is the gravitational force of attraction between spherical mass M_1 and spherical mass M_2, G is the Universal Gravitation Constant, and r is the distance between the center of mass M_1 and center of mass M_2. The second and third equations evaluate the acceleration field a_{M1} equal to the gravitational field g_{M1} of mass M_1 acting upon mass M_2.

$$\boldsymbol{F = \frac{G \times M_1 \times M_2}{r^2}} \qquad \boldsymbol{F = M_2 \times a_{M_1}} \qquad \boldsymbol{a_{M_1} = g_{M_1} = \frac{G \times M_1}{r^2}}$$

Classical Mechanics excluding Quantum Mechanics states:

Total Energy = Kinetic Energy + Potential Energy

Nuclear Gravitation Field Theory

TE = KE + PE

$$\boldsymbol{E_{Total} = \frac{1}{2}mv^2 + E_{Potential}}$$

Quantum Mechanics uses the Schrodinger Wave Equation to evaluate total energy of an atomic or nuclear particle such as the electron, proton, or neutron. The general form of the equation is as follows:

Total Energy = Kinetic Energy + Potential Energy

$$i\hbar\frac{\partial\psi(r,\theta,\varphi,t)}{\partial t} = \frac{-\hbar^2}{2m}\nabla^2\,\psi(r,\ \theta,\ \varphi,\ t) + V(r,\ \theta,\ \varphi)(\,\psi(r,\ \theta,\ \varphi,\ t)$$

Where the General Schrodinger Wave Equation is defined in Spherical Coordinates: i is the square root of −1, h-bar is Planck's Constant, h, divided by 2π, ∂ is the first order partial derivative operator, ψ is the wave function of the particle being evaluated, ∇^2 is the second order spatial derivative operator, r is the distance from the center of the Nucleus to the center of the particle being evaluated, θ is the azimuthal angle of the particle being evaluated relative to the Nucleus from 0 to 2π radians, φ is the altitude angle of the particle being evaluated relative to the Nucleus from –π/2 to +π/2 radians, t is time, m is the mass of the particle being evaluated, V is the general Potential Function operating on particle wave function ψ .

If the field provides an acting force on a particle where Force is proportional to $1/r^2$, then the Potential Energy of that particle can be determined by integrating that Force over a given distance. The Potential Energy (PE) function will be proportional to 1/r, where r is the variable in the Potential Energy Function incorporated in the Schrodinger Wave Equation:

Force x Distance = Work or Energy

Nuclear Gravitation Field Theory

The following equations represent a generic Force proportional to $1/r^2$, r being the distance of the particle from the center of the Force acting upon the particle and the resultant Potential Energy proportional to 1/r.

$$\boldsymbol{F} = \frac{\boldsymbol{k}}{\boldsymbol{r^2}} \qquad \boldsymbol{PE} = \int_r^\infty \frac{\boldsymbol{kdr}}{\boldsymbol{r^2}} = \frac{\boldsymbol{k}}{\boldsymbol{r}}$$

By convention, the Potential Energy for a particle "bound" within a system is considered a negative value. The particle is no longer "bound" by the system at the point where the Potential Energy is equal to zero. This occurs when the particle is at a distance of infinity or "∞" from the system. Whether we consider the Electron bound to the Nucleus of the Atom by the Nuclear Electric Field or the Proton or Neutron bound to the Nucleus by the Nuclear Gravitation Field, the Potential Energy Function will be determined by integrating the Force from a distance r from the Nucleus to the distance where the particle is no longer bound or ∞.

The following equations represent the Nuclear Electric Field Force and Potential Energy of an Electron orbiting a Nucleus with Z number of Protons where e represents the electric charge of an Electron or Proton and r represents the Electron distance from the center of the Nucleus:

$$\boldsymbol{F} = \frac{(\boldsymbol{Ze})(\boldsymbol{e})}{4\pi\epsilon_0 \boldsymbol{r^2}} \qquad \boldsymbol{PE} = \int_r^\infty \frac{(\boldsymbol{Ze})(\boldsymbol{e})\boldsymbol{dr}}{4\pi\epsilon_0 \boldsymbol{r^2}} = \frac{(\boldsymbol{Ze})(\boldsymbol{e})}{4\pi\epsilon_0 \boldsymbol{r}}$$

The following equations represent the Nuclear Gravitation Field Force and Potential Energy of either a Proton or Neutron added to a Nucleus with Z number of Protons and N number of Neutrons where $m_{p\ or\ n}$ represents mass of the Proton or Neutron and r represents the proton or neutron distance from the center of the Nucleus:

$$\boldsymbol{F} = \frac{G(Zm_p+Nm_n)(m_{p\ or\ n})}{r^2} \qquad \boldsymbol{PE} = \int_r^\infty \frac{G(Zm_p+Nm_n)(m_{p\ or\ n})dr}{r^2} = \frac{G(Zm_p+Nm_n)(m_{p\ or\ n})}{r}$$

The Schrodinger Wave Equation for the Nuclear Electric Field Potential is a Quantum Mechanical Analysis of the electron in position around a given Nucleus. This equation assumes the Nucleus is a point source of the Electric Field because the radius of the Atom containing the electrons range from 30,000 to 100,000 times the radius on the Nucleus. Therefore, the Nuclear Electric Field appears to propagate outward from the Nucleus omnidirectional with spherical symmetry to infinity. The Nuclear Electric Field intensity drops off as a function of $1/r^2$ where r is the distance of the Electron being evaluated from the center of the Nucleus. The Schrodinger Wave Equation for the Total Energy of the electron of interest being evaluated about the Nucleus with its Potential Energy as a function of 1/r is as follows:

$$\boldsymbol{i}\,\hbar \frac{\partial \psi(\boldsymbol{r}, \boldsymbol{\theta}, \varphi, \boldsymbol{t})}{\partial \boldsymbol{t}} = \frac{-\hbar^2}{2m} \nabla^2 \psi(\boldsymbol{r}, \ \boldsymbol{\theta}, \ \varphi, \ \boldsymbol{t}) + \frac{(Ze)(e)}{4\pi\epsilon_0 r} \psi(\boldsymbol{r}, \ \boldsymbol{\theta}, \ \varphi, \ \boldsymbol{t})$$

Where m represents the mass of an Electron, Z represents the number of Protons in the Nucleus, e represents the value of electric charge of a single Proton or single Electron, and ϵ_0 is the permittivity of the Electric Field in free space.

The solutions to the Schrodinger Wave Equation for the Nuclear Electric Field Potential are known, define how the electron energy levels are filled about the Nucleus, and produce the Periodic Table of the Elements which define the chemical properties of those elements. The solutions to the Schrodinger Wave Equation for the Nuclear Electric Field establish how each of the energy levels fill with Electrons if the function used to provide Electron Potential Energy is proportional to 1/r.

When the Nucleus of the Atom meets a classical physical configuration that supports a Nuclear Gravitation Field propagating outward omnidirectional with spherical symmetry where the Nuclear Gravitation Field propagates outward proportional to $1/r^2$, then the associated Schrodinger Wave Equation will have a Gravitational Field Potential Energy for either the Proton or Neutron being evaluated proportional to 1/r and the following form of the Schrodinger Wave Equation can be considered valid.

$$\boldsymbol{i}\,\hbar \frac{\partial \psi(\boldsymbol{r}, \boldsymbol{\theta}, \varphi, \boldsymbol{t})}{\partial \boldsymbol{t}} = \frac{-\hbar^2}{2\,(m_{p\ or\ n})} \nabla^2 \psi(\boldsymbol{r}, \ \boldsymbol{\theta}, \ \varphi, \ \boldsymbol{t}) + \frac{G(Zm_p + Nm_n)(m_{p\ or\ n})}{r} \psi(\boldsymbol{r}, \ \boldsymbol{\theta}, \ \varphi, \ \boldsymbol{t})$$

It is expected that all the applicable energy levels for Protons and Neutrons will fill in identical manner as the same applicable energy levels for electrons are filled. For the Schrodinger Wave Equation for the Nuclear Gravitation Field: G is the Universal Gravitation Constant, Z is the number of Protons in the Nucleus, m_p is the mass of a Proton, N is the number of Neutrons in the Nucleus, m_n is the mass of a Neutron, and $m_{p \text{ or } n}$ represents mass of the Proton or Neutron being added to the Nucleus.

NOTE: The constant G would be consistent with the Universal Gravitation Constant outside the Electron cloud. The value of G within the Nucleus of the Atom may very well be 10^{50} times larger considering that the Strong Nuclear Force and gravity are quantized.

4. If the Strong Nuclear Force is Gravity and the calculated Nuclear Gravitation Field intensity at the surface of the Nucleus of the Atom is greater than or equal to the gravity field of our Sun, then the General Relativity effect of Space-Time Compression must be considered to take place.

5. If the Strong Nuclear Force is Gravity, then the Nuclear Gravitation Field must be associated with specific energy levels of the Protons and Neutrons in the Nucleus of the Atom, therefore, must be considered quantized because the Nuclear Gravitation Field intensity is concentrated at specific energy level spectral lines. The quantized Nuclear Gravitation Field intensity versus the average gravity field intensity should be analogous to a quantized photon of energy to the average energy from light distributed evenly upon a surface.

6. If the Strong Nuclear Force is Gravity, the Nuclear Gravitation Field must propagate outward from the Atom with the extremely feeble intensity currently observed - the weakest field associated with the Atom.

Nuclear Gravitation Field Theory

Compare Electron Energy Levels to Proton and Neutron Energy Levels

Energy Level Magic Numbers						
Energy Level	Electrons $^{0}_{-1}e$	Energy Level Δ	Protons $^{1}_{1}p$	Energy Level Δ	Neutrons $^{0}_{1}n$	Energy Level Δ
1	2	---	2	---	2	---
2	10	8	8	6	8	6
3	18	8	20	12	20	12
4	36	18	28	8	28	8
5	54	18	50	22	50	22
6	86	32	82	32	82	32
7	118	32	114	32	126	44
8	168	50	164	50	184	58

Magic Numbers represent the number of Electrons, Protons, or Neutrons to completely fill energy levels. Magic Numbers for Protons and Neutrons are identical for Energy Levels 1 through 6 indicating the Potential Energy Functions are the same for each. Matching Energy Level Changes for Protons or Neutrons to Electrons are in Red.

The Nuclear Gravitation Field solutions to Schrodinger Wave Equation differ from Schrodinger Wave Equation solutions to the Nuclear Electric Field. Newton's Law of Gravity assumes Masses M_1 and M_2 are spherical. Stars, Planets, and Moons are, typically, spherical, therefore the $1/r^2$ Gravity Field attracting mass M_2 to mass M_1 of the equation is valid.

$$F = \frac{G \times M_1 \times M_2}{r^2} \qquad g_{M_1} = \frac{G \times M_1}{r^2}$$

The Nuclear Gravitation Field propagating outward from the Nucleus will be dependent upon the shape of the Nucleus as "seen" by the Proton or Neutron next to Nucleus.

Nuclear Gravitation Field Theory

Periodic Table of the Elements

Group	1	2		3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
Period	**s-Orbitals**			**d-Orbitals**										**p-Orbitals**					
1	1 **H**	2 **He**																1 **H**	2 **He**
2	3 **Li**	4 **Be**												5 **B**	6 **C**	7 **N**	8 **O**	9 **F**	10 **Ne**
3	11 **Na**	12 **Mg**												13 **Al**	14 **Si**	15 **P**	16 **S**	17 **Cl**	18 **Ar**
4	19 **K**	20 **Ca**		21 **Sc**	22 **Ti**	23 **V**	24 **Cr**	25 **Mn**	26 **Fe**	27 **Co**	28 **Ni**	29 **Cu**	30 **Zn**	31 **Ga**	32 **Ge**	33 **As**	34 **Se**	35 **Br**	36 **Kr**
5	37 **Rb**	38 **Sr**		39 **Y**	40 **Zr**	41 **Nb**	42 **Mo**	43 **Tc**	44 **Ru**	45 **Rh**	46 **Pd**	47 **Ag**	48 **Cd**	49 **In**	50 **Sn**	51 **Sb**	52 **Te**	53 **I**	54 **Xe**
6	55 **Cs**	56 **Ba**	*	71 **Lu**	72 **Hf**	73 **Ta**	74 **W**	75 **Re**	76 **Os**	77 **Ir**	78 **Pt**	79 **Au**	80 **Hg**	81 **Tl**	82 **Pb**	83 **Bi**	84 **Po**	85 **At**	86 **Rn**
7	87 **Fr**	88 **Ra**	**	103 **Lr**	104 **Rf**	105 **Db**	106 **Sg**	107 **Bh**	108 **Hs**	109 **Mt**	110 **Ds**	111 **Rg**	112 **Cn**	113 **Nh**	114 **Fl**	115 **Mc**	116 **Lv**	117 **Ts**	118 **Og**

	f-Orbitals													
Lanthanide Series *	57 **La**	58 **Ce**	59 **Pr**	60 **Nd**	61 **Pm**	62 **Sm**	63 **Eu**	64 **Gd**	65 **Tb**	66 **Dy**	67 **Ho**	68 **Er**	69 **Tm**	70 **Yb**
Actinide Series **	89 **Ac**	90 **Th**	91 **Pa**	92 **U**	93 **Np**	94 **Pu**	95 **Am**	96 **Cm**	97 **Bk**	98 **Cf**	99 **Es**	100 **Fm**	101 **Md**	102 **No**

Elements with Electron Magic Numbers are in Group 18 at the right. Elements with Proton Magic Numbers are outlined in Red.

Reference: http://www.webelements.com/index.html

Nuclear Gravitation Field Theory

Electron Configuration and Energy Levels for the Periodic Table of the Elements

Group	1	2		3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
Period	**s-Orbitals**			**d-Orbitals**										**p-Orbitals**					
1	**$1s^1$**	**$1s^2$**																**$1s^1$**	**$1s^2$**
2	**$2s^1$**	**$2s^2$**												**$2p^1$**	**$2p^2$**	**$2p^3$**	**$2p^4$**	**$2p^5$**	**$2p^6$**
3	**$3s^1$**	**$3s^2$**												**$3p^1$**	**$3p^2$**	**$3p^3$**	**$3p^4$**	**$3p^5$**	**$3p^6$**
4	**$4s^1$**	**$4s^2$**		**$3d^1$**	**$3d^2$**	**$3d^3$**	**$3d^4$**	**$3d^5$**	**$3d^6$**	**$3d^7$**	**$3d^8$**	**$3d^9$**	**$3d^{10}$**	**$4p^1$**	**$4p^2$**	**$4p^3$**	**$4p^4$**	**$4p^5$**	**$4p^6$**
5	**$5s^1$**	**$5s^2$**		**$4d^1$**	**$4d^2$**	**$4d^3$**	**$4d^4$**	**$4d^5$**	**$4d^6$**	**$4d^7$**	**$4d^8$**	**$4d^9$**	**$4d^{10}$**	**$5p^1$**	**$5p^2$**	**$5p^3$**	**$5p^4$**	**$5p^5$**	**$5p^6$**
6	**$6s^1$**	**$6s^2$**	*	**$5d^1$**	**$5d^2$**	**$5d^3$**	**$5d^4$**	**$5d^5$**	**$5d^6$**	**$5d^7$**	**$5d^8$**	**$5d^9$**	**$5d^{10}$**	**$6p^1$**	**$6p^2$**	**$6p^3$**	**$6p^4$**	**$6p^5$**	**$6p^6$**
7	**$7s^1$**	**$7s^2$**	**	**$6d^1$**	**$6d^2$**	**$6d^3$**	**$6d^4$**	**$6d^5$**	**$6d^6$**	**$6d^7$**	**$6d^8$**	**$6d^9$**	**$6d^{10}$**	**$7p^1$**	**$7p^2$**	**$7p^3$**	**$7p^4$**	**$7p^5$**	**$7p^6$**
			f-Orbitals																
Lanthanides**			**$4f^1$**	**$4f^2$**	**$4f^3$**	**$4f^4$**	**$4f^5$**	**$4f^6$**	**$4f^7$**	**$4f^8$**	**$4f^9$**	**$4f^{10}$**	**$4f^{11}$**	**$4f^{12}$**	**$4f^{13}$**	**$4f^{14}$**			
Actinides **			**$5f^1$**	**$5f^2$**	**$5f^3$**	**$5f^4$**	**$5f^5$**	**$5f^6$**	**$5f^7$**	**$5f^8$**	**$5f^9$**	**$5f^{10}$**	**$5f^{11}$**	**$5f^{12}$**	**$5f^{13}$**	**$5f^{14}$**			

Electrons fill the electron energy levels starting from left to right along each row and by rows from top to bottom. Hydrogen (H), with a $1s^1$ electron configuration, and Helium (He), with a $1s^2$ electron configuration, are placed at the top of the Periodic chart on both sides for the Periodic Table of the Elements because the first electron energy level consists only of an "s-Orbital" and Hydrogen can take on the characteristic of either an Alkali Metal and as a Halogen and Helium is a Noble Gas.

Reference: http://www.webelements.com/index.html

Nuclei with the number of Protons and/or Neutrons less than 50 typically will have a classical shape that deviates from a near perfect spherical shape. If the classical shape of the Nucleus is not spherical, then the Nuclear Gravitation Field Potential Energy Function would not be proportional to 1/r as assumed for the Potential Energy function within the Schrodinger Wave Equation defining the Proton or Neutron Total Energy. Nuclear Energy Level fills for Protons and Neutrons would be expected to deviate from energy level fills for Electrons as is observed. The Heisenberg Uncertainty Principle implies that all nuclei are spherical. If the Heisenberg Uncertainty Principle drives how Protons and Neutrons fill their respective nuclei energy level positions, the magic numbers for Protons and Neutrons should be identical to the magic numbers for the Electrons. Therefore, either the Heisenberg Uncertainty Principle does not drive how Proton and Neutron Energy Levels are filled or the method of fill of the nuclear energy levels cannot confirm the Strong Nuclear Force being equivalent to Gravity.

