Anti Gravity

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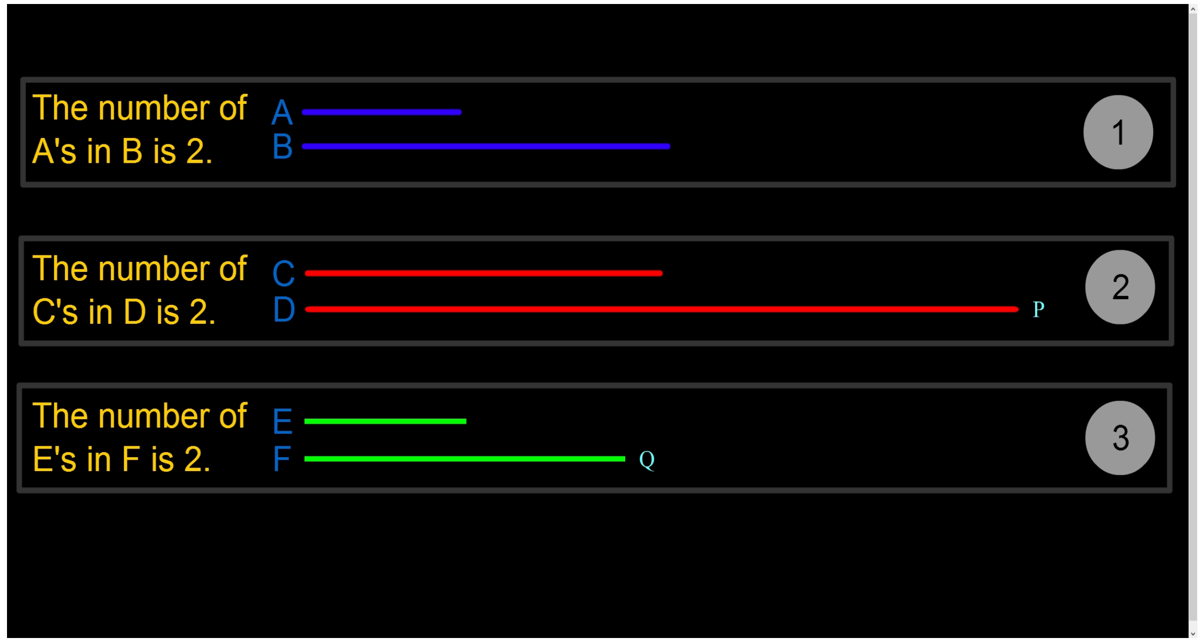
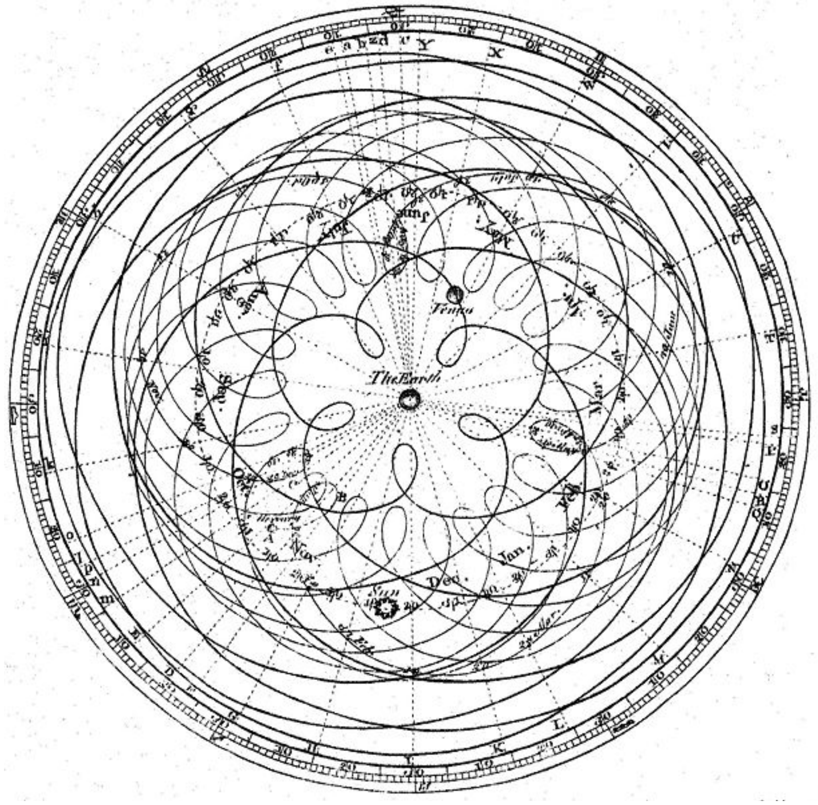
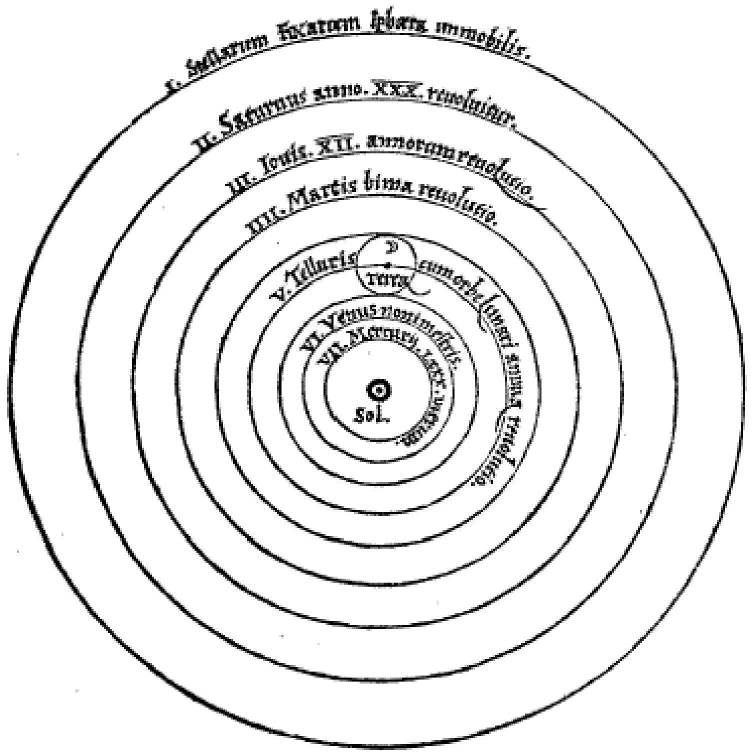


