Unification of the Forces

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(physic references from Wikipedia on applicable pages
see:www.wikipedia.org, also from http://hyperphysics.phys-
astr.gsu.edu)

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Note: See the end of this theory for physical constant not listed.

3 Dimensional Strong Force (Hydrogen & Deuteron Example):

Hydrogen Electron Binding Energy: (created 7/23/2020) The electric force causes a motion
for the electron around the nucleus. But for a mass reduction like binding energy, one must be
using a curvature. That curvature comes from the DeBroglie wavelength kinetic energy as a
curvature (explained later):

\[ U_H = -\frac{1}{2} m_e v^2 = -2.179872 \times 10^{-18} \text{Joules} \]

Where \( U_H \) is the binding energy of Hydrogen, \( m_e \) is the mass of the electron, \( v \) is the orbit
velocity of the electron.

Deuteron Nuclear Binding Energy: (created prior to 6/18/2019) The strong force is a gravity-
like force based on the particle energy and a strain curvature. The curvature breaks down at a
distance away from the particle with a 3 dimensional energy decay structure:

\[ U_D = \frac{-2 m_p c^2}{4\pi \frac{r_n^2}{\lambda_p^2} \exp \left(2 \frac{r_n}{\lambda_p} \right)} = -3.564788 \times 10^{-13} \text{Joules} \]

Where exp is the natural exponent, \( U_D \) is the binding energy of the strong force for Deuteron, \( m_p \)
is the mass of the proton, \( r_n \) is the radius between nucleons (Deuteron charge radius in this
case), \( \lambda_p \) is the wavelength of the proton. The strong force binding energy at the wavelength for
larger atoms is approximately 1.3E-12 Joules.

Neutron (Electron Capture):

(.created prior to 6/18/2019, revised 7/18/2020) The neutron might be modeled as an orbiting
relativistic electron:

\[ v_n = \sqrt{\frac{Ke^2}{m_n - m_p |\lambda_p|}} \]
\[
m_n = m_p + \frac{m_e}{\sqrt{1 - \frac{v_n^2}{c^2}}} = 1.674\ 918\ E\ 27\ Kilograms
\]

Where \(v_n\) is the velocity of the electron, \(m_n\) is the mass of the neutron and \(m_e\) is the mass of the electron.

Where the centripetal force matches:

\[
\frac{K e^2}{\lambda_p^2} = \frac{m_e v_n^2}{\lambda_p \sqrt{1 - \frac{v_n^2}{c^2}}}
\]

**Deuteron (Electron Orbital Pairing):**

(created 7/18/2019) Electron might switch between protons and pull the protons apart with its centripetal force coupled with electric force:

\[
\frac{U_D}{2} = \frac{m_e v_n^2}{\sqrt{1 - \frac{v_n^2}{c^2}}} = \frac{K e^2}{\lambda_p}
\]

**Logarithmic Strain (particle of the wave-particle duality):**

**Strain Energy Definition (see Wikipedia):**

(created 5/9/2020) I will consider that Young’s modulus for Planck’s constant and particles to be based from the electric force. I will also consider a wave-particle duality, where waves are represented by Planck’s constant and particles are represented by strain energy equations. The wave-particle duality is as follows: The strain energy is defined as:

\[
U = \frac{hc}{\lambda} = \frac{1}{2} VE \epsilon^2
\]

Where \(\lambda\) is the wavelength of the energy, \(U\) is the energy, \(V\) is the volume, \(E\) is Young’s modulus, \(\epsilon\) is the strain.

**Planck’s Constant (Wave-Particle Duality):**

(created 5/21/2020) Young’s modulus here is a 1 dimensional electric field at \(\frac{1}{2}\) the wavelength. This curvature field is not mass since there is no radius in the logarithmic strain. The charge Planes sit at one half the wavelength and therefore use a factor of sixteen times three. The 3/2 relates to a longitudinal mass in relativity (see Wikipedia). The following describes both the wave and particle:

\[
hc = \frac{1}{2} 48 \frac{e^2}{2 \epsilon_0} ln^{\frac{1}{2}} \left( \frac{e^2}{\epsilon_0 \hbar c} \right) = 1.985937\ E - 25\ Joules \cdot meters
\]
Were $\ln$ is the natural logarithm.