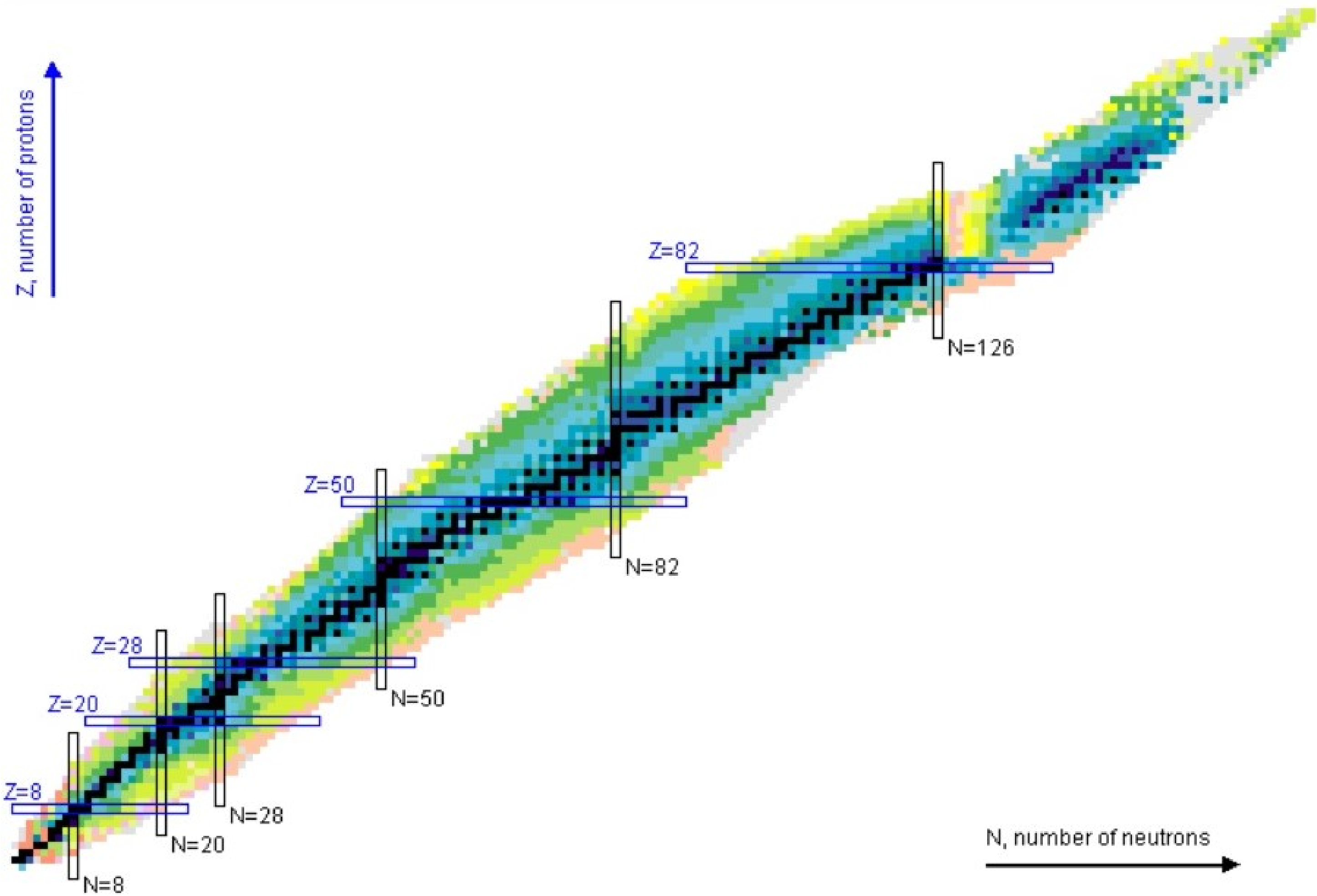
Nuclei with the number of Protons and/or Neutrons greater than or equal to 50 will have a classical shape that matches a near perfect sphere. Therefore, if the Strong Nuclear Force and Gravity are the same, then the Solutions for the Schrodinger Wave Equation with a Nuclear Gravitation Field Potential Energy proportional to 1/r should result in the applicable Proton and Neutron Energy Levels filling identically to the filling of the Electron Energy Levels for the applicable energy levels.

- The fill for Protons in the Sixth Energy Level and Protons in the Seventh Energy Level are identical for the fill for Electrons in the Sixth Energy Level and the fill for the Electrons in the Seventh Energy Level at a change of 32 for each
- The projected fill for Protons in the Eighth Energy Level is Identical for the projected fill of Electrons in the Eighth Energy Level at a change of 50 for each
- The fill for Neutrons in the Sixth Energy Level is identical for the fill for Electrons in the Sixth Energy Level at a change of 32 for each

The fill of Neutrons for the Seventh Energy Level at a change of 44 deviates from the Electrons and Protons for the Seventh Energy Level at a change of 32. The fill of Neutrons for the Eighth

Nuclear Gravitation Field Theory

Chart of the Nuclides



Reference: http://www.nndc.bnl.gov/chart/

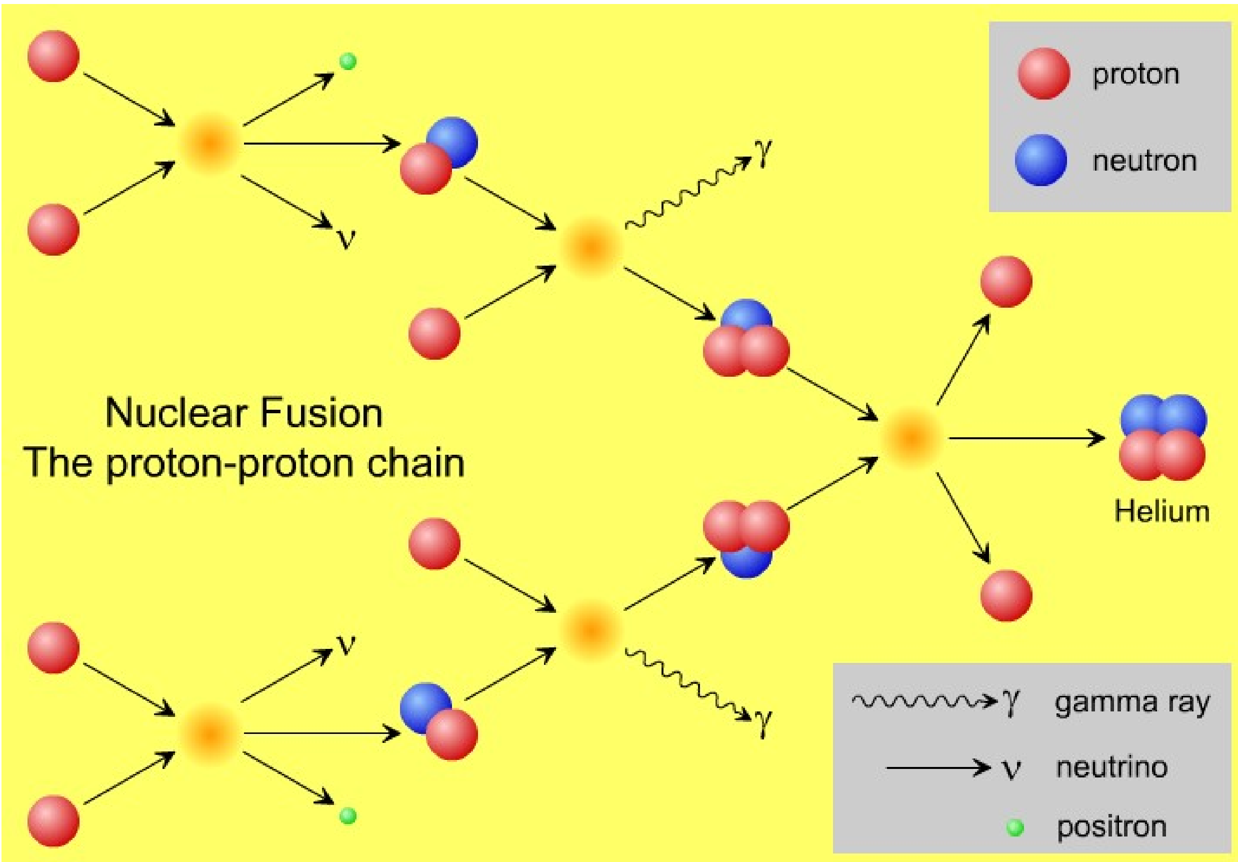
Energy Level at a change of 58 deviates from the projected fill of Electrons and Protons for the Eighth Energy Level at a change of 50. The Neutron Energy Level fill deviations are suspected to be the result of the strong accumulated Coulombic Repulsion Force tending to tear the nucleus apart. The need for additional Neutrons in the Nucleus is required to raise the Strong Nuclear Force to hold the Nucleus together. Note that for the heavier elements, the Neutron to Proton ratio rises from a 1 to 1 ratio for Light Nuclei to a 3 to 2 ratio for Heavy Nuclei. For stable Nuclei of the Heavier Elements, Neutrons fill the next higher energy level than the Protons fill. For example, the Nucleus for Lead-208 ($_{82}Pb^{208}$), 82 Protons fill Six Energy Levels and 126 Neutrons fill Seven Energy Levels. All currently known Elements beyond Element 83, Bismuth-209, ($_{83}Bi^{209}$), are observed to be radioactive – not stable.

The methodology of fill of a given energy level position for a Proton or Neutron for a given nucleus of interest is completely independent of how previous Protons or Neutrons filled their respective energy level positions. The methodology of fill is only dependent upon the potential energy function for that nucleus (the kinetic energy function remains the same for all nuclei). Therefore, if the nucleus of interest has spherical symmetry, then the potential energy function will be a function proportional to 1/r. Somewhere between the magic number of 28 for the Fourth Energy Level for Protons and Neutrons in the nucleus and the magic number of 50 for the Fifth Energy Level of Protons and Neutrons in the nucleus the nucleus becomes spherical in shape. When the number of Protons and Neutrons in the Nucleus each number 50 or greater, the classical shape of the Nucleus is a near perfect sphere. Proton Energy Levels Six through Eight fill in identical manner to Electron Energy Levels Six through Eight. Neutron Energy Level Six fills in identical manner to Electron Energy Level Six. The deviation for Neutron Energy Levels above Level Six can be accounted for by the need to raise the Nuclear Gravitation Field intensity to overcome the rising Coulombic Repulsion Force tending to break the Nucleus apart. It is safe to conclude that when the classical shape of the Nucleus is a near perfect sphere, then the Nuclear Gravitation Field is proportional to $1/r^2$ and consistent with Newton's Law of Gravity. In this case, the Nuclear Gravitation Field Potential Energy Function will be proportional to 1/r.

Nuclear Gravitation Field Theory

Nuclear Gravitation Field Required to Overcome Nuclear Electric Field Repulsion

Solar Nuclear Fusion – the Proton-Proton Chain



Assume we will initiate the first step to fusing Hydrogen to Helium in the same manner that takes place within the interior of our Sun. In this case, we must bring two Protons in contact with one another. In order to accomplish this, we must overcome the like charge Coulombic repulsion of each of the Protons – the Nuclear Electric Field established by each Proton. Let's determine the minimum intensity of the Strong Nuclear Force – the minimum intensity of the Nuclear Gravitation Field required to overcome the Nuclear Electric Field repulsive force present at the surface of the Proton in order to bring the second Proton into contact with our Proton. The radius, r, of each Proton is equal to 1.20 x 10^{-15} meter, therefore, the distance between the centers of each Proton in contact is twice the radius of each Proton or 2.40 x 10^{-15} meter. The equation for Force between electrically charged particles is as follows:

$$F = \frac{q_1 q_2}{4\,\pi\epsilon_0 r^2}$$

q_1 is the charge of the first Proton, q_2 is the charge of second Proton placed in contact with the first Proton to establish the repulsive force, F; ϵ_0 is the permittivity of the Electric Field in free space; and r is the distance between the centers of each of the Protons. We also know that the classical physics calculation for force acting on a body, in this case the Nuclear Electric Field of the first Proton acting upon the second Proton, is as follows:

$$F = m_p a$$

F is Force, m_p is the mass of the second Proton being acted upon by the Nuclear Electric Field of the first Proton, and a is the acceleration of the second Proton. In order for both Protons to remain in contact with one another, the Strong Nuclear Force – Nuclear Gravitation Field force holding the second Proton to the first Proton – must be, at a minimum, equal and opposite to the Nuclear Electric Field repulsion force repelling the second Proton from the first Proton. If the forces are equal and opposite, then the acceleration fields associated with those forces must be equal and opposite. Each field is acting upon the second Proton with a mass m_p. Using both equations, above, the acceleration sensed by the second Proton being repelled by the first Proton can be determined by solving for acceleration, a, as follows:

$$a = \frac{q_1 q_2}{4\,\pi\epsilon_0 r^2 m_p}$$

$$a = \frac{q_1 q_2}{4\,\pi\epsilon_0 r^2 m_p} = \frac{(1.602\times10^{-19}\ Coulomb)(1.602\times10^{-19} Coulomb)}{(4\,\pi)(8.85\times10^{-12}\frac{Coulomb^2\ sec^2}{kg\ meter^3})(2.4\times10^{-15}\ meter)^2(1.673\times10^{-27} kg)}$$

Nuclear Gravitation Field Theory

$$a = (2.395 \times 10^{28})\frac{meters}{sec^2}$$

Divide the acceleration field, a, by the acceleration of gravity on Earth, 9.81 meters/sec^2, to obtain the acceleration field in g's.

$$a = (2.441 \times 10^{27})\, g$$

The value of acceleration, a, represents the repulsive Nuclear Electric Field established by the first Proton acting upon the second Proton of interest. In order to overcome the Nuclear Electric Field repulsion of the second Proton from the first Proton, the minimum required acceleration field required by the Strong Nuclear Force – the Nuclear Gravitation Field – to hold the second Proton next to the first Proton is 2.441 x 10^{27}g.

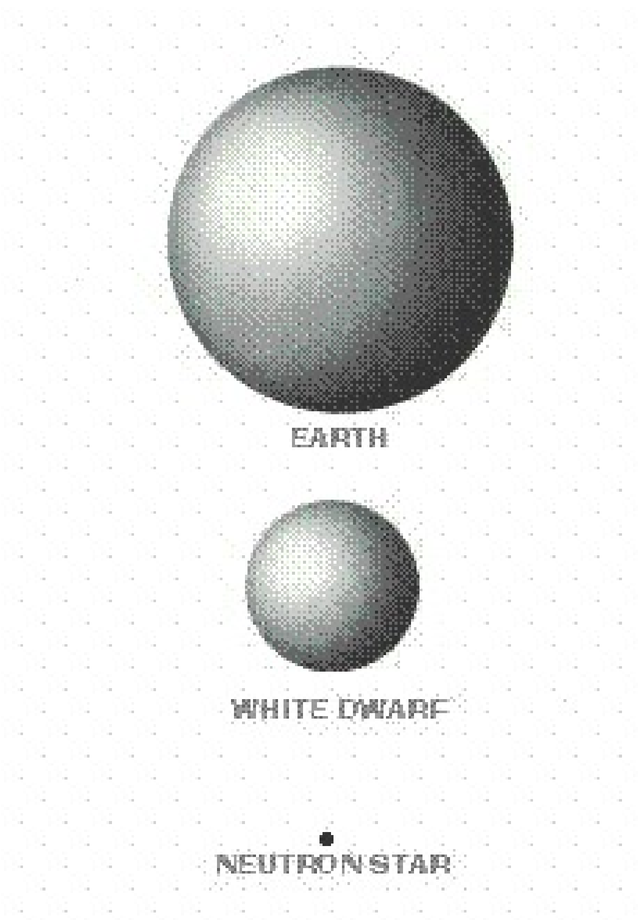
In order to determine whether or not the Nuclear Gravitation Field at the surface of the nucleus has an intensity great enough to result in observable General Relativistic effects, one must compare the Nuclear Gravitation Field at the surface of the nucleus to the gravitational field in the vicinity of the Sun's surface and in the vicinity of the surface of a Neutron Star. Gravitational fields in the vicinity of stars are more than intense enough for significant General Relativistic effects to be observed. The Neutron Star was selected as one of the cases to study because the density of the Nucleus, which is made up of Protons and Neutrons, is very close to the density of a Neutron Star. A Neutron Star typically contains the mass approximately that of our Sun, however, the matter is concentrated into a spherical volume with a diameter of about 10 miles or 16 kilometers. The radius of a Neutron star is about 5 miles or 8 kilometers. The following figure illustrates the relative size of the Earth to the size of a White Dwarf star and a Neutron star.