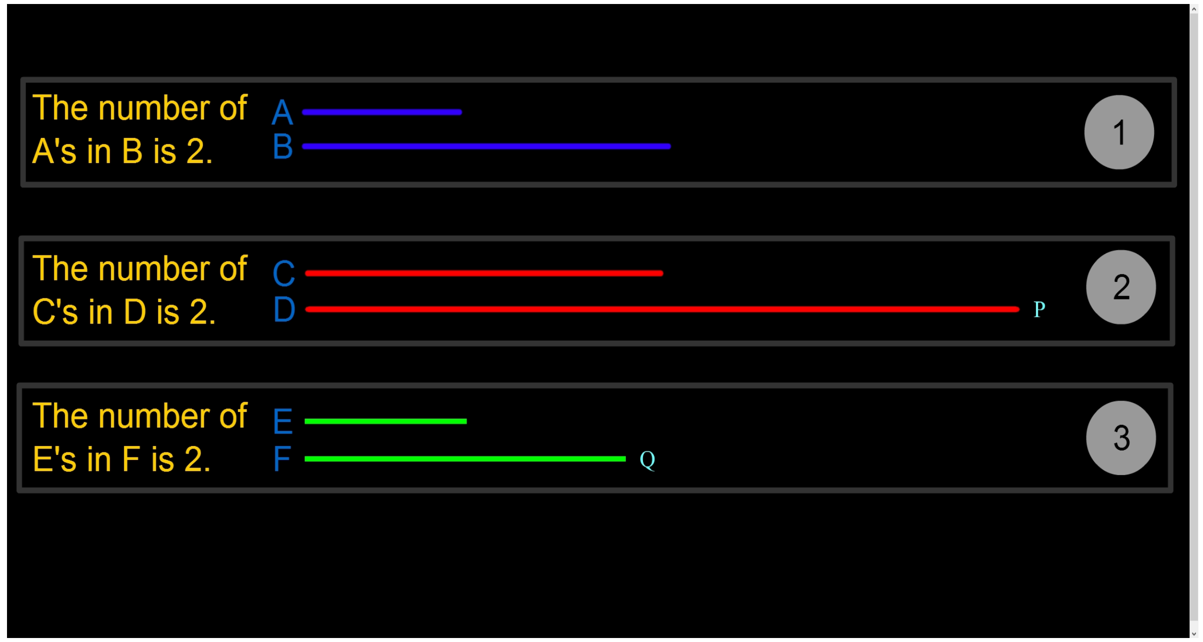
- Each length is static with respect to its ruler.
- Infinite number of reference lengths.
- Rulers encode observables as magnitudes
- Experiments are verified by clocks and rulers.
- A clock is a dynamic ruler.
- Velocity or speed is interchangeable with time.

