

## Hubble Expansion & CMBR & Bekenstein Hawking Entropy

Hubble Expansion is Kinetic Energy Of Space Time Dropping as Entropy Rises

$$\left( \frac{70406.7914 \text{ (m/s)}}{1 \text{ Mpc}} \right) / \left( \frac{160.390049 \text{ GHz}}{G} \right) * (6.5248935 \text{ (kg}^{-1}) * (\text{m/s}) * (\text{c}^2) * (8 \text{ s})) = 1$$

$$1 / \left( \frac{6.5248935 / (2 * \pi) * (\text{m/s})}{1 \text{ Mpc}} \right) / \left( \frac{160.390049 \text{ GHz}}{G} \right) * (6.5248935 \text{ (kg}^{-1}) * (\text{m/s}) * (\text{c}^2) * (8 \text{ s})) = 67798.6418$$

$$70406.791856 / 67798.6422 = 6.5248935 / 2\pi$$

$$(0.5 * 2.1764702\text{e-}8 \text{ kg} * (\text{c}^2)) / \left( \frac{(\text{c}^7)}{(\hbar * (\text{G}^2))} \right) * (\text{planck length}^3) = 0.50000000$$

$$1 / \left( \frac{1}{299792458} * \text{kg} * (\text{c}^2) \right) / \left( \frac{(\text{c}^7)}{(\hbar * (\text{G}^2))} \right) * (\text{planck length}^3) = 6.5248935$$

## Planck Parameters

$$\left( \frac{6.5248935 \text{ ((kg m) / s)}}{c} * (\text{c}^2) \right) / \left( \frac{(\text{c}^7)}{(\hbar * (\text{G}^2))} \right) * (\text{Planck length}^3)$$

## Friedmann Parameters

$$(3.71295774\text{e-}28 \text{ kg} * (\text{c}^2)) = (3.33703999\text{e-}11 \text{ pascal}) * (1 \text{ m})^3$$

## Electron Compton Parameters

$$(0.5 \text{ electron mass} * \text{c}^2) = (9.12227006\text{e+}20 \text{ pascal} * \pi) * (2.42632627\text{e-}12 \text{ m})^3$$

$$(\text{Planck length} * 1.50122737\text{e+}23) / \text{meter} = 2.42632627\text{e-}12$$

$$\left( (8^{0.5}) * 6.5248935 \right)^{0.25} / \text{Boltzmann constant} = 1.50122737\text{e+}23 \text{ m}^{-2} \text{ kg}^{-1} \text{ s}^2 \text{ K}$$

$$\left( 1 / \left( \frac{1}{299792458} * \text{kg} * (\text{c}^2) \right) / \left( \frac{(\text{c}^7)}{(2\pi * \hbar * (\text{G}^2))} \right) * (\text{planck length}^3) \right)^{0.5} = 1.01905301786$$

<http://vixra.org/pdf/1102.0032vB.pdf>

[https://docs.google.com/document/d/17W\\_L19\\_YvxkKXv1vNya0YekR0vb8K31XTq4\\_4-CssSM](https://docs.google.com/document/d/17W_L19_YvxkKXv1vNya0YekR0vb8K31XTq4_4-CssSM)

$$\text{Redshift Hubble } 70406.791856 \text{ m/s/Mpc} = (67798.6422484 * 6.5248935 / 2\pi)$$

$$1.70377849e+53 \text{ kg} * (((70406.791856 * (\text{m} / \text{s})) / (1 \text{ Mpc})) * (\text{planck length} / (2\pi))) = 1 \text{ m kg} / \text{s}$$

$$\text{Hubble} ((\text{mass universe} * (((70406.791856 * (\text{m} / \text{s})) / (1 \text{ Mpc})) * \text{planck length}) = (2\pi \text{ kg m/s}))$$

$$c * (((\text{planck length} * 0.5)^3) / (\text{Planck Time} * 0.5)) * 1.70377849e+53 (\text{kg}^{(-1)}) = 1 \text{ m}^4 \text{ kg}^{-1} \text{ s}^{-2}$$

Bulk Modulus Reverberations & Wave Speed @ c .... Bjerknes Forces

$$((((1.70377849e+53 \text{ kg}) * G) / (c^2)) / (13.88805086 \text{ billion light years})) * 6.5248935) / (2\pi) = 1$$

$$1.70377849e+53 \text{ kg} * (((70406.791856 * (\text{m} / \text{s})) / (1 \text{ Mpc})) * (\text{planck length} / (2\pi))) = 1.00000000 \text{ m kg/s}$$