Let's determine the gravitational field at the surface of a Neutron Star. The Neutron Star is assumed to contain the same mass as the Sun, therefore, the mass of the Neutron Star, "$M_{Neutron\ Star}$," is equal to 1.99×10^{30} kg. The Neutron Star's radius, which is defined as "$R_{Neutron\ Star}$," is about 5 miles equal to about 8 km or 8.0×10^{3} meters. The gravitational field of a Neutron Star, which is represented by the gravitational acceleration at the star's surface, is calculated below:

$$a_{NeutronStar} = \frac{GM_{NeutronStar}}{R^2_{NeutronStar}} = \frac{\left(6.67\times10^{-11}\,\text{Newton-meter}^2/\text{kg}^2\right)\left(1.99\times10^{30}\,kg\right)}{\left(8.00\times10^{3}\,meters\right)^2}$$

$a_{\text{Neutron Star}} = 2.07\times10^{12}$ Newtons/kg $= 2.07\times10^{12}$ meters/second^2

Comparative Sizes of the Earth, a Typical White Dwarf Star, and a Typical Neutron Star



Nuclear Gravitation Field Theory

To determine the "g-force" at the Neutron Star's surface, the gravitational field of the Neutron Star must be normalized relative to Earth's gravitational field in the same manner used to calculate the g-force at the Sun's surface. Earth's gravitational field is 1g. The ratio of the acceleration of gravity on the Neutron Star's surface to the acceleration of gravity on the Earth's surface represents the g-force on the Neutron Star's surface. The g-force on the Neutron Star's surface is calculated as follows:

$$g - force_{NeutronStar} = \frac{a_{NeutronStar}}{a_{Earth}} = \frac{\left(2.07 \times 10^{12}\, meters/\sec ond^{2}\right)}{\left(9.81 meters/\sec ond^{2}\right)} = 2.10 \times 10^{11}\, g$$

Albert Einstein's General Relativity Theory was confirmed in 1919 when a total eclipse of the Sun occurred. With the Sun being blocked out by the Moon, a star directly behind the Sun could be seen on either side of the Sun due to the acceleration of light around the Sun. The gravitational field of the Sun at 27.8g can warp or bend Space-Time. The gravitational field of a Neutron Star, at 2.10×10^{11}g, has an intensity over 7.5 billion times greater than the Sun's gravitational field. The Neutron Star's gravitational field will result in substantial "Space-Time Compression." The minimum gravitational field intensity at the surface of the Proton was calculated to be 2.441 x 10^{27}g, a value over 16 decades more intense than the value calculated for the Neutron Star. The General Relativistic effects next to the Nucleus of the Atom must be considered.

Nuclear Gravitation Field Theory

General Relativity and Space-Time Compression

Space-Time Compression:

What is Space-Time Compression and how is it related to Special Relativity and General Relativity? Space-Time Compression is the relativistic effect of reducing the measured distance and light travel-time between two points in space as a result of the presence of either:

1. Two or more inertial reference frames where relativistic velocities (velocities of a significant fraction of the velocity of light) between the reference frames are involved – Special Relativity. A spacecraft traveling at 0.98c (98% of the velocity of light) relative to Earth is an example of two relativistic inertial reference frames.
2. Accelerated reference frames defined by either the physical acceleration, or change in velocity, of an object of interest relative to a point of reference in Space-Time in the presence of an acceleration field – General Relativity. An example of an accelerated reference frame is that of the Sun's gravitational field, equal to 27.8g, near the Solar surface.

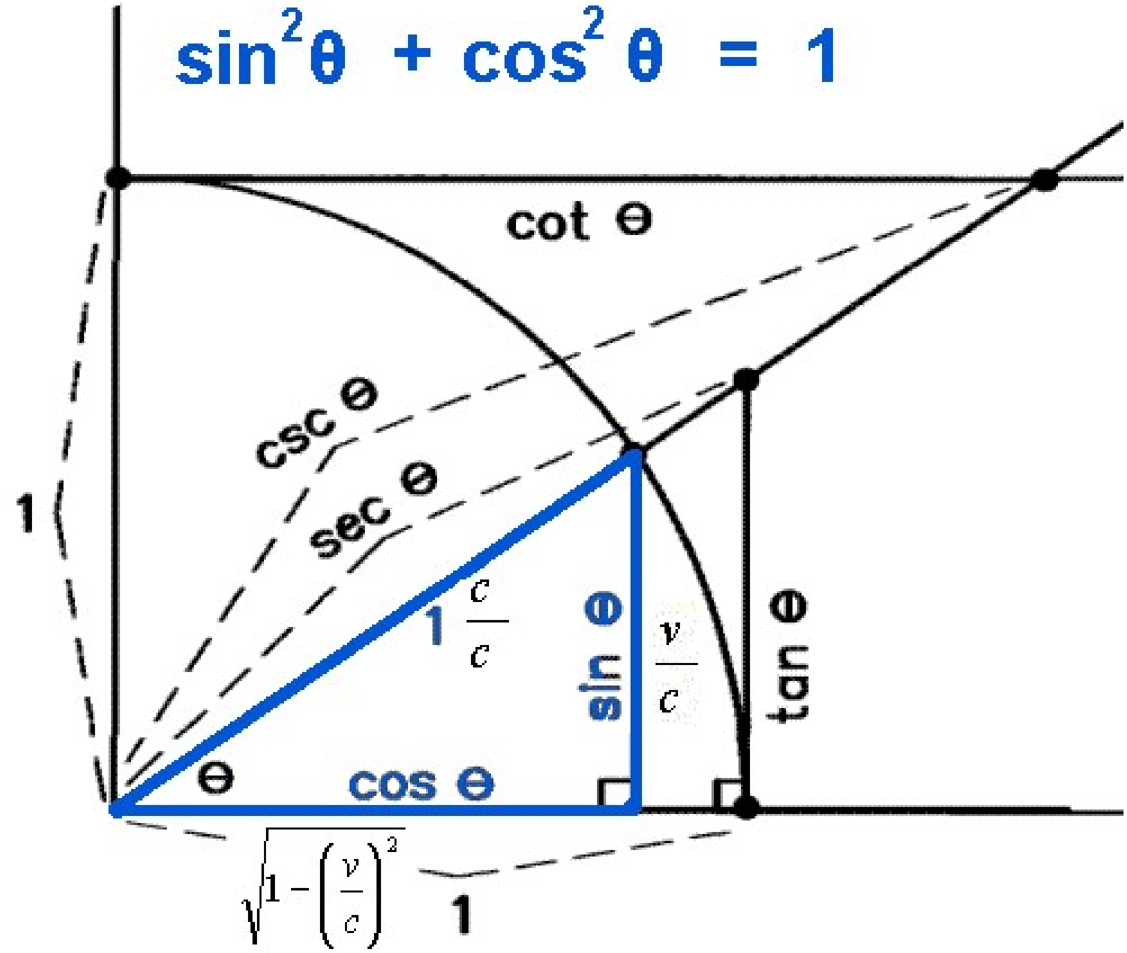
Space-Time Compression occurs because of the invariance of the measured, or observed, velocity of light: 186,300 miles/sec = 299,750 km/sec, independent what inertial or accelerated reference frame the observer exists within or externally observes.

Inertial Reference Frames:

One way to quantitatively observe the Space-Time compression effect is to look at the blue right triangle within a quarter circle of unity radius (radius, r = 1) displayed in the figure, below. The hypotenuse of the triangle is the side of the blue triangle starting from the center of the circle moving diagonally upward and to the right with a length unity, or 1, and equal to the radius of the quarter circle. The hypotenuse of the blue right triangle represents the velocity of light, c, as a fraction of the velocity of light, c, or c/c = 1.

Nuclear Gravitation Field Theory

Trigonometric Identities and Relationship to Relativity



The vertical side of the blue right triangle is the ratio of the velocity of the spacecraft to that of the velocity of light, or v/c and is the "opposite side" from the angle formed by the hypotenuse of the blue right triangle, or the radius of the quarter circle, and the horizontal leg of the blue right triangle. That angle is represented by the Greek letter θ (Theta). The angle θ spans from 0° to 90°. The length of the vertical side of the blue right triangle is equal to sinθ, therefore, v/c = sinθ. The horizontal side of the blue right triangle represents the amount of Space-Time Compression that reduces the distance between two points in Space-Time (length contraction) and reduces the time it takes light to travel between the two points (time dilation) based on the velocity of the spacecraft relative to the velocity of light. The length of the horizontal side of the blue right triangle is equal to cosθ. Using the Pythagorean Theorem, we can solve for cosθ.

$$\sin^2\theta + \cos^2\theta = 1$$

$$v/c = \sin\theta$$

Substitute v/c for sinθ, then solve for cosθ

$$(v/c)^2 + \cos^2\theta = 1$$

$$\cos^2\theta = 1 - (v/c)^2$$

$$\cos\theta = [1 - (v/c)^2]^{1/2}$$

$$1/\cos\theta = \sec\theta = 1/[1 - (v/c)^2]^{1/2} = \text{“Space-Time Compression Factor”}$$

The “Space-Time Compression Factor” is the multiplicative inverse of the value of length of the horizontal side of the blue right triangle equal to 1/cosθ, or secθ, and is designated by the Greek Letter γ (gamma). The length contraction and time dilation can be determined by solving for the length of the horizontal side of the triangle using the Pythagorean Theorem.

Therefore, the distance between the Earth and the star of interest 10 light-years away as measured by the observer in the spacecraft moving at a velocity, v, is defined as follows:

$$d = d_0 [1 - (v/c)^2]^{1/2}$$

Where d_0 is the measured distance to the star of interest in “Normal Space-Time” or “Uncompressed Space-Time” as measured by the observer on the Earth and d is the “Compressed Space-Time” distance (or length contracted distance) as measured by the observer in the spacecraft moving at a velocity, v. The reduction of time for light to travel the distance between the star of interest and spacecraft in the vicinity of Earth is affected in the same manner by “Space-Time Compression.” Einstein noted the equivalence of space and time, hence the term Space-Time is used. The relationship of space and time is as follows:

$$d = ct$$

d represents distance, c represents the velocity of light, and t represents elapsed time. Substituting ct for d and ct_0 for d_0, the distance compression equation can become a time dilation equation.

$$ct = ct_0 [1 - (v/c)^2]^{1/2}$$

$$\text{Therefore:} \quad t = t_0 [1 - (v/c)^2]^{1/2}$$

The following table provides the values for length contraction and "Space-Time Compression Factor" as a function of velocity relative to the velocity of light, c = 299,750 km/sec = 186,300 miles/sec.

Velocity and Space-Time Compression

Angle θ Degrees	**Measured Velocity = v = (c)(sinθ) (v/c) = sinθ**	**Distance (Length) Contraction or Time Dilation Factor = cosθ = $[1 - (v/c)^2]^{1/2}$**	**Space-Time Compression Factor = γ = 1/cosθ = secθ = 1/ $[1 - (v/c)^2]^{1/2}$**	**Effective Velocity = v_{eff} = (c)(sinθ/cosθ) = (c)(tanθ) (v_{eff}/c) = tanθ**
0.000	0.000	1.000	1.000	0.000
2.866	0.050	0.999	1.001	0.050
5.739	0.100	0.995	1.005	0.101
8.627	0.150	0.989	1.011	0.152
11.537	0.200	0.980	1.021	0.204
14.478	0.250	0.968	1.033	0.258
17.458	0.300	0.954	1.048	0.314
20.487	0.350	0.937	1.068	0.374
23.578	0.400	0.917	1.091	0.436
26.744	0.450	0.893	1.120	0.504
30.000	0.500	0.866	1.155	0.577
33.367	0.550	0.835	1.197	0.659
36.870	0.600	0.800	1.250	0.750

Velocity and Space-Time Compression (Continued)				
Angle θ Degrees	**Measured Velocity $= v$ $= (c)(\sin\theta)$ $(v/c) = \sin\theta$**	**Distance (Length) Contraction or Time Dilation Factor $= \cos\theta$ $= [1 - (v/c)^2]^{1/2}$**	**Space-Time Compression Factor $= \gamma = 1/\cos\theta = \sec\theta$ $= 1/[1 - (v/c)^2]^{1/2}$**	**Effective Velocity $= v_{eff}$ $= (c)(\sin\theta/\cos\theta)$ $= (c)(\tan\theta)$ $(v_{eff}/c) = \tan\theta$**
40.542	0.650	0.760	1.316	0.855
44.427	0.700	0.714	1.400	0.980
45.000	0.707	0.707	1.414	1.000
48.590	0.750	0.661	1.512	1.134
53.130	0.800	0.600	1.667	1.333
58.212	0.850	0.527	1.898	1.614
60.000	0.866	0.500	2.000	1.732
64.158	0.900	0.436	2.294	2.065
71.805	0.950	0.312	3.203	3.042
73.739	0.960	0.280	3.571	3.428
75.930	0.970	0.243	4.113	3.990
78.522	0.980	0.199	5.025	4.925
81.890	0.990	0.141	7.470	7.018
84.268	0.995	0.100	10.013	9.962
85.000	0.996	0.087	11.474	11.430
85.561	0.997	0.077	12.920	12.882
86.376	0.998	0.063	15.819	15.789
87.437	0.999	0.045	22.366	22.340

As indicated in the table, above, measured velocities do not contribute significantly to the "Space-Time Compression" effect unless the measured velocity is a significant fraction of the velocity of light, c. At a measured velocity of 0.995c, the "Space-Time Compression Factor" is just above 10 and at a measured velocity of 0.999c, the "Space-Time Compression Factor" is just under 22.4.

Table "Velocity and Space-Time Compression" introduces the concept of effective velocity. When the spacecraft is traveling at a measured velocity of 0.707c, the effective velocity, v_{eff}, of the spacecraft is 1.000c or the speed of light, c. Although the spacecraft only has a measured velocity as 0.707c, the length contraction along the line of travel is reduced to 0.707 (or 70.7%) of the original distance (which represents a "Space-Time Compression Factor" equal to 1.414), therefore, the time to travel the uncompressed distance (which is a known quantity) is equal to the time it would take light to travel the uncompressed distance.

The evaluation, above, discusses Space-Time Compression as a function of a constant relativistic velocity, therefore is an evaluation of a inertial reference frame. General Relativity includes the evaluation of accelerated reference frames. Gravity fields establish accelerated reference frames because gravity accelerates light, electric fields, and magnetic fields. Therefore, gravity fields generate the Compressed Space-Time due to the acceleration of light, electric fields, and magnetic fields. Since the speed of light will always be measured as propagating at a constant speed of 2.9975×10^8 meters/sec, the distance traveled is reduced by the Space-Time Compression Factor. Light, Electric Fields, and Magnetic Fields propagate based upon Compressed Space-Time.

General Relativity – Accelerated Reference Frames and Relation to Nuclear Gravitation Field

We determined that the minimum Nuclear Gravitation Field acceleration has to be at least 2.441 x 10^{27}g, therefore, the effects of General Relativity must be considered. Gravity fields propagate based upon Uncompressed Space-Time. In order to "see" or "measure" the Nuclear Gravitation Field propagating outward from the Nucleus omnidirectional in spherical symmetry dropping in intensity $1/r^2$ consistent with Newton's Law of Gravity, we would have to measure the field intensity in Uncompressed Space-Time. However, we live in the Compressed Space-Time reference frame, therefore, we see events in Compressed Space-Time. As previously discussed, gravity fields generate the Compressed Space-Time due to the acceleration of light, electric fields, and magnetic fields. Light, Electric Fields, and Magnetic Fields propagate based upon Compressed Space-Time.

Table "Accelerated Reference Frame Space-Time Compression Due to Gravity Field," below, determines the Uncompressed Space-Time acceleration of light as a function of the intensity of various gravity fields, determines the reduction in the distance traveled by light as observed in Compressed Space-Time, and the resulting Space-Time Compression Factors. Let's assume the gravitational field next to the nucleus of the atom was equal to 2.9975 x 10^8 meters/sec^2. If light was subjected to this acceleration field, in one second the speed of light would be doubled to 5.9950 x 10^8 meters/sec equal to the speed of light in Uncompressed Space-Time. Since the speed of light in free space is invariant with respect to the reference frame of the observer, the speed of light remains at 2.9975 x 10^8 meters/sec. Therefore, the distance traveled by light in Compressed Space-Time must be reduced to half the Uncompressed Space-Time distance as indicated by the first entry highlighted in red in Table, "Accelerated Reference Frame Space-Time Compression Due to Gravity Field." below. That Space-Time Compression factor is equivalent to the Space-Time Compression factor for one travelling at 86.6% of the Speed of Light.