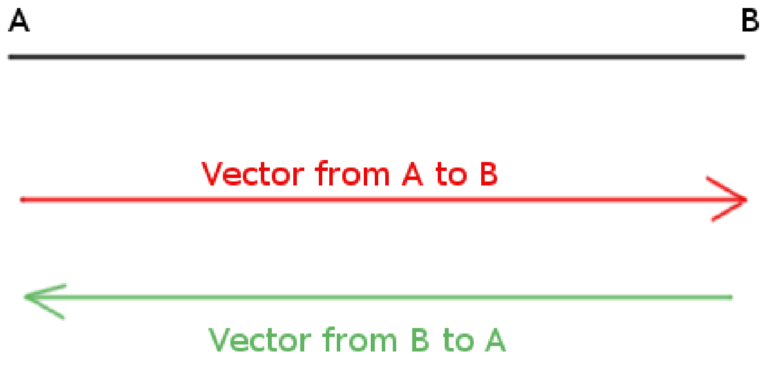
Before Copernicus





After Copernicus

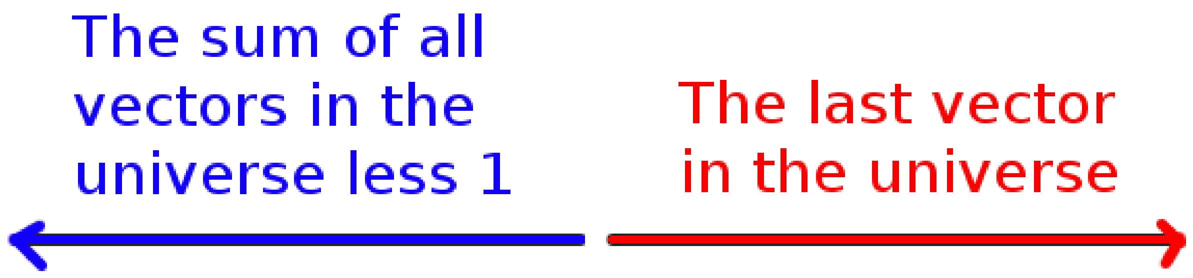




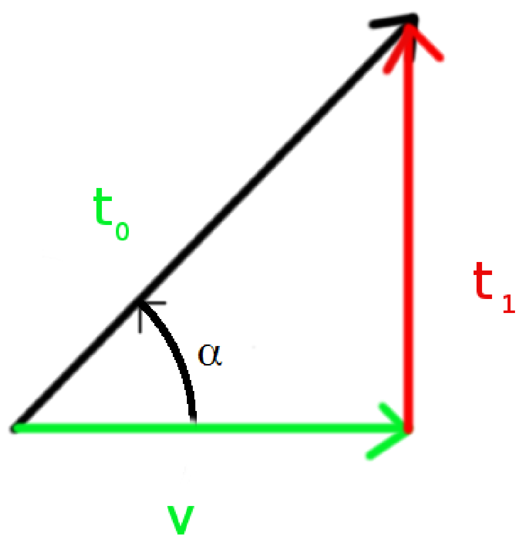
The Cosmic Sum

For all vectors: $S = \sum_{i=0}^{n} v_i = 0$ *(or null)*

The units are abstract and so this sum applies to all vector types *which implies:* $s = [\sum_{i=1}^{n} v_i] + v_0 = 0$



and for the sum of all inertial frames: $S = \sum_{i=0}^{n} s_i = 0$

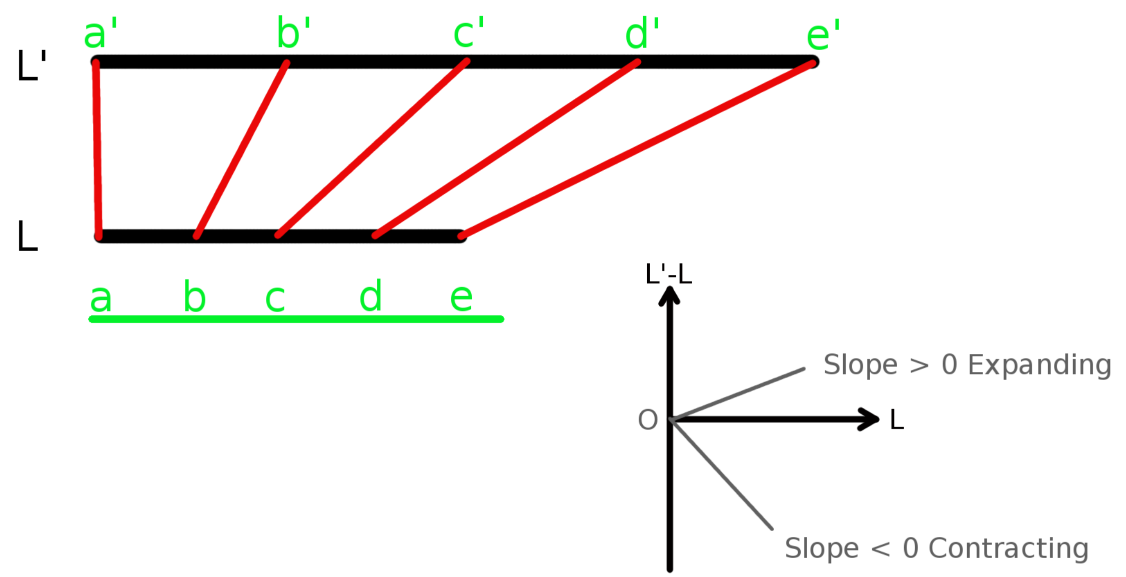


$$\sin(\alpha) = \frac{t_1}{t_0} = \sqrt{1 - \cos^2(\alpha)}$$

$$\text{Mine: } \frac{t_1}{t_0} = \sqrt{1 - \frac{v^2}{t_0^2}}$$

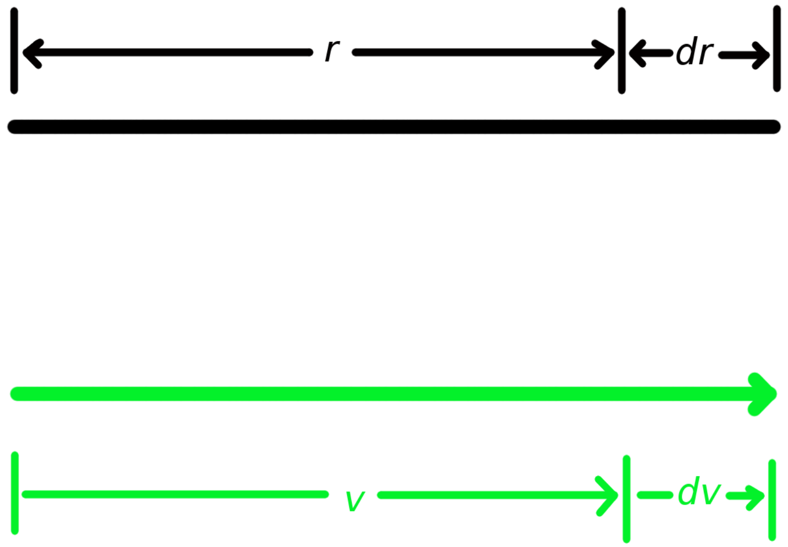
$$\text{Einsteins: } \frac{t_1}{t_0} = \sqrt{1 - \frac{v^2}{c^2}}$$

The speed of light is the best natural unit of time.