**Electron Particle Mass (must match the wave mass):**

The Young’s modulus here is a 3 dimensional version of Planck’s 1 dimensional value. The electron might form during interaction of electromagnetic radiation at the half electron wavelength with protons. The radii logarithmic strain gives the electron a matter field. Like Planck’s constant (above) it has 3 times the value and the radius is one half the electron wavelength so a factor of 48 is used. Again the factor of 3/2 relates to a longitudinal mass. It’s a vacuum field surrounded by a pressure field:

$$m_e c^2 = \frac{1}{2} 48 \varepsilon_0 \frac{K^2 e^2}{\lambda_e^2} \left( 4 \ln \left( \frac{\lambda_p}{\lambda_e} \right) \right)^2 = 8.206 \times 10^{-14} \text{ Joules}$$

Where $m_e$ is the electron mass, $\lambda_e$ is the electron wavelength.

**Proton Particle Mass (must match the wave mass, as Electron-Positron composition):**

(created 4/29/2020, revised 4/29/2020) Proton is an electron plus two positrons. The factor of 3/2 relates to a longitudinal mass. It’s a pressure field surrounded by a vacuum field:

$$m_p c^2 = \frac{1}{2} 3 m_e c^2 \left( 4 l n \left( \frac{\lambda_p}{\lambda_e} \right) + l n \left( \frac{K e^2}{\hbar c} \right) \right)^2 = 1.503 \times 10^{-10} \text{ Joules}$$

**Quark Electrical Composition:**

(created 7/6/2020) 2 Positrons and 1 electron relate to the electrical to matter energy between the proton and electron:

$$\frac{2 K e^2}{\lambda_p} = \frac{1}{2} 3 m_e c^2 l n^2 \left( \frac{e^2}{\varepsilon_0 \hbar c} \right)$$

**Photon (Planck) Gravity follows the Larmor Formula:**

(created 7/25/2020) The gravitational field of the photon is electromagnetic in nature. Therefore charge is a hill instead of a gravitational valley. Like charges repel instead of attract. The exponent allows the hill curvature to extend to infinity for charge just like gravitation:

$$\frac{2 K e^2}{3} = \frac{\hbar c}{\lambda} \exp^3 \left( l n \left( \frac{e^2}{\varepsilon_0 \hbar c} \right) \right)$$

Where $\lambda$ is the wavelength of the photon.

**Electron Gravity:**

The gravitation has a longer distance to travel since it has a logarithmic strain. We must account for this. This may be a longitudinal mass and is therefore power to the third. This is a pressure
field and therefore must include both radii and the fine structure. I’m using a Riemann zeta 3 with a length expansion of the electromagnetic coupling constant:

\[ \frac{G m_e^2}{\lambda_e} = m_e c^2 \exp \left( 4 \ln \left( \frac{\lambda_p}{\lambda_e} \right) + \ln \left( \frac{K e^2}{\hbar c} \right) \right) \zeta(3) \exp \left( -\frac{3}{2} \frac{e^2}{\varepsilon_0 \hbar c} \right) = 2.269 \times 10^{-59} \text{ Joules} \]

**Proton Gravity:**

The gravitation has a longer distance to travel since it has a logarithmic strain. We must account for this. This may be a longitudinal mass and is therefore power to the third. This is a vacuum field and therefore has only radii in the strain. I’m using a Riemann zeta 3 with a length contraction of the electromagnetic coupling constant:

\[ \frac{G m_p^2}{\lambda_p} = m_p c^2 \exp \left( 4 \ln \left( \frac{\lambda_p}{\lambda_e} \right) \right) \zeta(3) \exp \left( \frac{3}{2} \frac{e^2}{\varepsilon_0 \hbar c} \right) = 1.412 \times 10^{-49} \text{ Joules} \]

**Relativity, Particle lifetime, Magnetic Moments, Momentum & Larmor Formula:**

(created 7/6/2020, revised 7/25/2020)

**Relativity:**

The relativity suggests that the charge is in a speed of light strong force gravity-like field, this creates an outward magnetic moment. The relativity for any logarithmic strain energy is (see Wikipedia):

Waves:

\[ \frac{1}{\gamma} = \frac{\lambda}{\lambda_0} = \sqrt{1 - \frac{v^2}{c^2}} \]

Where the wavelengths represent energies thru Planck’s constant.

Particles:

\[ \frac{1}{\gamma} = \frac{1}{\epsilon^2} = \sqrt{1 - \frac{v^2}{c^2}} \]

**Particle Lifetime:**

If there is a lifetime to a particle, then: The lifetime of a particle is the gravitational leak energy that would normally burst out as \( m c^2 \) at the period of the wavelength:

\[ T = \frac{m c^2 \lambda}{G m^2 f} = \frac{c \lambda^2}{G m} \]
Where $T$ is the lifetime, $m$ is the mass of the particle, $\lambda$ is the wavelength of the particle’s energy, $f$ is the frequency of the Compton wavelength of the particle, the proton then has a free space lifetime of $1.5E+08$ years, the electron is much greater.