Accelerated Reference Frame Space-Time Compression Due to Gravity Field						
Gravity Acceleration Units of Earth Gravity g	**Gravity Acceleration Meters/Second^2**	**Final Speed of Light in Uncompressed Space-Time After 1 Second Meters/Second**	**Length Reduction Due to Space-Time Compression = cosθ**	**arccosθ Radians**	**arccosθ Degrees**	**Space-Time Compression Factor = 1/cosθ = secθ**
0	0.00	2.99750E+08	1.00000	0.000000	0.00000	1.00000
1	9.81	2.99750E+08	1.00000	0.000256	0.01466	1.00000
2	19.62	2.99750E+08	1.00000	0.000362	0.02073	1.00000
3	29.43	2.99750E+08	1.00000	0.000443	0.02539	1.00000
4	39.24	2.99750E+08	1.00000	0.000512	0.02932	1.00000
5	49.05	2.99750E+08	1.00000	0.000572	0.03278	1.00000
6	58.86	2.99750E+08	1.00000	0.000627	0.03591	1.00000
7	68.67	2.99750E+08	1.00000	0.000677	0.03878	1.00000
8	78.48	2.99750E+08	1.00000	0.000724	0.04146	1.00000
9	88.29	2.99750E+08	1.00000	0.000768	0.04398	1.00000
10	98.10	2.99750E+08	1.00000	0.000809	0.04635	1.00000
20	196.20	2.99750E+08	1.00000	0.001144	0.06556	1.00000
50	490.50	2.99750E+08	1.00000	0.001809	0.10365	1.00000
100	981	2.99751E+08	1.00000	0.002558	0.14659	1.00000
200	1962	2.99752E+08	0.99999	0.003618	0.20730	1.00001
500	4905	2.99755E+08	0.99998	0.005721	0.32777	1.00002
1000	9810	2.99760E+08	0.99997	0.008090	0.46354	1.00003
2000	19620	2.99770E+08	0.99993	0.011441	0.65553	1.00007
5000	49050	2.99799E+08	0.99984	0.018089	1.03645	1.00016
10000	98100	2.99848E+08	0.99967	0.025581	1.46566	1.00033
20000	196200	2.99946E+08	0.99935	0.036171	2.07247	1.00065
50000	490500	3.00241E+08	0.99837	0.057169	3.27553	1.00164
100000	981000	3.00731E+08	0.99674	0.080794	4.62915	1.00327
200000	1.96200E+06	3.01712E+08	0.99350	0.114105	6.53772	1.00655
500000	4.90500E+06	3.04655E+08	0.98390	0.179686	10.29526	1.01636
1.000E+06	9.81000E+06	3.09560E+08	0.96831	0.252424	14.46283	1.03273

Nuclear Gravitation Field Theory

Accelerated Reference Frame Space-Time Compression Due to Gravity Field						
Gravity Acceleration Units of Earth Gravity g	Gravity Acceleration Meters/Second^2	Final Speed of Light in Uncompressed Space-Time After 1 Second Meters/Second	Length Reduction Due to Space-Time Compression = cosθ	arccosθ Radians	arccosθ Degrees	Space-Time Compression Factor = 1/cosθ = secθ
2.000E+06	1.96200E+07	3.19370E+08	0.93857	0.352344	20.18780	1.06545
5.000E+06	4.90500E+07	3.48800E+08	0.85938	0.536750	30.75352	1.16364
1.000E+07	9.81000E+07	3.97850E+08	0.75342	0.717541	41.11209	1.32727
2.000E+07	1.96200E+08	4.95950E+08	0.60440	0.921789	52.81464	1.65455
3.056E+07	2.99750E+08	5.99500E+08	0.50000	1.047198	60.00000	2.00000
5.000E+07	4.90500E+08	7.90250E+08	0.37931	1.181746	67.70903	2.63636
1.000E+08	9.81000E+08	1.28075E+09	0.23404	1.334563	76.46481	4.27273
2.000E+08	1.96200E+09	2.26175E+09	0.13253	1.437875	82.38418	7.54545
5.000E+08	4.90500E+09	5.20475E+09	0.05759	1.513173	86.69842	17.36364
1.000E+09	9.81000E+09	1.01098E+10	0.02965	1.541142	88.30095	33.72727
2.000E+09	1.96200E+10	1.99198E+10	0.01505	1.555748	89.13779	66.45455
5.000E+09	4.90500E+10	4.93498E+10	0.00607	1.564722	89.65198	164.63636
1.000E+10	9.81000E+10	9.83998E+10	0.00305	1.567750	89.82546	328.27273
2.000E+10	1.96200E+11	1.96500E+11	0.00153	1.569271	89.91260	655.54545
5.000E+10	4.90500E+11	4.90800E+11	0.00061	1.570186	89.96501	1637.36364
1.000E+11	9.81000E+11	9.81300E+11	0.00031	1.570491	89.98250	3273.72727
2.000E+11	1.96200E+12	1.96230E+12	0.00015	1.570644	89.99125	6546.45455
5.000E+11	4.90500E+12	4.90530E+12	0.00006	1.570735	89.99650	16364.63636
1.000E+12	9.81000E+12	9.81030E+12	0.00003	1.570766	89.99825	32728.27273
2.000E+12	1.96200E+13	1.96203E+13	0.00002	1.570781	89.99912	65455.54545
5.000E+12	4.90500E+13	4.90503E+13	0.00001	1.570790	89.99965	1.63637E+05
1.000E+13	9.81000E+13	9.81003E+13	0.00000	1.570793	89.99982	3.27274E+05
2.000E+13	1.96200E+14	1.96200E+14	0.00000	1.570795	89.99991	6.54546E+05
5.000E+13	4.90500E+14	4.90500E+14	0.00000	1.570796	89.99996	1.63636E+06
1.000E+14	9.81000E+14	9.81000E+14	0.00000	1.570796	89.99998	3.27273E+06
2.000E+14	1.96200E+15	1.96200E+15	0.00000	1.570796	89.99999	6.54546E+06

Accelerated Reference Frame Space-Time Compression Due to Gravity Field						
Gravity Acceleration Units of Earth Gravity g	**Gravity Acceleration Meters/Second^2**	**Final Speed of Light in Uncompressed Space-Time After 1 Second Meters/Second**	**Length Reduction Due to Space-Time Compression = cosθ**	**arccosθ Radians**	**arccosθ Degrees**	**Space-Time Compression Factor = 1/cosθ = secθ**
5.000E+14	4.90500E+15	4.90500E+15	0.00000	1.570796	90.00000	1.63636E+07
1.000E+15	9.81000E+15	9.81000E+15	0.00000	1.570796	90.00000	3.27273E+07
2.000E+15	1.96200E+16	1.96200E+16	0.00000	1.570796	90.00000	6.54545E+07
5.000E+15	4.90500E+16	4.90500E+16	0.00000	1.570796	90.00000	1.63636E+08
1.000E+16	9.81000E+16	9.81000E+16	0.00000	1.570796	90.00000	3.27273E+08
2.000E+16	1.96200E+17	1.96200E+17	0.00000	1.570796	90.00000	6.54545E+08
5.000E+16	4.90500E+17	4.90500E+17	0.00000	1.570796	90.00000	1.63636E+09
1.000E+17	9.81000E+17	9.81000E+17	0.00000	1.570796	90.00000	3.27273E+09
2.000E+17	1.96200E+18	1.96200E+18	0.00000	1.570796	90.00000	6.54545E+09
5.000E+17	4.90500E+18	4.90500E+18	0.00000	1.570796	90.00000	1.63636E+10
1.000E+18	9.81000E+18	9.81000E+18	0.00000	1.570796	90.00000	3.27273E+10
2.000E+18	1.96200E+19	1.96200E+19	0.00000	1.570796	90.00000	6.54545E+10
5.000E+18	4.90500E+19	4.90500E+19	0.00000	1.570796	90.00000	1.63636E+11
1.000E+19	9.81000E+19	9.81000E+19	0.00000	1.570796	90.00000	3.27273E+11
2.000E+19	1.96200E+20	1.96200E+20	0.00000	1.570796	90.00000	6.54545E+11
5.000E+19	4.90500E+20	4.90500E+20	0.00000	1.570796	90.00000	1.63636E+12
1.000E+20	9.81000E+20	9.81000E+20	0.00000	1.570796	90.00000	3.27273E+12
2.000E+20	1.96200E+21	1.96200E+21	0.00000	1.570796	90.00000	6.54545E+12
5.000E+20	4.90500E+21	4.90500E+21	0.00000	1.570796	90.00000	1.63636E+13
1.000E+21	9.81000E+21	9.81000E+21	0.00000	1.570796	90.00000	3.27273E+13
2.000E+21	1.96200E+22	1.96200E+22	0.00000	1.570796	90.00000	6.54545E+13
5.000E+21	4.90500E+22	4.90500E+22	0.00000	1.570796	90.00000	1.63636E+14
1.000E+22	9.81000E+22	9.81000E+22	0.00000	1.570796	90.00000	3.27273E+14
2.000E+22	1.96200E+23	1.96200E+23	0.00000	1.570796	90.00000	6.54545E+14
5.000E+22	4.90500E+23	4.90500E+23	0.00000	1.570796	90.00000	1.63636E+15
1.000E+23	9.81000E+23	9.81000E+23	0.00000	1.570796	90.00000	3.27273E+15

Nuclear Gravitation Field Theory

Accelerated Reference Frame Space-Time Compression Due to Gravity Field						
Gravity Acceleration Units of Earth Gravity g	**Gravity Acceleration Meters/Second^2**	**Final Speed of Light in Uncompressed Space-Time After 1 Second Meters/Second**	**Length Reduction Due to Space-Time Compression = cosθ**	**arccosθ Radians**	**arccosθ Degrees**	**Space-Time Compression Factor = 1/cosθ = secθ**
2.000E+23	1.96200E+24	1.96200E+24	0.00000	1.570796	90.00000	6.54545E+15
5.000E+23	4.90500E+24	4.90500E+24	0.00000	1.570796	90.00000	1.63636E+16
1.000E+24	9.81000E+24	9.81000E+24	0.00000	1.570796	90.00000	3.27273E+16
2.000E+24	1.96200E+25	1.96200E+25	0.00000	1.570796	90.00000	6.54545E+16
5.000E+24	4.90500E+25	4.90500E+25	0.00000	1.570796	90.00000	1.63636E+17
1.000E+25	9.81000E+25	9.81000E+25	0.00000	1.570796	90.00000	3.27273E+17
2.000E+25	1.96200E+26	1.96200E+26	0.00000	1.570796	90.00000	6.54545E+17
5.000E+25	4.90500E+26	4.90500E+26	0.00000	1.570796	90.00000	1.63636E+18
1.000E+26	9.81000E+26	9.81000E+26	0.00000	1.570796	90.00000	3.27273E+18
2.000E+26	1.96200E+27	1.96200E+27	0.00000	1.570796	90.00000	6.54545E+18
5.000E+26	4.90500E+27	4.90500E+27	0.00000	1.570796	90.00000	1.63636E+19
1.000E+27	9.81000E+27	9.81000E+27	0.00000	1.570796	90.00000	3.27273E+19
2.000E+27	1.96200E+28	1.96200E+28	0.00000	1.570796	90.00000	6.54545E+19
2.441E+27	2.39462E+28	2.39462E+28	0.00000	1.570796	90.00000	7.98873E+19
5.000E+27	4.90500E+28	4.90500E+28	0.00000	1.570796	90.00000	1.63636E+20
1.000E+28	9.81000E+28	9.81000E+28	0.00000	1.570796	90.00000	3.27273E+20
2.000E+28	1.96200E+29	1.96200E+29	0.00000	1.570796	90.00000	6.54545E+20
5.000E+28	4.90500E+29	4.90500E+29	0.00000	1.570796	90.00000	1.63636E+21
1.000E+29	9.81000E+29	9.81000E+29	0.00000	1.570796	90.00000	3.27273E+21
2.000E+29	1.96200E+30	1.96200E+30	0.00000	1.570796	90.00000	6.54545E+21
5.000E+29	4.90500E+30	4.90500E+30	0.00000	1.570796	90.00000	1.63636E+22
1.000E+30	9.81000E+30	9.81000E+30	0.00000	1.570796	90.00000	3.27273E+22

Nuclear Gravitation Field Theory

In accordance with the article "The Speed of Gravity – What the Experiments Say" by the late Associate Professor Tom Van Flandern, gravity propagates at least 20 billion times faster than light and may propagate instantaneously. No term in the force equation for Newton's Law of Gravity provides a speed of gravity field propagation. Gravity has a value of intensity at a given distance from the mass of interest. The only time dependent function in Newton's Law of Gravity is the gravity acceleration field acting upon a mass of interest at a given position in space, therefore, it is assumed that gravity propagates instantaneously. Final Uncompressed Space-Time velocity of light after one second can be calculated in a specific gravitational field if the units used are consistent for velocity and acceleration – in this case meters/second and meters/second^2.

From Table "Accelerated Reference Frame Space-Time Compression Due to Gravity Field," the Space-Time Compressed distance that light travels, at five significant digits, is zero distance for any gravity field acceleration field greater than 1.00×10^{13}g. The minimum gravitational acceleration field required to overcome like charge Coulombic Repulsion of two Protons in contact is 2.441×10^{27}g results in Space-Time Compression to zero distance because the Space-Time Compression Factor equals 7.99873×10^{19} as indicated by the second entry highlighted in red in Table "Accelerated Reference Frame Space-Time Compression Due to Gravity Field." The characteristic "vanishing" of the Strong Nuclear Force at the surface of the Nucleus can only occur if the Strong Nuclear Force accelerates light, therefore, the Strong Nuclear Force must be Gravity.

The Nuclear Gravitation Field next to the Proton is much greater than the classical physics calculated gravitational field near a Neutron Star or Black Hole. The Nuclear Gravitation Field intensity drops about 19 decades just outside the Nucleus before the gravitational field can be "seen" or "measured" propagating outward from the Nucleus because we observe the Nuclear Gravitation Field in a Compressed Space-Time reference frame. The Space-Time Compression occurring next to the nucleus is so significant that if we could view the atom in Uncompressed Space Time, the Electron Cloud exit would be on the order of a half meter away from the Nucleus.

Let's assume that the Strong Nuclear Force from a single Proton provides the minimum gravitational acceleration to overcome the like charge Coulombic repulsion of a second Proton. The gravitational acceleration field of the Proton at its surface is 2.395 x 10^{28} meters/second^2. The diameter of the Proton is 2.40 x 10^{-15} meter, therefore, the radius of the Proton is 1.20 x 10^{-15} meter. The Proton Strong Nuclear Force Field – the Nuclear Gravitation Field intensity – at a distance of 1.20 x 10^{-15} meter from the center of the Proton is 2.395 x 10^{28} meters/second^2. Using Newton's Law of Gravity, calculate the distance the Proton gravitational field must propagate outward in Uncompressed Space-Time before the intensity of the gravitational field has dropped sufficiently to result in a measurable outward propagation of the Proton gravitational field from the Proton in Compressed Space-Time. Newton's Law of Gravity is as follows:

$$F = \frac{G \times M_1 \times M_2}{r^2} \qquad g_{M_1} = \frac{G \times M_1}{r^2} \qquad g_{m_p} = \frac{G \times m_p}{r^2}$$

The Proton's gravitational field propagates outward with spherical symmetry, therefore, the Proton gravitational field intensity will drop off proportional to $1/r^2$ where the initial gravitational field intensity at a distance 1.20 x10^{-15} meter is 2.395 x 10^{28} meters/second^2. Determine the Proton gravitational field at various distances from the Proton surface in Uncompressed Space-Time using the Newton's Law of Gravity $1/r^2$ proportionality. Starting at the Proton surface with a gravitational field of 2.395 x 10^{28} meters/second^2, calculate the Gravitational Field and the Speed of Light in Uncompressed Space-Time at various Uncompressed Space-Time distances from the Proton surface to determine the Space-Time Compression Factors and the equivalent Compressed Space-Time distances from the Proton surface. Table "Proton Gravity Field Propagation in Uncompressed Space-Time and Compressed Space-Time," below, provides the calculation results.

Nuclear Gravitation Field Theory

Proton Gravity Field Propagation in Uncompressed Space-Time and Compressed Space-Time						
Uncompressed Space-Time Distance from Center of Proton Meters	**Proton Gravitational Field Meters/Second^2**	**Proton Gravitational Field – Units of Earth Gravity g**	**Proton Gravitational Field Uncompressed Space-Time Speed of Light Meters/Second**	**Space-Time Compression Factor**	**Compressed Space-Time Distance from Center of Proton Meters**	**Quantized Gravitational Field in Compressed Space-Time Meters/Second^2**
1.200E-15	2.395E+28	2.441E+27	2.395E+28	7.989E+19	1.200E-15	2.395E+28
2.000E-15	8.621E+27	8.788E+26	8.621E+27	2.876E+19	1.200E-15	8.621E+27
5.000E-15	1.379E+27	1.406E+26	1.379E+27	4.602E+18	1.200E-15	1.379E+27
1.000E-14	3.448E+26	3.515E+25	3.448E+26	1.150E+18	1.200E-15	3.448E+26
2.000E-14	8.621E+25	8.788E+24	8.621E+25	2.876E+17	1.200E-15	8.621E+25
5.000E-14	1.379E+25	1.406E+24	1.379E+25	4.602E+16	1.200E-15	1.379E+25
1.000E-13	3.448E+24	3.515E+23	3.448E+24	1.150E+16	1.200E-15	3.448E+24
2.000E-13	8.621E+23	8.788E+22	8.621E+23	2.876E+15	1.200E-15	8.621E+23
5.000E-13	1.379E+23	1.406E+22	1.379E+23	4.602E+14	1.200E-15	1.379E+23
1.000E-12	3.448E+22	3.515E+21	3.448E+22	1.150E+14	1.200E-15	3.448E+22
2.000E-12	8.621E+21	8.788E+20	8.621E+21	2.876E+13	1.200E-15	8.621E+21
5.000E-12	1.379E+21	1.406E+20	1.379E+21	4.602E+12	1.200E-15	1.379E+21
1.000E-11	3.448E+20	3.515E+19	3.448E+20	1.150E+12	1.200E-15	3.448E+20
2.000E-11	8.621E+19	8.788E+18	8.621E+19	2.876E+11	1.200E-15	8.621E+19
5.000E-11	1.379E+19	1.406E+18	1.379E+19	4.602E+10	1.200E-15	1.379E+19
1.000E-10	3.448E+18	3.515E+17	3.448E+18	1.150E+10	1.200E-15	3.448E+18
2.000E-10	8.621E+17	8.788E+16	8.621E+17	2.876E+09	1.200E-15	8.621E+17
5.000E-10	1.379E+17	1.406E+16	1.379E+17	4.602E+08	1.200E-15	1.379E+17