- Hubble's Law is a Law of constant proportions
- L' – L is a length
- Measure it with L to get a static magnitude
- Measure that with a dynamic ruler for the magnitude of change.

Hubble's law: $V=Hr$



r and v both change by the same proportion s... $s\,r = r + dr$

Rewriting as... $s = \dfrac{r + dr}{r}$

Then... $sv = v + dv$ gives $s = \dfrac{v + dv}{v}$

which gives us: $\dfrac{r + dr}{r} = \dfrac{v + dv}{v}$

rearranging …

$$(r + dr)v = (v + dv)r$$

multiplying through gives...

$$rv + v\,dr = rv + r\,dv$$

the *rv*'s cancel and you have...

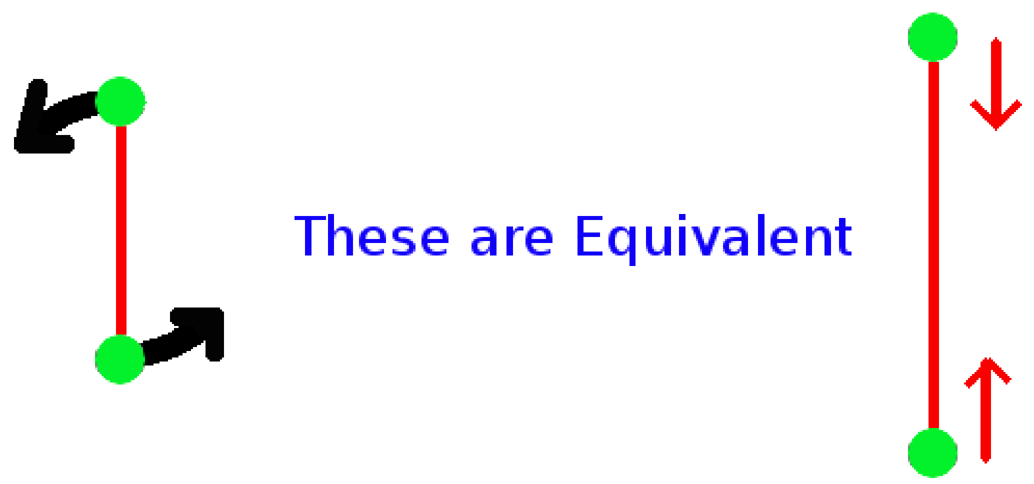
$v\,dr = r\,dv$ divide both sides by *dt*

$v\dfrac{dr}{dt} = r\dfrac{dv}{dt}$ which is $v^2 = r\,a$ or...

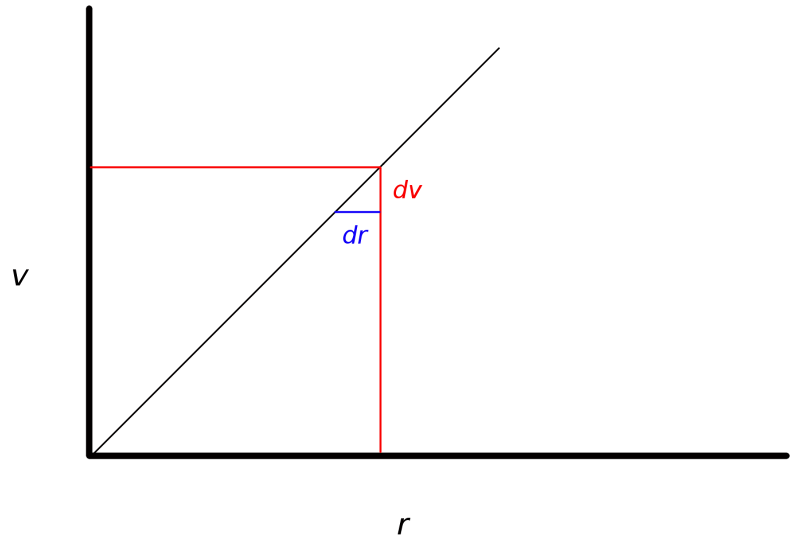
This moves Hubble's law "up a dimension"

$$a = \frac{v^2}{r}$$

Not uniform circular rotation!!



- Both represent changes in length and time.
- Circular is strictly angular
- contraction/expansion is strictly magnitude



$$\frac{dv}{dr} = \frac{v}{r}$$

$$v\,dr = r\,dv$$

$$v\frac{dr}{dt} = r\frac{dv}{dt}$$

$$a = \frac{v^2}{r}$$

and we can re-write $v\,dr = r\,dv$

as

$v = \frac{dv}{dr} r$ and from fig 2 we can see that *dv/dr* is constant and so we also have.

$$v = H\,r$$

So far

- Hubble's law $v = H\,r$ directly implies $a = \frac{v^2}{r}$
- Uniform rectangular expansion
- Space and time must change together.
- Uniform rectangular expansion is equivalent to uniform circular rotation

Relative consideration

Since length contracts with velocity... we have

$$r' = r\sqrt{1 - \frac{v^2}{c^2}}$$ then we have...

$$r' = r\sqrt{1 - \frac{H^2 r'^2}{c^2}}$$

after a bit of algebra we have...

$$r' = \frac{rc}{\sqrt{c^2 + H^2 r^2}}$$ Eq. 1

The Pale Yellow Equation (or Pyeq)

substituting this into $a = \frac{(Hr')^2}{r}$ gives

$$a = \frac{H^2 r c^2}{c^2 + H^2 r^2}$$ The Blue Equation

since r can be infinite it is interesting to note that...