**Magnetic Moment:**

The magnetic moment of the electron:

$$\mu_e = ec \frac{\lambda_e}{4\pi} \left(1 + \frac{Ke^2}{\hbar c}\right) = 9.284781E-24 \text{ J/T}$$

Where $\mu_e$ is the magnetic moment of the electron.

The magnetic moment of the proton involves a strong force factor at the wavelength and the logarithmic strain of the electromagnetic coupling constant similar to the electric field:

$$\mu_p = \frac{1}{2} ec \frac{\lambda_p}{4\pi} \ln^2\left(\frac{e^2}{\varepsilon_0 \hbar c}\right) \left(1 - \frac{2}{4\pi \exp|2|}\right) = 1.410703E-26 \text{ J/T}$$

Where $\mu_p$ is the magnetic moment of the proton.

The magnetic moment of the neutron relates to the addition of a single electron, I will leave out the strong force factor for simplicity:

$$\mu_n = \frac{1}{2} ec \frac{\lambda_n}{4\pi} \ln^2\left(\frac{e^2}{\varepsilon_0 \hbar c}\right) + \frac{1}{2} ec \frac{\lambda_n}{4\pi} \ln^2\left(\frac{1}{2} \frac{e^2}{\varepsilon_0 \hbar c}\right) = -9.667662E-27 \text{ J/T}$$

Where $\mu_n$ is the magnetic moment of the neutron.

**Momentum:**

The DeBroglie wavelength stretches out the strong force’s speed of light field to match the velocity of the particle. This provides the field necessary to allow for particle speed. The speed of light strong force field exists within the Compton wavelength:

$$p = mv = mc \frac{\lambda_C}{\lambda_D}$$

Where $\lambda_D$ is the DeBroglie wavelength, $\lambda_C$ is the Compton wavelength of the particle, $v$ is the vectored velocity of the matter field, and $c$ is the original velocity of the matter field (strong force), $p$ is the momentum and $m$ is the mass of the particle.

Such that the kinetic energy of a particle is:

$$KE = \frac{1}{2} m v^2 = \frac{1}{2} m c^2 \frac{\lambda_C^2}{\lambda_D^2}$$
Electrons orbiting a nucleus don’t radiate when accelerating. This is because charges accelerating don’t give off radiation. Only changes in the DeBroglie wavelength radiate electromagnetic radiation. To relate the older Larmor Formula to Planck’s constant I will use a similar form to the gravitational curvature escape used for the electron and proton but this time applied to how Planck’s constant is a curvature of a plane wave:

$$\frac{2}{3} \frac{Ke^2a^2}{c^3} = \frac{e^2}{c^2} \exp \left( \ln \left( \frac{e^2}{\varepsilon_0 \hbar c} \right) \right)$$

Where \( a \) is the acceleration or change in DeBroglie wavelength over time.

**Standard Constants that may be used in this Theory (2010 CODATA):**

where \( g \) is the Electromagnetic coupling constant:

\[ g = 0.302822121 \]

where \( b \) is the Wien displacement constant:

\[ b = 2.897772917 \times 10^{-3} \]

where \( k_B \) is the Boltzmann constant (NIST 2017 data):

\[ k_B = 1.380642969 \times 10^{-23} \]

where \( \alpha \) is the fine structure constant:

\[ \alpha_0 = 7.297352839 \times 10^{-3} \]

where \( Z \) is the impedance of free space:

\[ Z_0 = 376.730313461771 \]

where \( \mu \) is the Permeability of free space:

\[ \mu_0 = 1.25663706143592 \times 10^{-6} \]

where \( \varepsilon \) is the Permittivity of free space:

\[ \varepsilon_0 = 8.854187817 \times 10^{-12} \]

where \( e \) is the Elementary Charge constant:

\[ e = 1.6021766208 \times 10^{-19} \]

where \( K \) is the electric constant:

\[ K = \frac{1}{4\pi \varepsilon_0} = 8.98755178736818 \times 10^9 \]

where \( G \) is the gravitational constant:
\[ G = 6.67408 \times 10^{-11} \]

**where** \( c \) **is the Speed of Light:**

\[ c = 299,792,458 \]

**where** \( h \) **is the Planck constant:**

\[ h = 6.62607015 \times 10^{-34} \]

**where** \( \hbar \) **is the reduced Planck constant:**

\[ \hbar = 1.05457182 \times 10^{-34} \]