Nuclear Gravitation Field Theory

Proton Gravity Field Propagation in Uncompressed Space-Time and Compressed Space-Time						
Uncompressed Space-Time Distance from Center of Proton Meters	**Proton Gravitational Field Meters/Second^2**	**Proton Gravitational Field – Units of Earth Gravity g**	**Proton Gravitational Field Uncompressed Space-Time Speed of Light Meters/Second**	**Space-Time Compression Factor**	**Compressed Space-Time Distance from Center of Proton Meters**	**Quantized Gravitational Field in Compressed Space-Time Meters/Second^2**
1.000E-09	3.448E+16	3.515E+15	3.448E+16	1.150E+08	1.200E-15	3.448E+16
2.000E-09	8.621E+15	8.788E+14	8.621E+15	2.876E+07	1.200E-15	8.621E+15
5.000E-09	1.379E+15	1.406E+14	1.379E+15	4.602E+06	1.200E-15	1.379E+15
1.000E-08	3.448E+14	3.515E+13	3.448E+14	1.150E+06	1.200E-15	3.448E+14
2.000E-08	8.621E+13	8.788E+12	8.621E+13	2.876E+05	1.200E-15	8.621E+13
5.000E-08	1.379E+13	1.406E+12	1.379E+13	4.602E+04	1.200E-15	1.379E+13
1.000E-07	3.448E+12	3.515E+11	3.449E+12	1.150E+04	1.200E-15	3.448E+12
2.000E-07	8.621E+11	8.788E+10	8.624E+11	2.877E+03	1.201E-15	8.621E+11
5.000E-07	1.379E+11	1.406E+10	1.382E+11	4.612E+02	1.203E-15	1.379E+11
1.000E-06	3.448E+10	3.515E+09	3.478E+10	1.160E+02	1.214E-15	3.448E+10
2.000E-06	8.621E+09	8.788E+08	8.920E+09	2.976E+01	1.254E-15	8.621E+09
5.000E-06	1.379E+09	1.406E+08	1.679E+09	5.602E+00	1.478E-15	1.379E+09
1.000E-05	3.448E+08	3.515E+07	6.446E+08	2.150E+00	2.166E-15	3.448E+08
1.073E-05	2.998E+08	3.056E+07	5.995E+08	2.000E+00	3.248E-15	2.998E+08
2.000E-05	8.621E+07	8.788E+06	3.860E+08	1.288E+00	3.848E-15	8.621E+07
5.000E-05	1.379E+07	1.406E+06	3.135E+08	1.046E+00	7.526E-15	1.379E+07
1.000E-04	3.448E+06	3.515E+05	3.032E+08	1.012E+00	1.497E-14	3.448E+06
2.000E-04	8.621E+05	8.788E+04	3.006E+08	1.003E+00	2.989E-14	8.621E+05

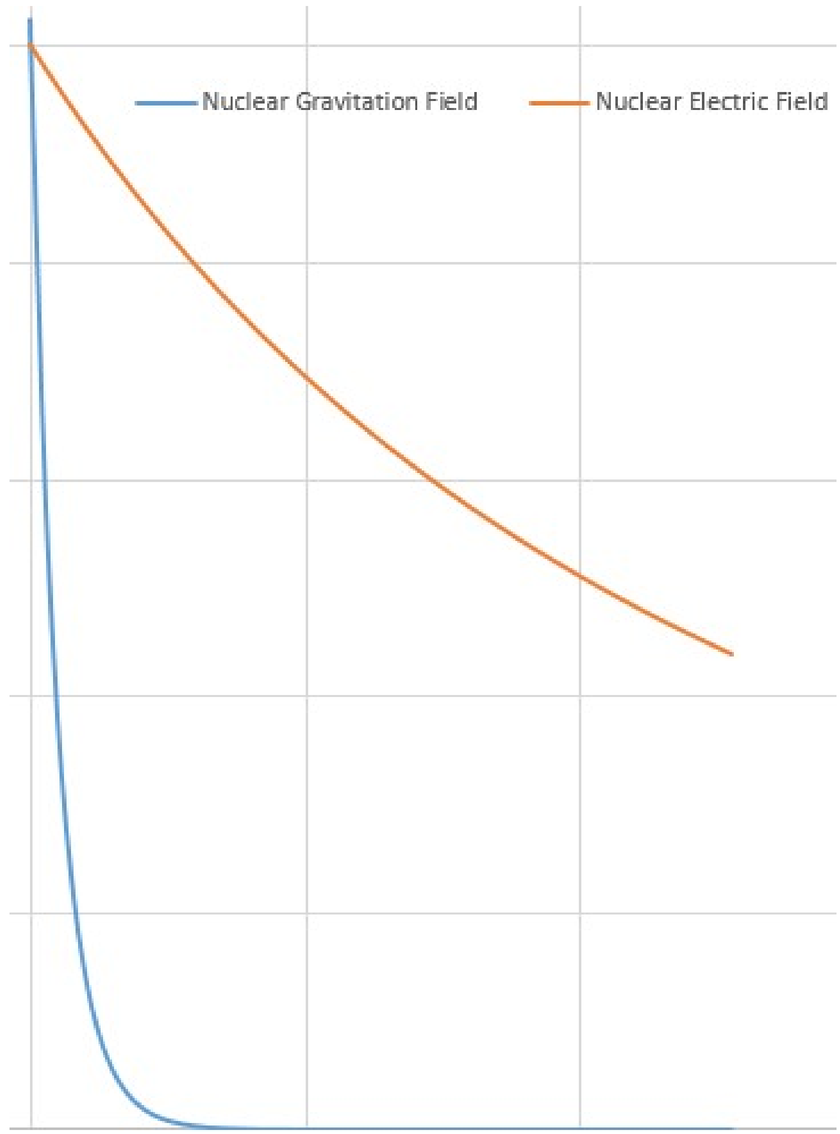
Proton Gravity Field Propagation in Uncompressed Space-Time and Compressed Space-Time						
Uncompressed Space-Time Distance from Center of Proton Meters	Proton Gravitational Field Meters/Second^2	Proton Gravitational Field – Units of Earth Gravity g	Proton Gravitational Field Uncompressed Space-Time Speed of Light Meters/Second	Space-Time Compression Factor	Compressed Space-Time Distance from Center of Proton Meters	Quantized Gravitational Field in Compressed Space-Time Meters/Second^2
5.000E-04	1.379E+05	1.406E+04	2.999E+08	1.000E+00	5.977E-14	1.379E+05
1.000E-03	3.448E+04	3.515E+03	2.998E+08	1.000E+00	1.195E-13	3.448E+04
2.000E-03	8.621E+03	8.788E+02	2.998E+08	1.000E+00	2.390E-13	8.621E+03
5.000E-03	1.379E+03	1.406E+02	2.998E+08	1.000E+00	4.781E-13	1.379E+03
1.000E-02	3.448E+02	3.515E+01	2.998E+08	1.000E+00	9.562E-13	3.448E+02
2.000E-02	8.621E+01	8.788E+00	2.998E+08	1.000E+00	1.912E-12	8.621E+01
5.000E-02	1.379E+01	1.406E+00	2.998E+08	1.000E+00	3.825E-12	1.379E+01
5.929E-02	9.810E+00	1.000E+00	2.998E+08	1.000E+00	7.649E-12	9.810E+00
1.000E-01	3.448E+00	3.515E-01	2.998E+08	1.000E+00	1.530E-11	3.448E+00
2.000E-01	8.621E-01	8.788E-02	2.998E+08	1.000E+00	3.060E-11	8.621E-01
5.000E-01	1.379E-01	1.406E-02	2.998E+08	1.000E+00	6.120E-11	1.379E-01
1.000E+00	3.448E-02	3.515E-03	2.998E+08	1.000E+00	1.224E-10	3.448E-02
2.000E+00	8.621E-03	8.788E-04	2.998E+08	1.000E+00	2.448E-10	8.621E-03
5.000E+00	1.379E-03	1.406E-04	2.998E+08	1.000E+00	4.896E-10	1.379E-03

As indicated in Table "Proton Gravity Field Propagation in Uncompressed Space-Time and Compressed Space-Time," above, the Proton gravitational field just begins to propagate outward from the Proton surface as observed in Compressed Space-Time at three significant digits at a gravitational acceleration field of 8.621×10^{11} meters/second^2. The Proton gravitational field in Compressed Space-Time must drop in intensity by over 19 decades, from 2.395×10^{28} meters/second^2 to 1.379×10^{9} meters/second^2 before the Compressed Space-Time calculated quantized gravitational field has propagated outward from the Proton surface by at least 20% of the radius of the Proton or 1.478×10^{-15} meter as highlighted in the first red entry of Table "Proton Gravity Field Propagation in Uncompressed Space-Time and Compressed Space-Time."

As we see the Hydrogen Atom in our Compressed Space-Time reference frame, the diameter of the Hydrogen Atom is on the order of 1.00×10^{-10} meter, therefore, the radius of the Hydrogen atom is on the order of 5.00×10^{-11} meter. The Uncompressed Space-Time distance from the Proton is 0.5 meter and the quantized Nuclear Gravitation Field intensity is 1.379×10^{-1} meters/sec^2 equal to 1.406×10^{-2}g, at a Compressed Space-Time distance of 6.12×10^{-11} meter, a relatively feeble gravitational field, as highlighted in the second red entry of Table "Proton Gravity Field Propagation in Uncompressed Space-Time and Compressed Space-Time," above. However, this Nuclear Gravitation Field appears to be much too large to be the gravity we observe outside the Electron Cloud of the Hydrogen Atom. The intensity of Quantized Nuclear Gravitation Field is associated with specific, discrete, energy levels, therefore, has a value decades larger than the average gravity measured outside the Electron Cloud and requires evaluation.

The Nuclear Gravitation Field must be stronger than the Nuclear Electric Field at the Nuclear Surface in order to hold the nucleons in the Nucleus together. The average Nuclear Gravitation Field intensity propagating through the outer Electron Cloud is less than 1.0 x 10^{-12} the intensity of the Nuclear Electric Field propagating through the outer Electron Cloud. The General Relativistic effect of Space-Time Compression is the reason for the vertical drop in Nuclear Gravitation Field intensity just outside the nucleus.

Nuclear Gravitation Field and Nuclear Electric Field Outside Nucleus



Quantized Light and Photo-Electric Effect Analogous to Quantized Gravity – Liberating Outer Electron from Sodium Atom:

The average gravity outside the Electron Cloud relative to Quantized Gravitational Field intensity is analogous to the Classical Physics and Quantum Mechanical evaluation of light and how the Photo-Electric Effect occurs. In order to compare Classical Physics to Quantum Mechanics, the energy of light shining on a surface must be assumed to be a continuous distribution. In other words, light energy is assumed neither to be discrete nor quantized. Based upon that assumption, the amount of energy available to be absorbed by an electron can be determined. That calculated value will then be compared to the results of Millikan's "Photoelectric Effect" experiments. For this calculation, a 100 watt (Joules/second) orange light source with a wavelength of 6000 Angstroms is directed onto a square plate of Sodium 0.1 meter by 0.1 meter. The surface area of the square Sodium plate is 0.01 meter^2. It is assumed that all the light emitting from the orange light source is directed onto the Sodium plate. The atomic radius of the neutral Sodium atom is 2.23 Angstroms which is equal to 2.23×10^{-10} meter.

The diameter of the Sodium atom is twice the radius or 4.46 Angstroms equal to 4.46×10^{-10} meter. It now must be determined how many Sodium atoms can fill the square surface of the Sodium plate assuming only the top layer of Sodium atoms (one Sodium atom deep). Although the Sodium atoms are spheres, this calculation will assume that they are square. The side of the "square Sodium atom" has the same length as the diameter of the spherical atom. A spherical atom of Sodium will fit into each of the theoretical "square Sodium atoms" that make up the top layer of Sodium atoms on the square plate. Therefore, each Sodium atom will take up the following surface area on the plate:

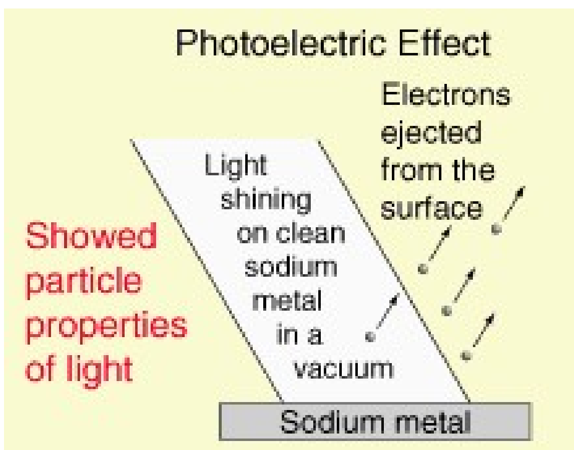
$$\text{Area of Sodium Atom} = (4.46\times10^{-10}\text{ meter})\times(4.46\times10^{-10}\text{ meter}) = 1.989\times10^{-19}\text{ meter}^2$$

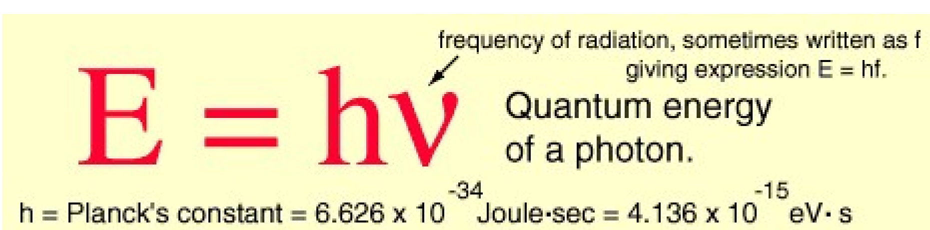
Number of Sodium Atoms on Surface of Plate =
Area of Plate divided by Area of Sodium Atom

Number of Sodium Atoms on Surface of Plate = 5.027×10^{16} Sodium Atoms

In one second, the Sodium plate surface absorbs 100 Joules of energy (1 Joule/second = 1 watt). 1 electron volt (eV) is equal to 1.6022×10^{-19} Joules. The next step is to calculate the amount of energy imparted to one Sodium atom in eV assuming a continuous even distribution of light energy across the Sodium plate. The intent here is to perform a comparison of the values of the classical electron absorption energy to the Quantum Mechanical electron absorbed energy as provided in Figures “Photo-Electric Effect on Sodium Plate” and “Sodium Plate Photo-Electric Effect Results.”

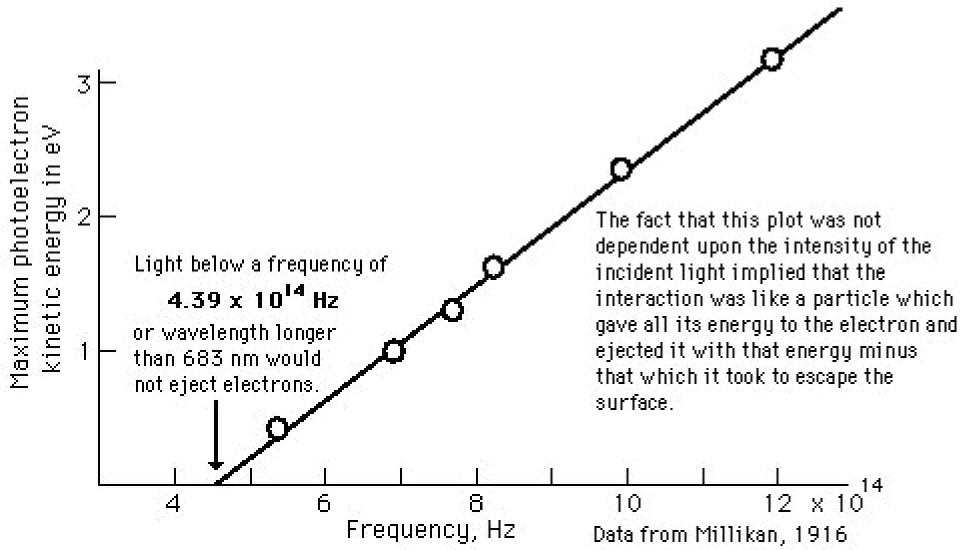
Photo-Electric Effect on Sodium Plate

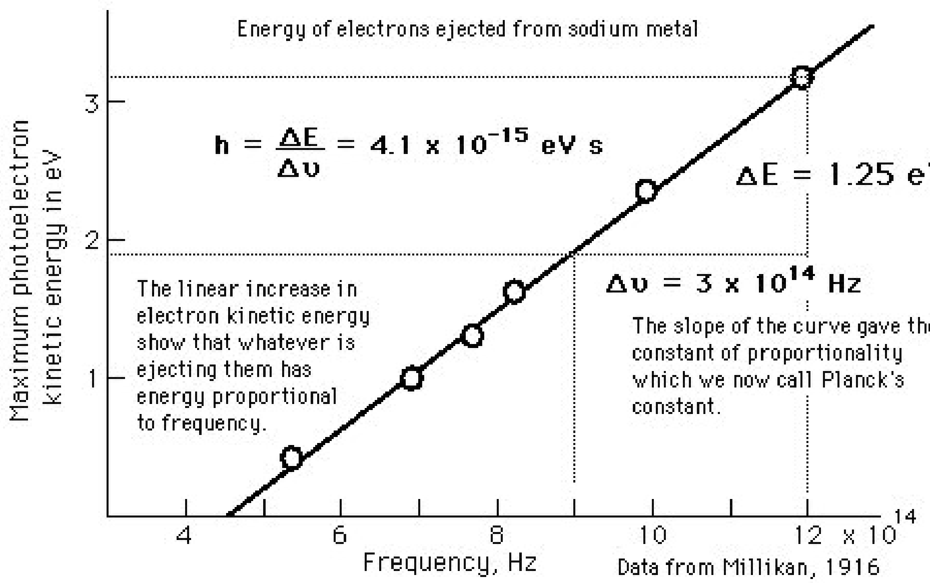




Nuclear Gravitation Field Theory

Sodium Plate Photo-Electric Effect Results





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Reference: http://chemlab.pc.maricopa.edu/periodic/periodic.html

Energy Imparted to 1 Sodium Atom (E_{Na}) =

Total Energy Imparted to Plate divided by Number of Sodium Atoms

Number of Sodium Atoms on Surface of Plate = (0.01 meter^2)/(1.989×10^{-19} meter^2)

= 5.027 x 10^{16} Na-atoms

$$E_{Na} = \frac{(100\,Joules)}{(1.6022\times10^{-19}\,Joule-eV^{-1})\times(5.027\times10^{16}\,Na-atoms)} = 1.242\times10^{4}\,eV$$

Each Sodium atom is receiving 1.242×10^4 eV of energy each second. The light is only illuminating one side of the Sodium atom because it is coming from one direction, therefore, as the spherical Sodium atom is considered, half the surface area of the Sodium atom is illuminated by the light. The total surface area of a spherical Sodium Atom is calculated as follows:

$$A_{surface-Na-atom} = 4\pi R^2 = 4\pi(2.23\times10^{-10}\,meter)^2 = 6.249\times10^{-19}\,meter^2$$

The illuminated portion of the sphere of the Sodium atom is equal to half the value calculated, above, or 3.124×10^{-19} meter^2. In actuality, from a classical point of view, the size of the Sodium Atom is not important or required to determine how much light energy the electron will receive from the light source based on classical physics. The size and exposed surface area of the electron is all that is required to complete this calculation. In this calculation it is assumed that the density of an electron is approximately the same as the density of a proton or neutron. The mass of a proton, neutron, or electron is proportional to the cube of its radius or its diameter. The surface area of either the proton, the neutron, or the electron is proportional to the cube root of its volume squared. The relative size of the electron, then, should be proportional to the size of a proton or neutron by the ratio of its mass to the mass of a proton or neutron to the 2/3 power. The diameter of a proton or neutron is about 1.0×10^{-15} meter. The radius of a proton or neutron is equal to half its diameter or about 0.5×10^{-15} meter. The surface area of either a proton or neutron is calculated below:

$$A_{surface-nucleon}=4\pi R^2=4\pi(0.5\times10^{-15}meter)^2=3.142\times10^{-30}meter^2$$

Since the light is shining from one direction, the light only illuminates half of the surface area of either a proton or neutron. Therefore, the illuminated surface area of the proton or neutron is equal to 1.571×10^{-30} meter^2.