$a = \frac{c^2}{r}$ but only for r where Hr >> c

When $r = 0$, $a = 0$

when Hr << c we have

$a = H^2 r$ The Beige Equation

And when

$H r = c$

we have

$$a=\frac{H^2 r}{2}$$ This is at the calibration radius

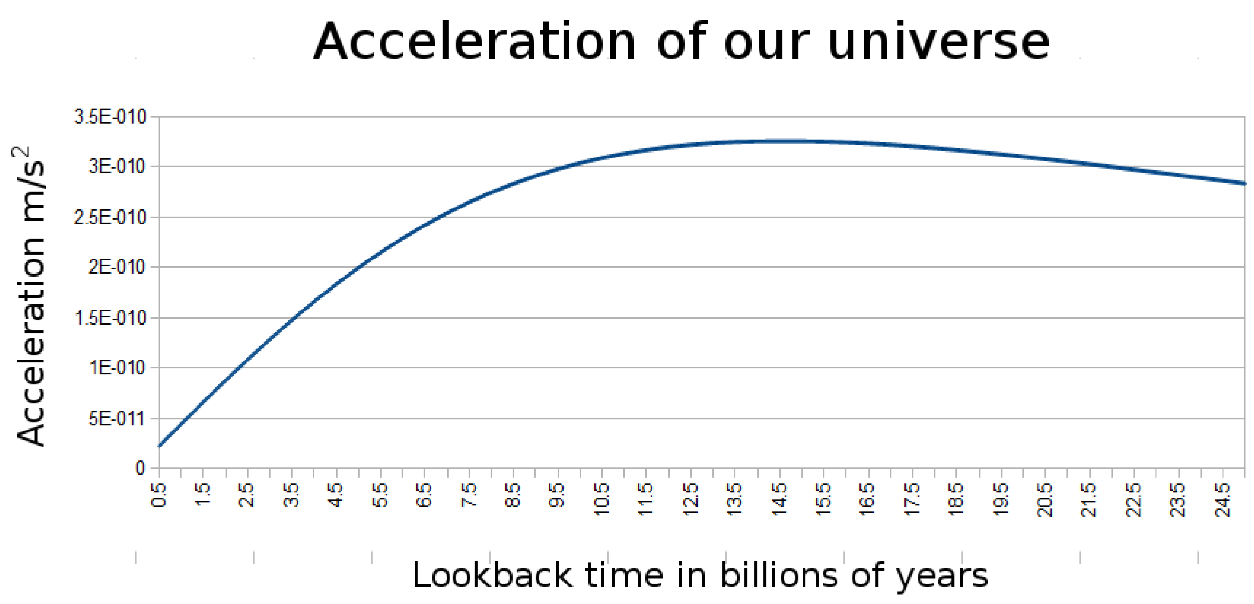


figure AOOU

A quotient models a measurement

magnitude of measurement = length/ruler

or simplified :

$$s_0 = \frac{r}{r_0}$$

r_0 is the reference length, r is the length we want to measure and s_0 is the result. Or

$$s_0 r_0 = l$$

Semantic = physical

Keep the symbolic part separate!

Measure the same length from the second frame

$$s_1 r_1 = l$$

And because it's the same length we have...

$$s_0 r_0 = l = s_1 r_1$$

And we drop the assumption that we are simply talking unit conversion. (but sometimes that's all it is)

Symmetric “Rulers” in different frames

$s_0 r_0 = s_1 r_1$ $s_0 v_0 = s_1 v_1$ ***AND*** $s_0 a_0 = s_1 a_1$

r and *v* are rulers. *r* measures length and *v* measures speed

And a measures acceleration!

Frame 0 is galactic space and frame 1 is ours. The *s*'s represent the spatial density of each frame.

in special relativity lengths change like so... $l' = l\sqrt{1 - \frac{v^2}{c^2}}$ and...

$m' = \frac{m}{\sqrt{1-\frac{v^2}{c^2}}}$ and multiplying l' by m' gives $m' l' = m l$ compare with:

$$s_0 r_0 = s_1 r_1$$

And since spatial density varies in exactly the same way it can be used as if it were mass!!! In fact, there may not be a way to separate them. So lets call it mass.

Incorporating mass we then have....

$$m_0 a_0 = m_1 a_1$$

adding in our term for acceleration...

$$m_0 a_0 = \frac{m_1 r_0 H^2 c^2}{c^2 + H^2 r_0^2}$$ Eq. 2 The grayt equation :)

Represents the rate of acceleration of the universe.
Or the opposite rate at which matter is shrinking???!!

