A Simplified ToE Summary

Physical Constants (MKS)

In[1]:= `<< PhysicalConstants``

In[2]:= c = SpeedOfLight

Out[2]= $\frac{299\,792\,458\ \text{Meter}}{\text{Second}}$

In[3]:= α = FineStructureConstant

Out[3]= 0.00729735

In[4]:= h = PlanckConstant ;

In[5]:= $\hbar = \frac{h}{2\pi}$

Out[5]= $\frac{1.05457\times10^{-34}\ \text{Kilogram Meter}^2}{\text{Second}}$

In[6]:= m_e = ElectronMass

Out[6]= 9.10938×10^{-31} Kilogram

In[7]:= R_∞ = RydbergConstant

Out[7]= $\frac{1.09737\times10^{7}}{\text{Meter}}$

In[8]:= KgGeV = Kilogram / Convert [Kilogram , Giga eVperC2]

Out[8]= $\frac{1.78266\times10^{-27}\ \text{Kilogram}}{\text{eVperC2 Giga}}$

My new Units of Measure

In[9]:= Convert [LengthUnit , Meter]

Out[9]= 6.64984×10^{-10} Meter

In[10]:= $L_{Unit} = \frac{\alpha}{R_\infty}$

Out[10]= 6.64984×10^{-10} Meter

In[11]:= Convert [TimeUnit , Second]

Out[11]= 0.275847 Second

In[12]:= $T_{Unit} = \frac{\alpha^{-8}}{c} L_{Unit}$

Out[12]= 0.275847 Second

In[13]:= Convert [MassUnit , Kilogram]

Out[13]= 5.28986×10^{-34} Kilogram

In[14]:= $M_{Unit} = \frac{\hbar}{c}\frac{1}{L_{Unit}}$

Out[14]= 5.28986×10^{-34} Kilogram

New model Mass-Length-Time relationships

These are used below to convert $\hbar$*Length (which has units of Mass*Volume/Time) to Mass^2 since in my model Mass=Volume/Time

In[15]:= $LTC = L_{Unit}\frac{1}{T_{Unit}{}^2}$;

In[16]:= $MPV = M_{Unit}\frac{T_{Unit}}{L_{Unit}{}^3}$;

New Particle Mass Prediction

In[17]:= $m_H = \sqrt{\sqrt{2}\ \hbar\ L_{Unit}\ MPV \,/\, KgGeV^2}$

Out[17]= $124.443\sqrt{\text{eVperC2}^2\ \text{Giga}^2}$

In[18]:= $\sqrt{\sqrt{2}\ \frac{\hbar}{c}\frac{R_\infty}{\alpha^5}} \,/\, KgGeV$

Out[18]= 124.443 eVperC2 Giga

Hubble's Constant (* $H_0 = \frac{1}{4\pi c}\frac{\lambda_{cp}}{\lambda_{ce}^2}$ *)

In[19]:= Convert $\left[\frac{LTC}{4\pi c}, \frac{\text{Kilo Meter}}{\text{Mega Parsec Second}}\right]$

Out[19]= $\frac{71.5812\ \text{Kilo Meter}}{\text{Mega Parsec Second}}$

In[20]:= $\lambda_{e^2/p} = \frac{\hbar}{c}\frac{\text{ProtonElectronMassRatio}}{m_e}$

Out[20]= 7.09047×10^{-10} Meter

In[21]:= $\lambda Cnv = \frac{\alpha}{R_\infty} \Big/ \lambda_{e^2/p}$

Out[21]= 0.937855

In[22]:= $H_0 = \frac{LTC}{4\pi c}\lambda Cnv$

Out[22]= $\frac{2.17561\times10^{-18}}{\text{Second}}$

In[23]:= Convert $\left[H_0, \frac{\text{Kilo Meter}}{\text{Second Mega Parsec}}\right]$

Out[23]= $\frac{67.1328\ \text{Kilo Meter}}{\text{Mega Parsec Second}}$

Newton's Gravitational Constant

In[24]:= $g_c = 1 / \lambda Cnv$

Out[24]= 1.06626

In[25]:= $G_N = \frac{g_c{}^2}{\alpha^{-8}\ T_{Unit}} \Big/ MPV$

Out[25]= $\frac{6.67889\times10^{-11}\ \text{Meter}^3}{\text{Kilogram Second}^2}$