The electron mass is only 1/1840 that of the proton or neutron. Therefore, the surface area of an electron will be equal to the surface area of a proton or neutron multiplied by the cube root of 1/1840 squared. The surface area of an electron can be calculated based upon the surface area of a proton or neutron (nucleon) as follows:

$$A_{surface-electron} = A_{surface-nucleon} \times \left(\sqrt[3]{\frac{M_{electron}}{M_{nucleon}}}\right)^2 = \left(3.142\times10^{-30}\,meter^2\right)\times\left(\sqrt[3]{\frac{1}{1840}}\right)^2$$

$$A_{surface-electron} = 2.092\times10^{-32}\ \text{meter}^2$$

Since the light is shining from one direction, the light only illuminates half of the surface area of the electron. Therefore, the illuminated surface area of the electron is equal to 1.046×10^{-32} meter^2.

The calculated amount of energy by the classical physics illumination from the light source received by the Sodium's electron is as follows:

$$E_{electron} = \frac{E_{Na-atom} \times A_{illum-surface-electron}}{A_{illum-surface-Na-atom}} = \frac{(9.025\times10^{3}eV)\times(1.046\times10^{-32}meter^{2})}{2.268\times10^{-19}meter^{2}} = 4.163\times10^{-10}eV$$

The Classical Physics analysis predicts the electron only receives 4.163×10^{-10} eV of light energy per second. The amount of energy required to liberate an electron from the Sodium atom is on the order of 0.5 eV. The Classical Physics analysis result indicates that it is impossible for the photoelectric effect to ever take place. Quantum Mechanics predicts that the electron can absorb energies on the order of 0.5 eV or greater and can be liberated from the Sodium atom because the incoming light energy propagates in discrete packets or quanta of energy rather than as a continuous distribution of energy. The vast difference in magnitude of the energy that the electron would absorb based upon Classical Physics to the amount of the energy the electron will absorb by Quantum Mechanics is extremely important. It is quite reasonable to assume that this significant relative difference in magnitude of field intensity can also apply to the intensity of the Nuclear Gravitation Field. The Nuclear Gravitation Field would be much more intense if it was a discrete function rather than a continuous function. Figure "Sodium Plate Photo-Electric Effect Results," above, states the electron Kinetic Energy is about 0.5 eV when it absorbs light at a wavelength of 6000 Angstroms. The electron must absorb a minimum amount of "Ionization Energy" to remove it from the Sodium atom before it obtains any Kinetic Energy. To be conservative, this calculation assumes the Ionization Energy of the electron in the 3s orbital of the Sodium atom to be equal to zero. The ratio of the quantized energy absorbed by the electron versus the classical calculated energy absorbed by the electron is as follows:

$$Electron-Energy-Ratio = \frac{Quantum-Mechanical-Absorbed-Energy}{Classical-Physics-Absorbed-Energy} = \frac{0.5eV}{4.163\times10^{-10}eV} = 1.201\times10^{9}$$

Let's determine the classical physics gravitational field of the Proton at the surface of the Proton.

$$a_{M_{^1_1H}} = g_{M_{^1_1H}} = \frac{G \times M_{^1_1H}}{r^2} = \frac{\left[\left(6.67 \times 10^{-11}\,\frac{meter^3}{kg\ sec^2}\right) \times (1.673 \times 10^{-27} kg)\right]}{(1.20 \times 10^{-15}\ meter)^2}$$

$$g_{M_{^1_1H}} = 7.749 \times 10^{-8}\,\frac{meters}{second^2} = 7.899 \times 10^{-9} g$$

Let's determine the classical gravity field for the Proton outside the Hydrogen Atom Electron Cloud assuming the Electron Cloud radius is equal to 5.00 x 10^{-11} meter.

$$g_{M_{^1_1H}} = \frac{G \times M_{^1_1H}}{r^2} = \frac{\left[\left(6.67 \times 10^{-11}\,\frac{meter^3}{kg\ sec^2}\right) \times (1.673 \times 10^{-27} kg)\right]}{(5.0 \times 10^{-11}\ meter)^2}$$

$$g_{M_{^1_1H}} = 4.464 \times 10^{-17}\,\frac{meters}{second^2} = 4.550 \times 10^{-18} g$$

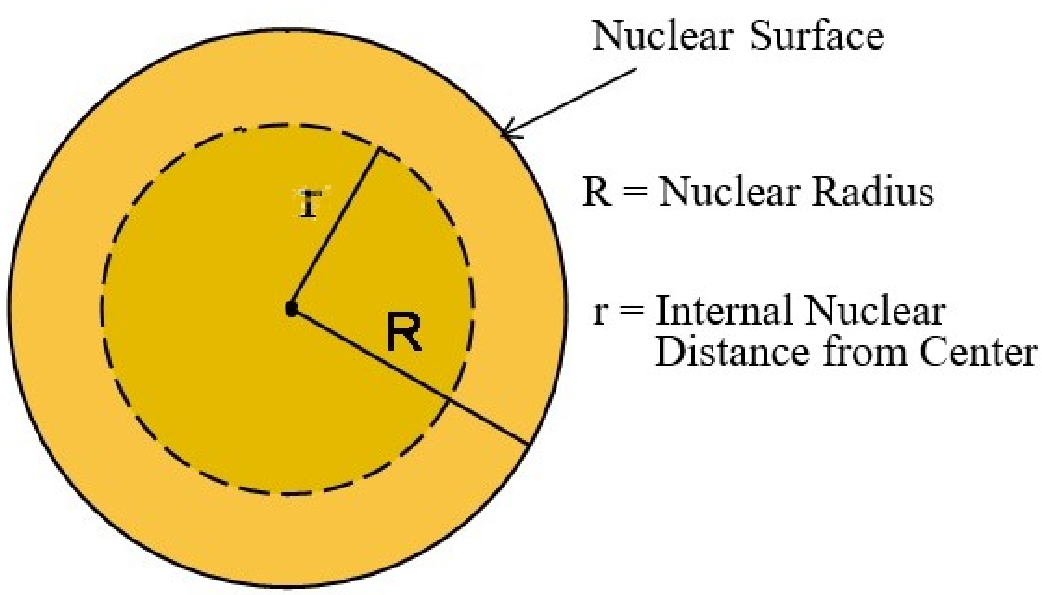
The ratio of the amount of energy absorbed by the electron via Quantized Light, assuming the principles of Quantum Mechanics, versus the amount of energy which would have been absorbed by the electron, assuming Classical Physics, is on the order of 1.201×10^9 times greater or over a billion times greater. It is expected that Quantized Gravity associated with the nuclear spectral line energy levels would behave in a similar manner to Quantized Light associated with spectral lines electron energy levels. However, the ratio of Quantized Gravity to average gravity would be expected to be on the order of 1,000,000 times larger than the ratio for Quantized Light energy to average light energy. The energy levels in the Nucleus are on the order of MeV (millions of electron volts) and the energy levels of the electrons in energy levels around the Nucleus are on the order of eV (electron volts). Since the nuclear energy levels are shorter in wavelength by a factor of 1,000,000, Quantized Gravity is expected to have an intensity on the order of 1.00×10^{15} to 1.00×10^{16} times greater than the average gravity measured outside the Electron Cloud of the Hydrogen Atom. The higher the energy associated with an energy level, the narrower the bandwidth, the lower the energy associated with an energy level, the broader the bandwidth. As previously calculated and provided in Table "Proton Gravity Field Propagation in Uncompressed Space-Time and Compressed Space-Time," above, the Quantized Nuclear Gravitation Field intensity of a Proton is 1.379×10^{-1} meters/sec^2 equal to 1.406×10^{-2}g, at a Compressed Space-Time distance of 6.12×10^{-11} meter. The classical physics Proton gravity field at the Electron Cloud exit was calculated to be 4.550×10^{-18}g. The ratio of Quantized Gravity to average gravity is calculated to be 3.090×10^{15} times larger than the ratio of Quantized Light energy to average light energy. This result falls within the expected range of 1.00×10^{15} to 1.00×10^{16} stated above. Therefore, the average gravity that would be measured outside the Hydrogen Atom Electron cloud would be consistent with the calculated Quantized Proton Nuclear Gravitation Field outside the Electron Cloud.

Strong Nuclear Force Properties Provide Case for Equivalence to Gravity

Several properties of the Strong Nuclear Force are observed specifically because the Strong Nuclear Force is Gravity. The virtual vanishing of the Strong Nuclear Force just outside the Nuclear Surface is the primary indicator the Strong Nuclear Force is Gravity because of the intense Space-Time Compression taking place. The addition of Neutrons to the Nucleus to boost the Strong Nuclear Force intensity to maintain its intensity above the Nuclear Electric Field intensity within the Nucleus and hold the Nucleus together is directly related to the General Relativistic effect of Gravity. If the Strong Nuclear Force had nothing to do with Gravity, no such accelerated field would be produced within the Nucleus affecting the propagation of Light, Electric Fields, or Magnetic Fields and Space-Time Compression would be non-existent. Without Space-Time Compression present within the Nucleus of the atom, would there be any need for Neutrons? The observed stability curve for Nuclei require about a 1 to 1 Neutron to Proton ratio for light Nuclei and require about a 3 to 2 Neutron to Proton ratio for heavy Nuclei. The Strong Nuclear Force (Gravity) propagates based upon Uncompressed Space-Time within and outside the Nucleus and the Nuclear Electric Field propagates based upon Compressed Space-Time within and outside the Nucleus.

The Strong Nuclear Force is the strongest field within the atom and is significantly stronger than the Nuclear Electric Field produced by the Protons in the Nucleus that would, otherwise, tend to tear the Nucleus apart because of the same electric charge (Coulombic) repulsion of each of the Protons. If the Strong Nuclear Force had nothing to do with Gravity, then the Strong Nuclear Force would continue to rise in intensity and remain more intense than the Nuclear Electric Field. There would be no need for Neutrons in the Nucleus because Protons connected to one another would always provide a sufficient Strong Nuclear Force to overcome Coulombic repulsion and hold the Nucleus together. There would be no limit to the size of a Nucleus or how large a number a stable Element could be. Under this The Strong Nuclear Force appears to saturate and be short ranged because the known Elements beyond Element 83, Bismuth-209, are radioactive. In order to boost the strength of the Strong Nuclear Force, Neutrons must be added to the Nucleus. For the lighter Nuclei, the ratio of Neutrons to Protons is 1 to 1. For the heavier Nuclei, the ratio of Neutrons to Protons is about 3 to 2. Refer to the Chart of the Nuclides, above. The Nuclear Gravitation Field loses its intensity because the Nuclear Gravitation Field propagates outward based upon Uncompressed Space-Time. The Nucleus exists in the same Compressed Space-Time Reference Frame that we, as observers, exist.

Nuclear Gravitation Field Within the Nucleus



Nuclear Gravitation Field Theory

Let's assume the Nucleus has a constant homogeneous mass density and constant homogeneous charge density for simplicity of calculations. Let's determine the Strong Nuclear Force acceleration profile without Space-Time Compression and with Space-Time Compression within the Nucleus. Let's determine the acceleration field for the Nuclear Electric Field within the Nucleus. R represents the radius of the Nucleus. r represents the variable radial position of a Proton being evaluated between the Nuclear Center and the outer radius, R, of the Nucleus, in order to determine the acceleration field profiles.

Determination of Nuclear Gravitational Field acceleration, g_{IN}, as a function of internal distance from the Center of the Nucleus, r.

Mass, M, is equal to constant mass density times Volume, ρ_{Mass} x V_{IN}, as a function of r, radial distance from Center of Nucleus.

$$M_{IN} = \rho_{Mass} \times V_{IN} = \rho_{Mass} \times \frac{4}{3} \times \pi \times r^3$$

$$g_{IN} = \frac{G \times M_{IN}}{r^2}$$

$$g_{IN} = \frac{G \times \rho_{Mass} \times \frac{4}{3} \times \pi \times r^3}{r^2}$$

$$g_{IN} = G \times \rho_{Mass} \times \frac{4}{3} \times \pi \times r$$

Therefore, the gravitational acceleration inside the Nucleus, g_{IN}, is proportional to r.

The mass contributing to g_{IN} is only the mass from Center of Nucleus to position r inside the Nucleus.

However, the g_{IN} calculated previously with linear rise relative to radial distance from the Center of Nucleus, r, is not correct because it assumes classical physics. The Gravity field internal to the Nucleus is extremely intense and the effects of General Relativity must be considered. g_{IN} must be evaluated with the effects of Space-Time Compression occurring. Gravity propagates based upon Uncompressed Space-Time. Light, Electric Fields, and Magnetic Fields propagate based upon Compressed Space-Time. We observe the Nucleus of the Atom in our Compressed Space-Time Reference Frame. g_{IN} must be reevaluated to see how it will behave in Compressed Space-Time.

The Mass of the Nucleus as a function of density and distance from the Center of the Nucleus is based upon the Compressed Space-Time radial distance, r_{CST}, as indicated by the equation below:

$$\boldsymbol{M_{IN} = \rho_{Mass} \times V_{IN} = \rho_{Mass} \times \frac{4}{3} \times \pi \times r_{CST}^3}$$

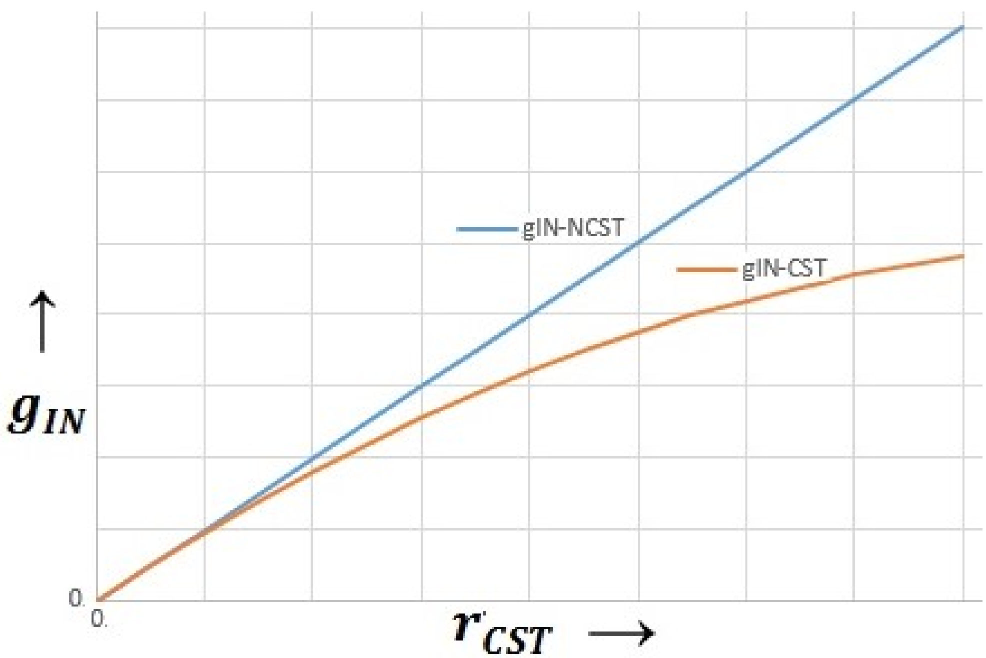
The Gravity Field inside the Nucleus, g_{IN}, must be calculated based upon Uncompressed Space-Time radial distance from the Center of the Nucleus, r_{UST} as indicated by the equation below:

$$\boldsymbol{g_{IN} = \frac{G \times M_{IN}}{r_{UST}^2}}$$

Substituting the calculation value for M_{IN}, the resulting equation for calculating g_{IN} is as follows:

$$g_{IN} = \frac{G \times \rho_{Mass} \times \frac{4}{3} \times \pi \times r_{CST}^3}{r_{UST}^2}$$

r_{UST} rises faster than r_{CST} and the rate of rise of r_{UST} goes up because the Gravity field intensity rises as a function of r_{UST} resulting in rising Compressed Space-Time. g_{IN} will no longer rise linearly, it will tend to level off as r_{UST} and r_{CST} rise. The figure, below, indicates the behavior of $g_{IN-NSTC}$, Nuclear Internal Gravity Field - No Space-Time Compression present, and g_{IN-CST}, Nuclear Internal Gravity Field – With Space-Time Compression present:



Determination of Nuclear Electric Field acceleration, a_{EF-IN}, as a function of internal distance from the Center of the Nucleus, r.