For very large r_0...

$$m_0 a_0 = \frac{m_1 c^2}{r_0}$$

Notice the mc^{2}

$$\int F \, dr = E$$

So we find the anti-derivative of our Force equation..

$$E = \frac{m_1 r_0 c^2 H^2}{\sqrt{H^2 c^2}} \tan^{-1}\left(r_0 \sqrt{\frac{H^2}{c^2}}\right)$$

and from 0 to infinity is...

$$E = m_1 r_0 c H \frac{\pi}{2}$$ Eq. 3

The Olive Equation

to calibrate...

choose r_0 where $H r_0 = c$

to get

$$m_1 r_0 c H \frac{\pi}{2} = m_1 c^2 \frac{\pi}{2}$$

or...

$$m_1 r_0 c H = m_1 c^2$$ Eq. 42

And that looks exactly like Einsteins very famous :

$$\hbar f = mc^2$$

Putting this back into our force equation:

and for very large r the Gray equation becomes

$$m_0 a_0 = \frac{m_1 r_0 c}{r_0^2} = \frac{K}{r_0^2}$$

So … given that it looks like the electrostatic force we'll calibrate to an electron and use Eq 2.

solving for r_0...

$$r_0 = \frac{K}{m_1 c^2}$$

The classical radius of the electron

and since our calibration radius is $r_0 = \frac{c}{H}$

we can solve for H at this radius...

$$H = \frac{c}{r_0} = \frac{m c^3}{K}$$ or $1.0638709927 \times 10^{23}$/s

Now … putting m_1, r_0 and c together gives us the value...

$$\rho = 7.6955806873 \text{ x } 10^{-37}\, Kg\, m^2/s$$

and since $\hbar f = mc^2$ ala Einstein (and P. Dirac, Di Broglie, and Compton). We have..

$$\rho H = \hbar f$$ or...

$$\frac{\rho}{\hbar} = \frac{f}{H} = \alpha$$

going back to Eq1 and plotting the graph and calculating r_1 from RCW...

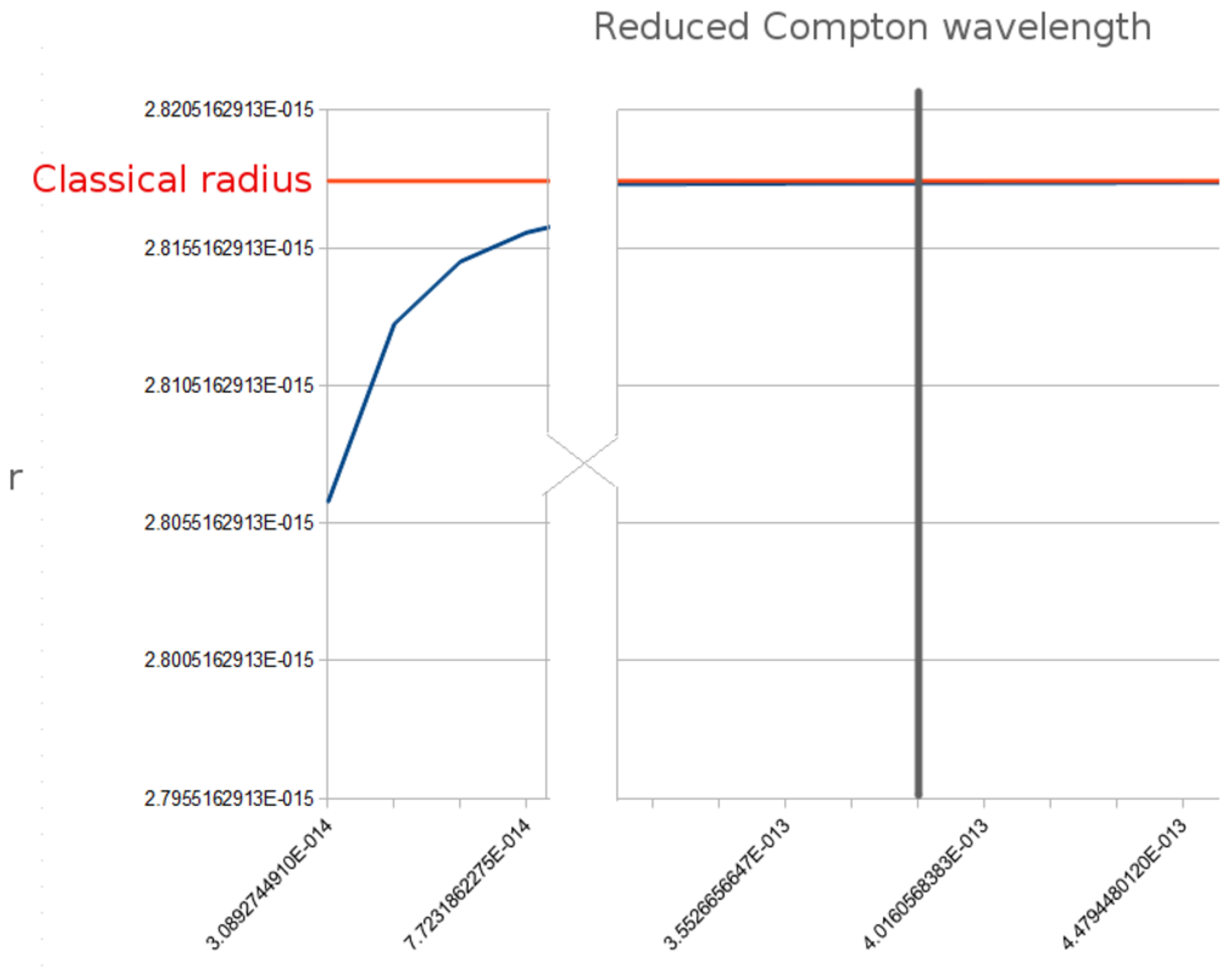


Figure 1

$$r = \frac{\hbar}{mc} = 3.8615931138 \times 10^{-13\mathrm{m}}$$

and putting this into Eq. 1 $r' = \frac{r\,c}{\sqrt{c^2 + H^2 r^2}}$ gives:

$$r' = 2.81786493 \, x \, 10^{-15} \, m$$

and the classical radius for the electron is:

$$r_e = 2.8179402761 \, x \, 10^{-15} \, m$$

the difference is:

$$r_e - r' = 7.5026569320 \, x \, 10^{-20}$$

or as a percentage :

about .0027 % discrepency

and from this we have for our ratio...