New Fundamental Constant Equality

$$c = \frac{\hbar}{m_{unit}\ l_{unit}} = \frac{g_c^2}{G_N} = \frac{\lambda_{Cnv}}{4\pi H_0} = a^{-8}\ t_{unit}$$

In[26]:= $c / LTC == \frac{\hbar}{M_{Unit} L_{Unit}} \Big/ LTC == \frac{g_c{}^2}{G_N} \Big/ MPV == \frac{\lambda Cnv}{4\pi H_0} == \alpha^{-8}\ T_{Unit}$

Out[26]= True

Cosmological Constant

In[27]:= $\rho c := \frac{3}{8\pi}\frac{H_0^2}{\lambda Cnv}\frac{g_c{}^2}{G_N}$

In[28]:= $\rho\Lambda := \Omega\Lambda\ \rho c$

In[29]:= $\Lambda := 2\left(4\pi\frac{G_N}{g_c{}^2}\right)\rho\Lambda$

In[30]:= Convert $[\Lambda, 1 / \text{Second}^2]$

Out[30]= $\frac{1.51407\times10^{-35}\ \Omega\Lambda}{\text{Second}^2}$

In[31]:= $1.\ \Omega\Lambda == \frac{\Lambda\ \lambda Cnv}{3 H_0^2} == \frac{\rho\Lambda}{\rho c}$

Out[31]= True

In[32]:= $c\gamma@t\_ := \int_0^t dt$

In[33]:= $\Omega\Lambda = \int_0^1 \sqrt{c\gamma@t}\ dt$

Out[33]= $\frac{2}{3}$

In[34]:= $H0@t\_ := \frac{1}{4\pi\ c\gamma@t}$

In[35]:= $\Lambda = 1 \Big/ \int \frac{4\pi}{H0@t} dt$

Out[35]= $\frac{1}{8\pi^2 t^2}$

In[36]:= $\Lambda == \Omega\Lambda\ 3\ (H0@t)^2$

Out[36]= True

In[37]:= $\Omega_{mVis} = 1 / 20$;

In[38]:= $\Omega_{mDrk} = 1 - \Omega\Lambda - \Omega_{mVis}$

Out[38]= $\frac{17}{60}$

In[39]:= $\Omega_m = \Omega_{mDrk} + \Omega_{mVis}$

Out[39]= $\frac{1}{3}$

In[40]:= $\Omega_\gamma = 0.01$;

In[41]:= $\Omega_k = -\Omega_\gamma$;

In[42]:= $\Omega == (\Omega_m + \Omega\Lambda) + (\Omega_\gamma + \Omega_k)$

Out[42]= $\Omega == 1.$

Age of the Universe

In[43]:= $R_H := \frac{c}{H_0}$

In[44]:= Convert [R_H, Giga LightYear]

Out[44]= 14.5652 Giga LightYear

$\Omega_\gamma = 0.01$
$\Omega_k = -\Omega_\gamma$
$\Omega_{mVis} = 1 / 20 = 5$ %
$\Omega_\Lambda = 2 / 3 = 66.6...$ %
$\Omega_{mDrk} = 1 - \Omega\Lambda - \Omega_{mVis} = 17 / 60 = 28.33...$ %
$\Omega_m = \Omega_{mDrk} + \Omega_{mVis} = 1 / 3 = 33.3...$ %

and using an ΛCDM FLRW age factor of :

In[45]:= $a@z\_ := \int_0^{1/(1+z)} \left(\sqrt{(\Omega_m + \Omega_k) / a + \Omega\Lambda\ a^2}\right)^{-1} da$

In[46]:= a@0.

Out[46]= 0.94606

gives a very precise calculation for the current age of the universe of:

In[47]:= a@0 Convert [1 / H_0, Giga Year]

Out[47]= 13.789 Giga Year

with a theoretical error factor based on Fine Structure error of:

In[48]:= 8 InverseFineStructureConstantError % $\frac{10^9}{\text{Giga}}$

Out[48]= 35.2997 Year