Nuclear Gravitation Field Theory

The charge distribution inside the Nucleus contributing to $a_{EF\text{-}IN}$ is only the charge distribution from Center of Nucleus to position r inside the Nucleus.

$$q_{IN} = \rho_{q_{IN}} \times V_{IN} = \rho_{q_{IN}} \times \frac{4}{3} \times \pi \times r^3$$

$$a_{EF-IN} = \frac{q_{Proton} \times q_{IN}}{4 \times \pi \times \epsilon_0 \times r^2 \times m_p}$$

$$a_{EF-IN} = \frac{q_{Proton} \times \rho_{qIN} \times \frac{4}{3} \times \pi \times r^3}{4 \times \pi \times \epsilon_0 \times r^2 \times m_p}$$

$$a_{EF-IN} = \frac{q_{Proton} \times \rho_{qIN} \times r}{3 \times \epsilon_0 \times m_p}$$

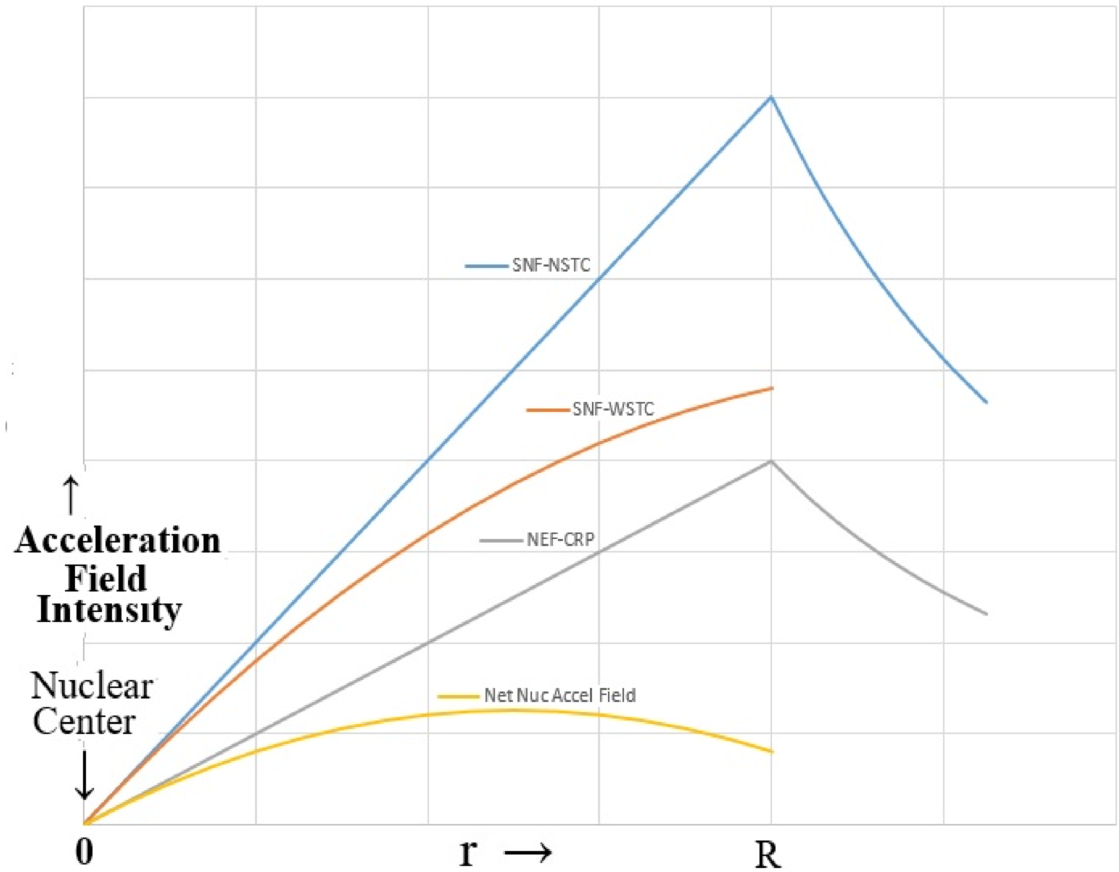
Therefore, the Nuclear Electric Field acceleration field inside the Nucleus, $a_{EF\text{-}IN}$ is proportional to r.

The charge distribution inside the Nucleus contributing to $a_{EF\text{-}IN}$ is only the charge distribution from Center of Nucleus to position r inside the Nucleus.

Figure “Nuclear Field Profiles Within the Nucleus,” below, provides the field profiles as a function of distance r from the Center of the Nucleus to the Nuclear Surface.

The profiles of the Acceleration Fields listed, above, within the Nucleus as a function of Atomic Mass are provided in Figure, **“**Nuclear Gravitation Field and Nuclear Electric Field at Nuclear Surface as Function of Atomic Mass,” below.

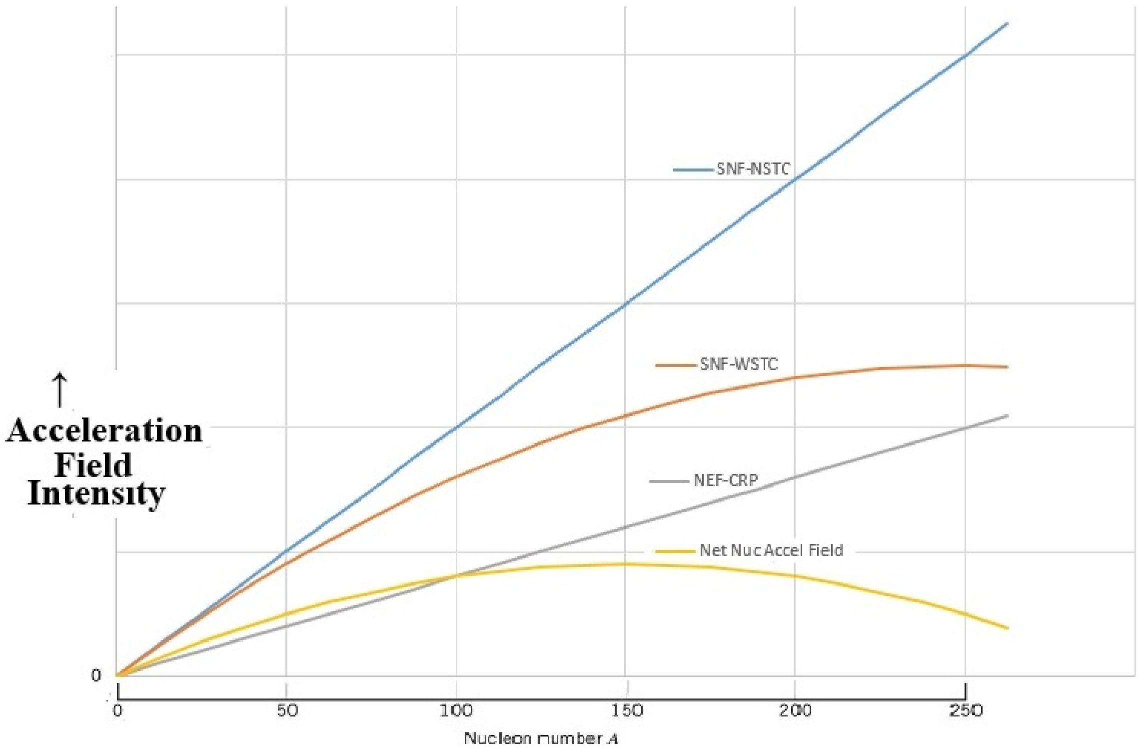
Nuclear Field Profiles Within the Nucleus



SNF-NSTC = Strong Nuclear Force – No Space-Time Compression present
SNF-WSTC = Strong Nuclear Force With Space-Time Compression
NEF-CRP = Nuclear Electric Field – Coulombic Repulsion of Proton
Net Nuc Accel Field is the difference between fields SNF-WSTC and NEF-CRP

The equations for the acceleration fields established by the Strong Nuclear Force and the Coulombic Repulsion Force within the Nucleus demonstrate the Strong Nuclear Force must be gravity. If the Strong Nuclear Force was not gravity, Space-Time Compression would be non-existent. Protons, alone, would always provide sufficient Strong Nuclear

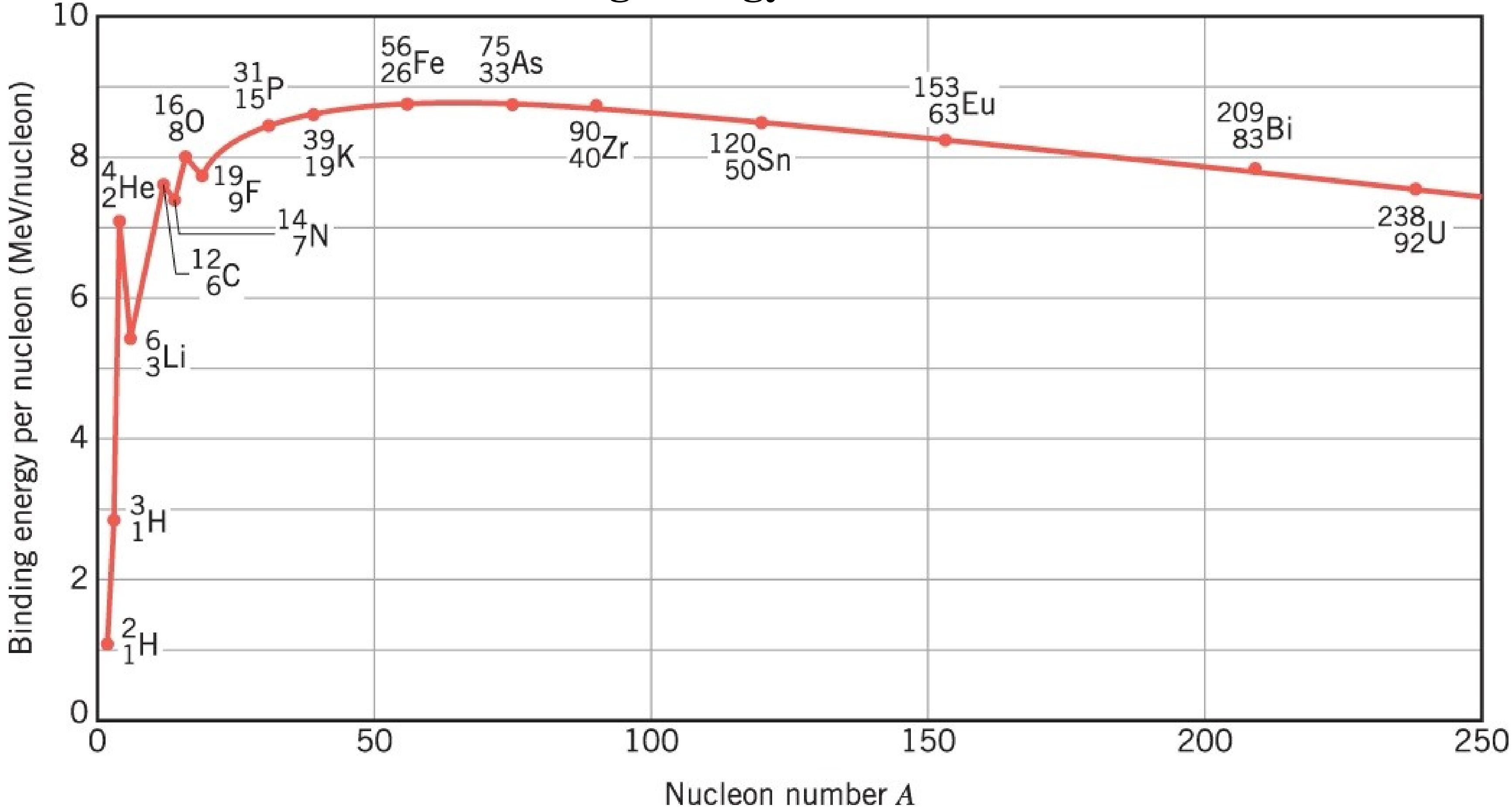
Nuclear Gravitation Field and Nuclear Electric Field at Nuclear Surface as Function of Atomic Mass



Force nuclear attraction field to overcome the Coulombic Repulsion generated by the Nuclear Electric Field generated by the Protons no matter how many Protons exist in the Nucleus. The Nucleus would remain stable with any number of Protons from one to infinity. The Strong Nuclear Force propagating out of the Electron Clouds of all atoms would provide such an intense attractive field that all the atoms in the universe would collapse into a black hole singularity. The strong Nuclear Electric Field propagating outward from the nucleus is neutralized by electrons orbiting the nucleus. Drop-off of SNF-WSTC results in the apparent “saturation” of the Strong Nuclear Force and has a profile appearance similar to Binding Energy per Nucleon curve as indicated by Figure “Binding Energy Per Nucleon,” below.

Nuclear Gravitation Field Theory

Binding Energy Per Nucleon



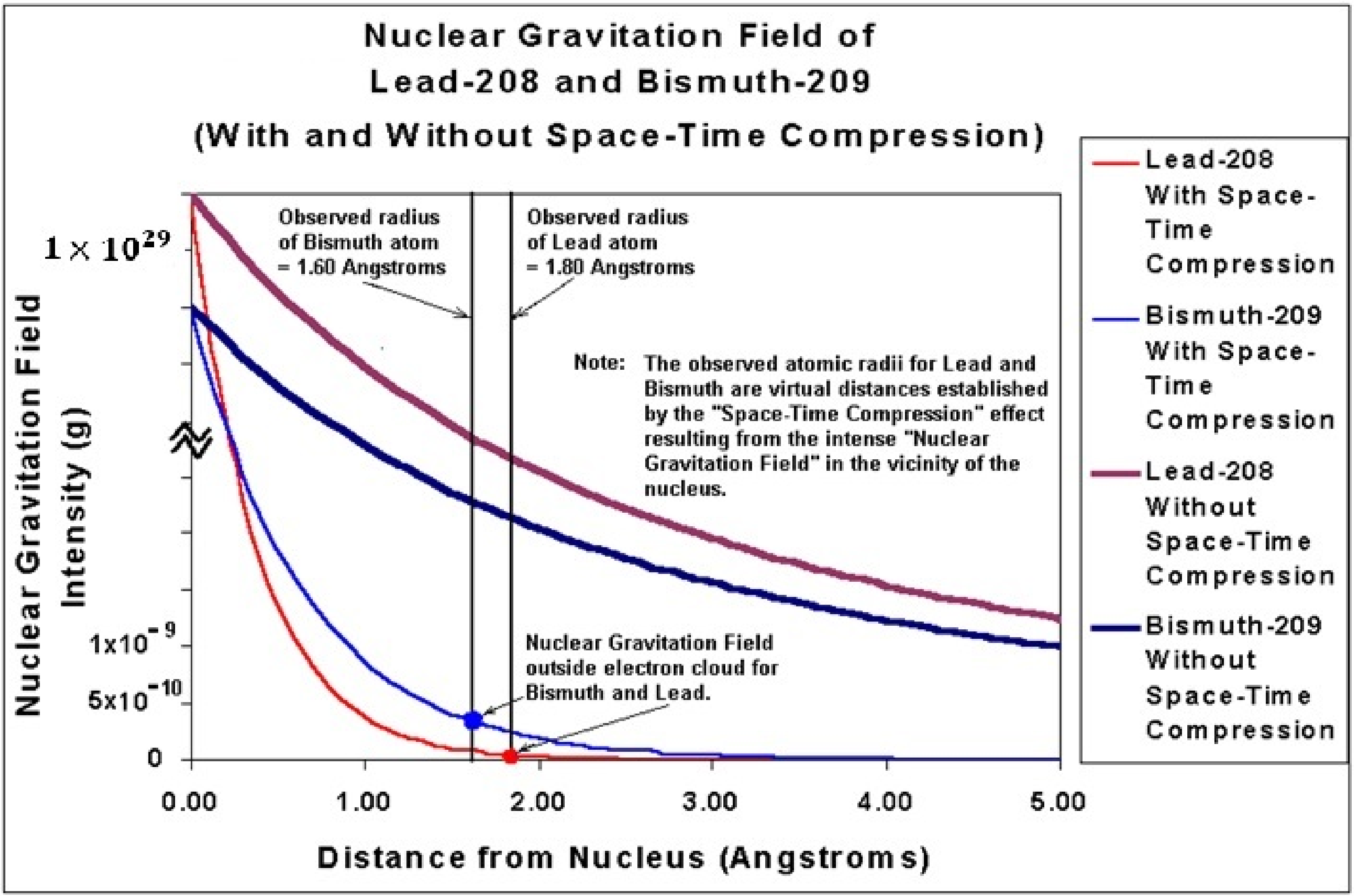
Nuclear Gravitation Field and Configuration of Lead-208 and Bismuth-209