or

$$\frac{r_0}{r_1} = \frac{2.81786493 \times 10^{-15}}{3.8615926771 \times 10^{-13}}$$

which is :

$$\alpha = 7.2971573 \times 10^{-3}$$

The value of alpha from NIST is:

$$\alpha = 7.2973525698 \times 10^{-3}$$

If an electron is a compressed space then Alpha tells us what the red shift is

$$\frac{\rho}{\alpha} H \alpha = \hbar f$$

or

$$m_1 \frac{r_0}{\alpha} c = m_1 r_1 c$$

is constant and equal to $\hbar$

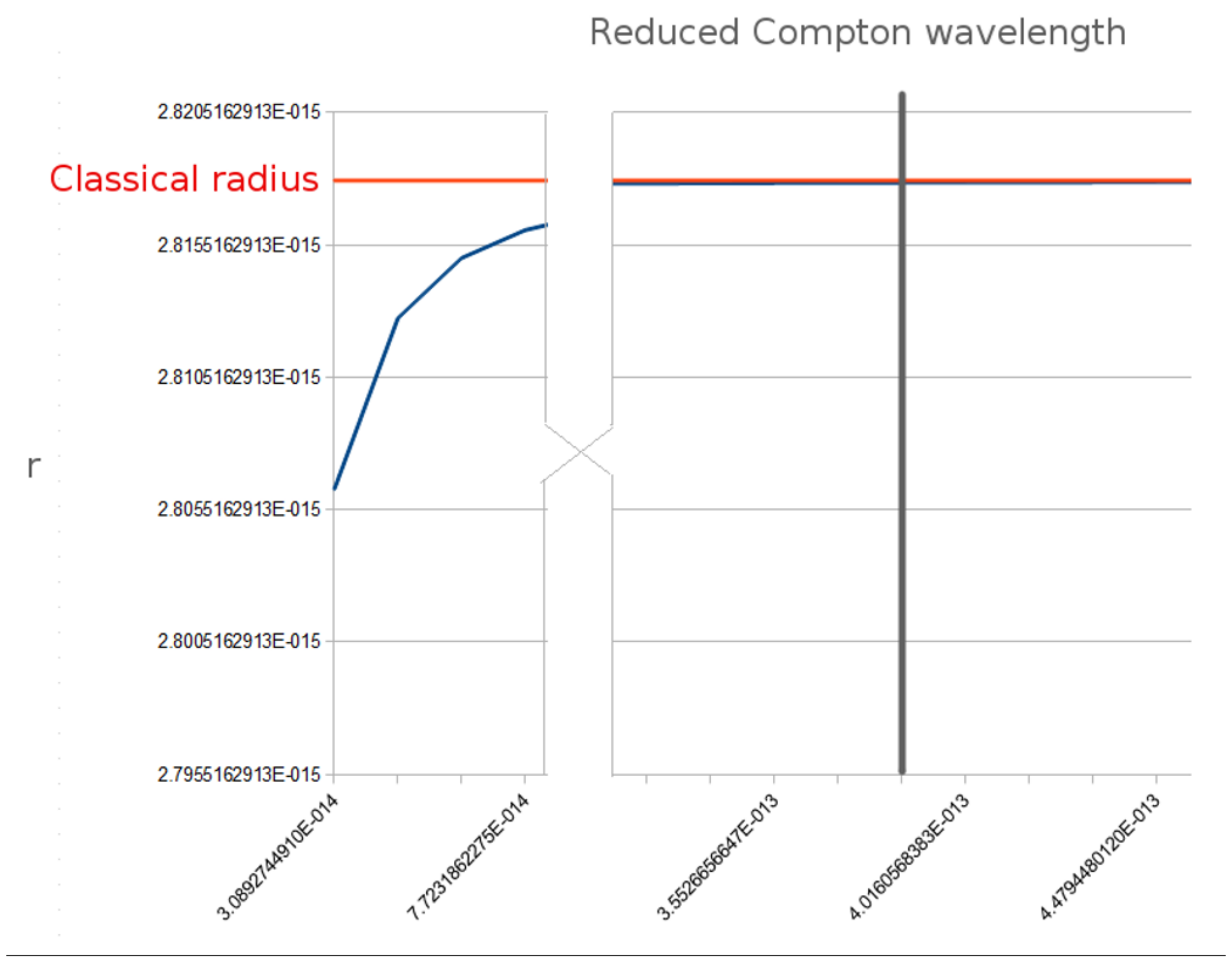

Reduced Compton wavelength
Classical radius
r
2.8205162913E-015
2.8155162913E-015
2.8105162913E-015
2.8055162913E-015
2.8005162913E-015
2.7955162913E-015
3.0892744910E-014
7.7231862275E-014
3.5526656647E-013
4.0160568383E-013
4.4794480120E-013

Fig. 1

Surface area of a sphere = $4\pi r'^2$

Since r' is approximately constant

the relative density is:

$$d = 4\pi \frac{k^2}{4\pi r^2} = \frac{k^2}{r^2}$$

Eq 2 describes force as a function of curved space so it should work for gravity as well. For a blackhole we have...

$$m_1 a_1 = \frac{m_1 r_0 H^2 c^2}{c^2 + H^2 r_0^2} \approx \frac{G m_1 m_2}{r^2}$$

$$a = \frac{r H^2 c^2}{c^2 + H^2 r^2} \approx \frac{G m}{r^2}$$

and at our calibration radius $Hr = c$ …

$\frac{r c^2}{2} \approx G m$ and finally

$r \approx \frac{2 G m}{c^2}$ Matches the Schwarzchild radius

Comparing to an electron's calibration radius...

$$r = \frac{\hbar}{mc} = \frac{2\text{Gm}}{c^2}$$

gives an m of $m = \sqrt{\frac{\hbar c}{2\text{G}}}$

Planck mass is: $m = \sqrt{\frac{\hbar c}{G}}$ and...

We can do the same thing with …

$$m_1 a = \frac{G m_1 m_2}{r^2}$$ cancel an m...

$$a = \frac{G m}{r^2}$$ and since $a = H^2 r$ we have

$$H^2 r = \frac{G m}{r^2}$$ or $$H^2 r^3 = G \frac{\hbar H}{c^2}$$

$$H r^3 = G \frac{\hbar}{c^2}$$ and since m is really only m at our calibration radius $Hr = c$

we have $$r = \sqrt{\frac{G \hbar}{c^3}}$$ which is Planck length

And finally.... The mass of the universe

Net inward acc + net outward acceleration = 0

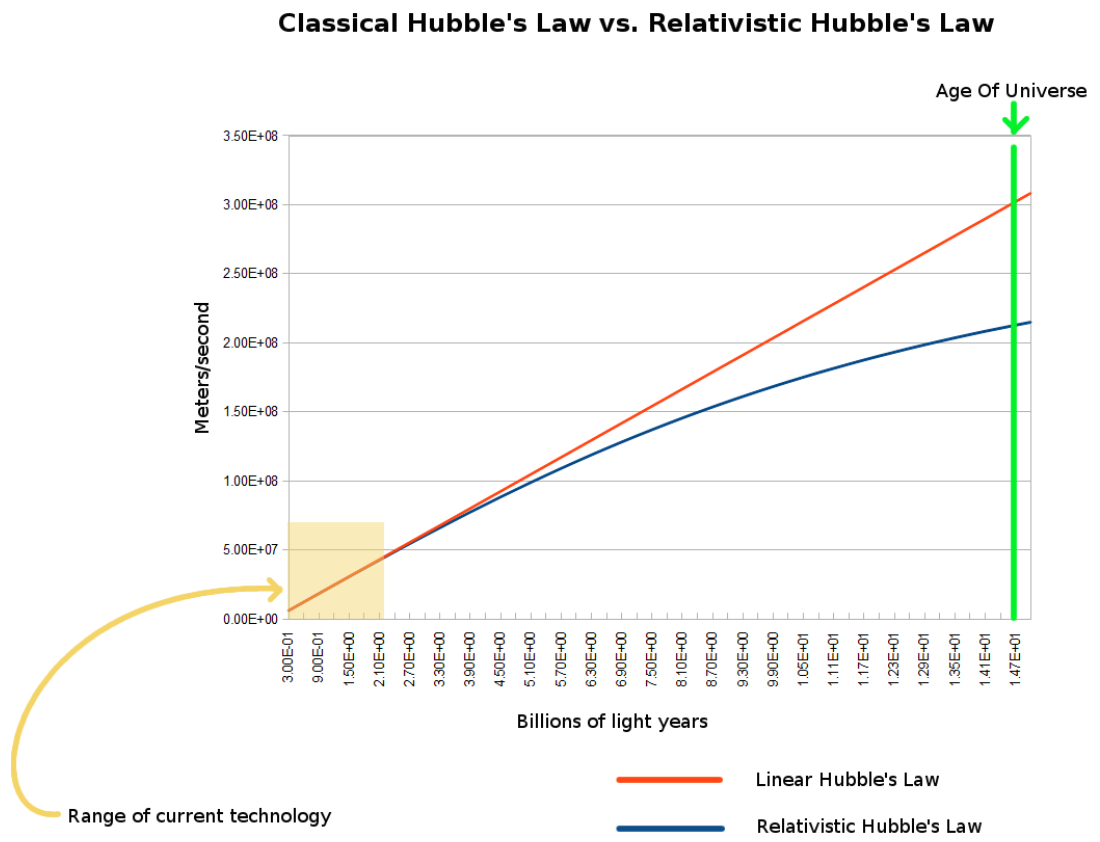
$$\frac{-Gm}{r^2} + H_0^2 r = 0$$ or

$$m = \frac{c^3}{GH_0}$$ which gives us:

$m = 1.8562672996 \text{ x } 10^{53}\, Kg$ The approximate measured mass:

$$\text{measured mass} = 3.14 \times 10^{54}\, kg$$

error = 41%



Verifying the theory... how to do it?

Summary

- Dimensions are relative too
- Classical time does not exist
- Special relativity can be derived without lightspeed
- Gravitation can be derived from SR
- The universe is a composition of n parallel spacetimes. I call one of

these a quantum subspace.

- A model of a measurement tells us how to anchor the physical to the abstract to get objective and universal natural units.
- The electron is a single spacetime
- Mass comes from relatively dense space
- Speed is the only thing known to cause curved spacetime.
- The Universe is steady state

- There is no dark energy.