Nucleon Energy Levels for Lead (Pb-208) and Bismuth (Bi-209)									
Energy Level	**1 (He)**	**2 (O)**	**3 (Ca)**	**4 (Ni)**	**5 (Sn)**	**6 (Pb)**	**7 (Fl)**	**8 (E-164)**	**Total Protons and Neutrons**
Protons Lead ($_{82}Pb^{208}$)	2p	6p	12p	8p	22p	32p			**82p**
Neutrons	2n	6n	12n	8n	22n	32n	44n		**126n**
Protons Bismuth ($_{83}Bi^{209}$)	2p	6p	12p	8p	22p	32p	**1p**		**83p**
Neutrons	2n	6n	12n	8n	22n	32n	44n		**126n**

Reference: http://www.nnde.bnl.gov/chart/

The Lead-208 isotope ($_{82}Pb^{208}$) is a "double magic" Nucleus containing 82 Protons and 126 Neutrons. For Lead-208, 82 Protons fill Six Energy Levels and 126 Neutrons fill Seven Energy Levels. The Nuclear Gravitation Field for Lead-208 is relatively strong and Space-Time Compression next to the Nuclear Surface is very significant compared to average stable nuclei. The Lead Nucleus is also near the apparent limit where the Strong Nuclear Force is able to overcome the Coulombic Repulsion Force and remain a stable nucleus. The Bismuth-209 isotope ($_{83}Bi^{209}$) has 83 Protons and 126 Neutrons. For Bismuth-209, 82 of the 83 Protons fill Six Energy Levels and 126 Neutrons fill Seven

Nuclear Gravitation Field Theory



Energy Levels. The 83rd Proton is the lone Proton in Seventh Energy Level. For all the currently known stable isotopes of Elements, the Bismuth-209 nuclear configuration is unique. There are no other stable isotopes of Elements on Earth with a similar configuration. Element 83, Bismuth-209, is the last known stable isotope listed on the Periodic Table of the Elements. All identified isotopes of Elements beyond Bismuth are radioactive indicating the Coulombic Repulsion Force has become significant enough to affect the Strong Nuclear Force ability to hold those nuclei together. Radioactive decay occurs to ultimately change the Nuclei to a stable Nucleus. The lone proton in the Seventh Energy Level of the Bismuth Nucleus is "loosely" held to the Nucleus resulting in the Nuclear Gravitation Field for Bismuth-209 being significantly weaker than the Nuclear Gravitation Field for Lead-208. The weaker Nuclear Gravitation Field for Bismuth-209 results in the Nuclear Gravitation Field undergoing a significantly lesser amount of Space-Time Compression. Therefore, the gravity field outside the electron cloud for Bismuth will be greater than what would be determined by Bismuth-209 having an atomic mass of 208.980399 amu (atomic mass units) and Lead-208 having an atomic mass of 207.976652 amu. Note that the difference in mass between Bismuth-209 and Lead-208 is 1.003747 amu. The atomic mass of the Hydrogen-1 isotope is 1.007825 amu, therefore, the mass defect to bind the 83rd proton to the Bismuth-209 Nucleus is 0.004078 amu.

Cavendish Experiments can be performed to demonstrate that Bismuth-209 has a stronger gravitational field beyond that associated with its mass than the gravitational field of Lead-208. The Cavendish Experiment was used to determine G in Newton's Law of Gravity equation:

$$\boldsymbol{F = \frac{G \times M_1 \times M_2}{r^2}}$$

Perform the Cavendish Experiment with Lead-208 to measure its Gravitation Constant G_{Pb}. Perform the Cavendish Experiment with Bismuth-209 to measure its Gravitation Constant G_{Bi}. Compare the values of G_{Pb} and G_{Bi} to the "Universal Gravitation Constant" G = 6.6726 x 10^{-11} Newton-meter^2/kg^2 (= 6.6726 x 10^{-11} meter^3/kg-sec^2). If the outcome of performing these Cavendish Experiments results in determining that the value for G_{Bi} is greater than the value for G (Universal Gravitation Constant) which is greater than the value for G_{Pb}, then this outcome will provide compelling evidence the Strong Nuclear Force and Gravity are one and the same. The Universal Gravitation Constant is, therefore, not Universal but specific to every isotope of every Element. It is related to the Binding Energy Per Nucleon and does not vary much for stable isotopes of Elements. The exceptions are Lead-208, a tight fitting "double magic" nucleus containing a strong Nuclear Gravitation Field next to its nucleus and Bismuth-209, containing a "loosely held" single proton in an outer energy level with a magic number for neutrons containing a relatively weak Nuclear Gravitation Field next to its nucleus.

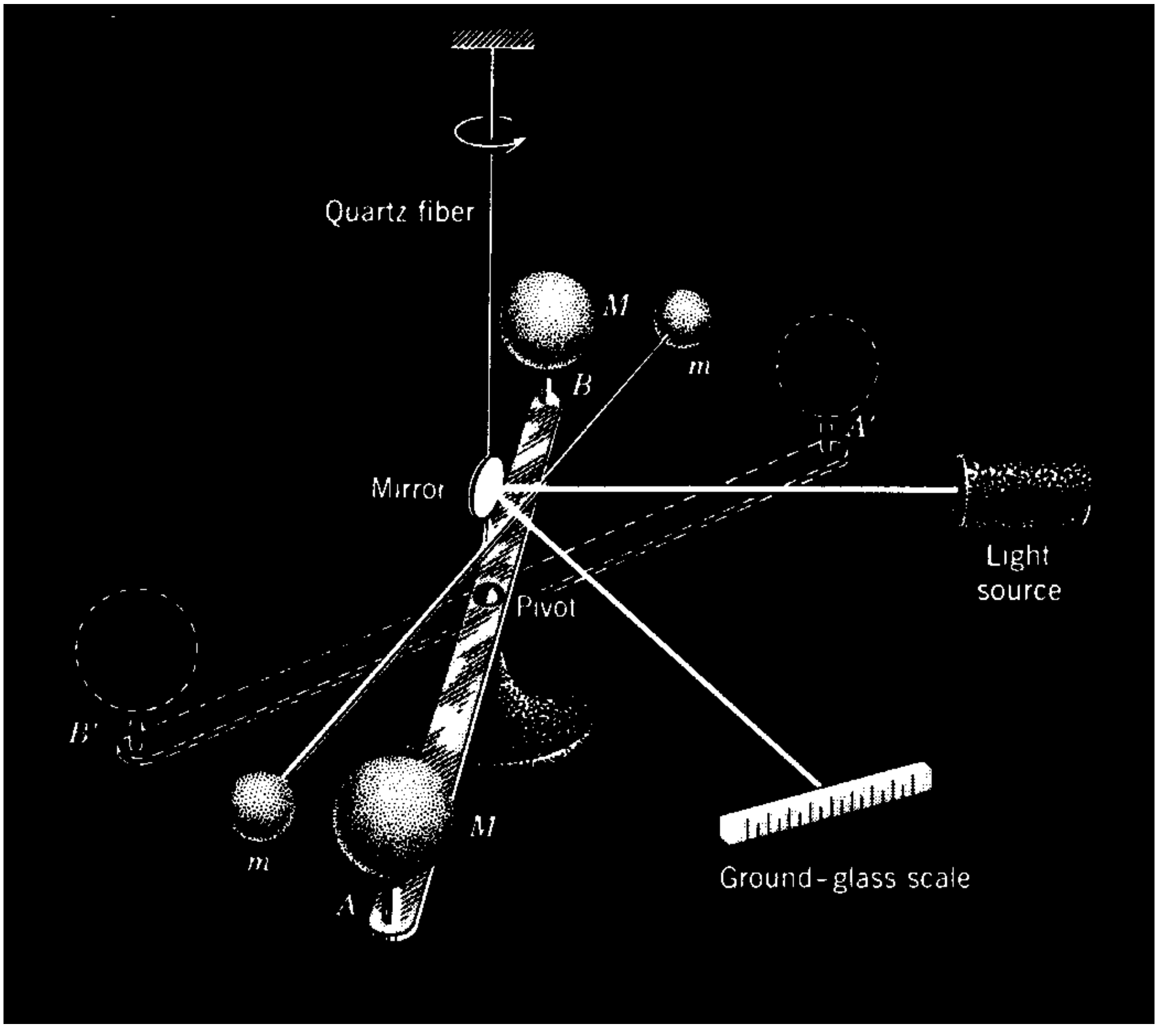
Let's first look at Newton's Law of Gravity and the "Universal Gravitation Constant." The following passage was extracted from "Physics, Parts I and II," by David Halliday and Robert Resnick, pages 348 to 349. This passage discusses Lord Cavendish's Experiment designed to measure the Universal Gravitation Constant:

To determine the value of G it is necessary to measure the force of attraction between two known masses. The first accurate measurement was made by Lord Cavendish in 1798. Significant improvements were made by Poynting and Boys in the nineteenth century. The present accepted value of G is 6.6726×10^{-11} Newton-meter^2/kg^2, accurate to about 0.0005×10^{-11} Newton-meter^2/kg^2. In the British Engineering System this value is 3.436×10^{-8} lb-ft^2/slug^2.

The constant G can be determined by the maximum deflection method illustrated in the Figure, "Cavendish Experiment," below. Two small balls, each of mass m, are attached to the ends of a light rod. This rigid "dumbbell" is suspended, with its axis horizontal, by a fine vertical fiber. Two large balls each of mass M are placed near the ends of the dumbbell on opposite sides. When the large masses are in the positions A and B, the small masses are attracted, by the Law of Gravity, and a torque is exerted on the dumbbell rotating it counterclockwise, as viewed from above. When the large masses are

Nuclear Gravitation Field Theory

Cavendish Experiment to Determine Universal Gravitation Constant



The Cavendish balance, used for experimental verification of Newton's Law of Universal Gravitation. Masses m and m are suspended from a quartz fiber. Masses M and M can rotate on a stationary support. An image of the l amp filaments is reflected by the mirror attached to m and m onto the scale so that any rotation of m and m can be measured.

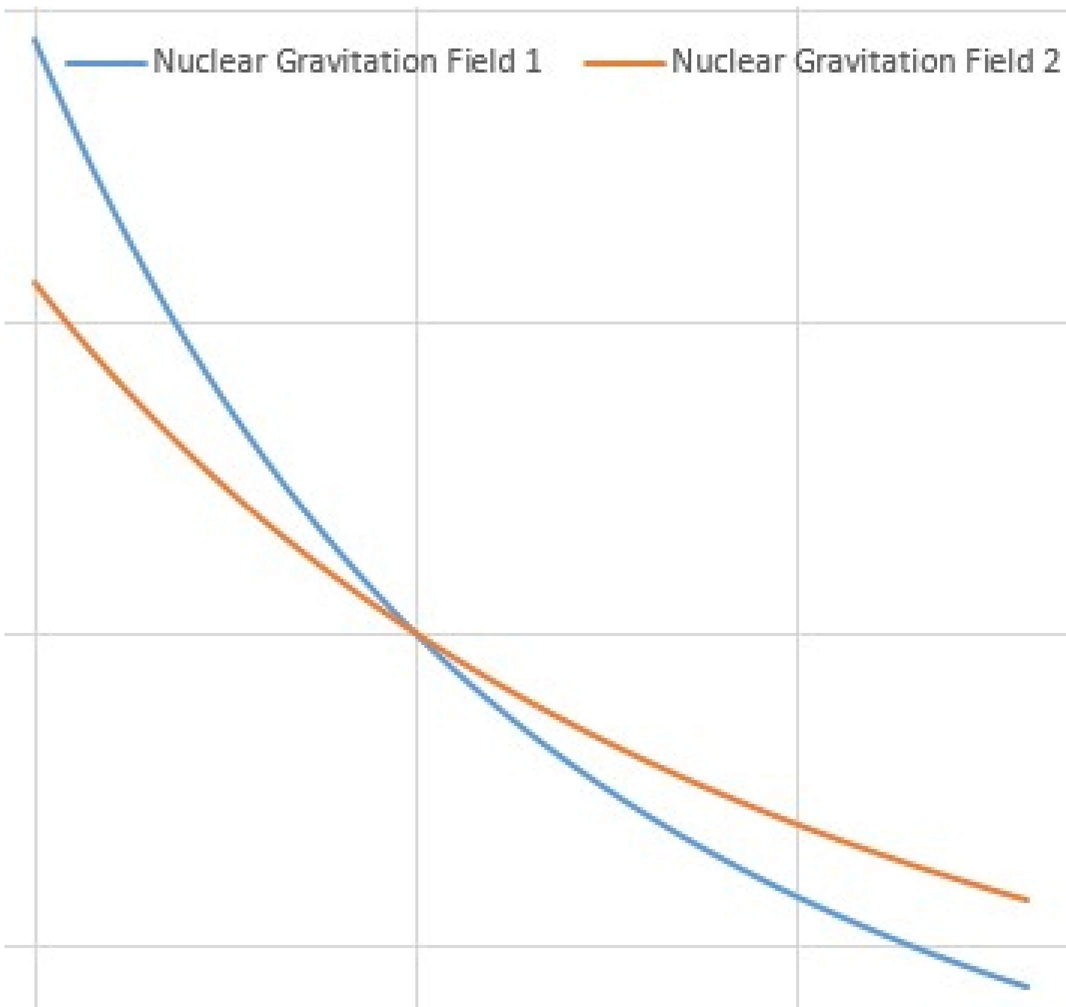
Reference: “Physics, Parts I and II,” David Halliday and Robert Resnick *in the positions A' and B', the dumbbell rotates clockwise. The fiber opposes these torques as it is twisted. The angle through which the fiber is twisted when the balls are moved from one position to the other is measured by observing the deflection of a beam of light reflected from the small mirror attached to it. If the values of each mass, the distances of the masses from one another, and the torsional constant of the fiber are known, then G can be calculated from the measured angle of twist. The force of of attraction is very small so that the fiber must have an extremely small torsion constant if a detectable twist in the fiber is to be measured.*

The masses in the Cavendish balance of displayed in Figure, "Cavendish Experiment," below, are, of course, not particles but extended objects. Since each of the masses are uniform spheres, they act gravitationally as though all their mass were concentrated at their centers.

Because G is so small, the gravitational forces between bodies on the earth's surface are extremely small and can be neglected for ordinary purposes.

In the figure, below, a comparison of two Nuclear Gravitation Fields propagating outward from the Nuclear surface, Nuclear Gravitation Field 1 has a greater intensity than Nuclear Gravitation Field 2 at the Nuclear surface. When the effect of Space-Time Compression is considered, Nuclear Gravitation Field 1 undergoes more Space-Time Compression than Nuclear Gravitation Field 2. Therefore, Nuclear Gravitation Field 2 leaving the electron cloud of the atom will have a greater intensity than Nuclear Gravitation Field 1 outside the electron cloud of the atom. As previously noted, the Nuclear Gravitation Field for Bismuth-209 outside the electron cloud should be greater than Nuclear Gravitation Field for Lead-208 outside the electron cloud because it is significantly weaker at Nuclear surface.

Comparison of Nuclear Gravitation Fields Originating from Nucleus



Conclusion

Compelling evidence that the Strong Nuclear Force and Gravity are one and the same is provided below:

1. The methodology for the filling of Proton and Neutron Energy Levels in the Nucleus of the Atom indicates that the Strong Nuclear Force field propagates omnidirectional outward to infinity from the Nucleus. When the Nucleus has a sufficient number of nucleons present to form a near perfect sphere, the Strong Nuclear Force field propagates outward omnidirectional to infinity with spherical symmetry resulting in the Nuclear Gravitation Field following a $1/r^2$ function. Therefore, the outward propagation of the Strong Nuclear Force field is consistent with Newton's Law of Gravity.
2. The observed virtual disappearance of the Strong Nuclear Force at the surface of the Nucleus is a result of extreme Space-Time Compression. This General Relativistic effect can only occur if the Strong Nuclear Force field is Gravity. Only Gravity fields can accelerate light, electric fields, or magnetic fields to produce Space-Time Compression. Gravity propagates based upon Uncompressed Space-Time; Light, Electric Fields, and Magnetic Fields propagate based upon Compressed Space-Time.
3. Neutrons are required to be added to the Nucleus to raise the strength to the Strong Nuclear Force to overcome the rising Coulombic Repulsion Force of the Protons as Protons are added to the Nucleus. Space-Time Compression within the Nucleus results in the Nuclear Gravitation Field rising slower than the Nuclear Electric Field as Protons are added to the Nucleus. The Nuclear Gravitation Field propagates outward within the Nucleus based upon Uncompressed Space-Time so its intensity rises slower / drops faster than the Nuclear Electric Field propagating outward through the Nucleus.
4. The Strong Nuclear Force appears to saturate as Protons and Neutrons are added to the Nucleus - Element 83, Bismuth-209, is the largest known Nucleus that is stable. Space-Time Compression within the Nucleus results in the Nuclear Gravitation Field

rising slower than the Nuclear Electric Field as Protons are added to the Nucleus. The Nuclear Gravitation Field propagates outward within the Nucleus based upon Uncompressed Space-Time so its intensity rises slower / drops faster than the Nuclear Electric Field propagating outward through the Nucleus. The Nuclear Electric Field is approaching the strength of the Nuclear Gravitation Field, therefore, the Elements beyond Bismuth are radioactive.

Strong Nuclear Force = Gravity