[https://en.wikipedia.org/wiki/Hubble%27s\\_law#Observed\\_values\\_of\\_the\\_Hubble\\_constant](https://en.wikipedia.org/wiki/Hubble%27s_law#Observed_values_of_the_Hubble_constant)

$$((0.5 \text{ Planck Time}) / ((0.5 \text{ Planck Length})^3)) / 299792458 = 1.70377849e+53 \text{ s} / \text{m}^3 = \text{mass universe}$$

$$((70406.791856 * (\text{m} / \text{s})) / 6.5248935) * (2\pi) = 67798.6422$$

<https://docs.google.com/document/d/158sSx9IAe1a4No0gD--OlqMczyEaf6h6upC-jSYZfl>

CMBR

[https://en.wikipedia.org/wiki/Cosmic\\_microwave\\_background#Features](https://en.wikipedia.org/wiki/Cosmic_microwave_background#Features)

160.390033967 GHz

$$(1 / ((6.022140857e+26^{0.5} \text{ joules})) / (\text{m}^3)) = 4.074971223-14 \text{ Joules/m}^3$$

$$((4.074971223e-14 \text{ joules}) / (c^2)) / (0.5 * \text{electron mass}) = 0.995460764$$

[https://en.wikipedia.org/wiki/Avogadro\\_constant](https://en.wikipedia.org/wiki/Avogadro_constant)

6.022140857e+26

[https://en.wikipedia.org/wiki/Friedmann\\_equations#Density\\_parameter](https://en.wikipedia.org/wiki/Friedmann_equations#Density_parameter)

3.71295774e-28 kg/m<sup>3</sup>

$$((((160.390033967 \text{ GHz}) * (3.71295774e-28 (\text{m}^2)))) / \text{Planck's constant}) * (1 \text{ kg})) = c^2$$

$$((160.390049 \text{ GHz} * (\text{planck length} / c)) / (\hbar * (2\pi))) / ((6.5248935 * (2 * \text{kg}^{-1} / \text{m} / \text{s})) = 1$$

$$((6.5248935 ((\text{kg m} / \text{s}))^2) / (((160.390049 \text{ GHz}) / c) / (4 * \pi))) = 1 \text{ m}^3 \text{ kg}^2 / \text{s}^2$$

$$(0.5 \text{ kg} \times G/c^2) = 3.71295774e-28 \text{ m}$$

$$(((160.390049656 \text{ GHz}) \times (3.71295774e-28 \text{ (m}^2))) / (\hbar \times 2\pi)) \times (1 \text{ kg}) = 8.98755179e+16$$

$$\text{CMBR joules/m}^3 = (1/6.022140857e+26^{0.5} \text{ joules}) / \text{m}^3$$

$$(2/6.022140857e+26^{0.5} \text{ joules}) / \text{m}^3 = 508679.401 \text{ eV} / \text{m}^3$$

<https://en.wikipedia.org/wiki/Electron>

$$(6.022140857e+26 \text{ (kg} / (\text{m}^3))) \times ((0.5 \text{ kg} \times G) / (c^2)) = 0.223599545 \text{ kg} / \text{m}^3 -$$

$$1 / ((6.022140857e+26 \text{ (m}^{-1})) \times ((5^{0.5} \text{ kg}) / (c^2))) = 6.67429648e-11 \text{ m}^3 \text{ kg}^{-1} \text{ s}^{-2}$$

$$(1 / ((6.022140857e+26 \text{ kg}) \times ((5^{0.5} \text{ (m}^{-1})) / (c^2)))) / G = 1.00003244$$

$$1.70377849e+53 \text{ kg} = \text{Mass Universe}$$

$$(1.70377849e+53^{0.5/2} \times G/c^2 \times (6.5248935 \text{ kg m/s})) = 1 \text{ m}^2/\text{s}$$

$$(((2.0638563e+26 \text{ kg}) \times (2.0638563e+26 \text{ kg}) \times 2 \times G) / (c^2)) / ((13.8879381 \text{ billion light years}) / \sqrt{5 / (1 + (1 / (2 \times \pi))))) = 1$$

$$0.5 \times \sqrt{5 / (1 + (1 / (2 \times \pi)))} = 1.03844681996$$

$$\sqrt{5 / (1 + (1 / (2 \times \pi)))} = 2.07689363991 = \text{Fuller's Constant}$$

$$\sqrt{5 / (1 + 1 / (2 \times \pi))} \pi = 6.52475380144 \quad \text{Planck Momentum}$$

**Bekenstein Hawking Entropy**

$$\underline{((m^2) / c) / (((\text{planck length} \times 0.5)^3) / ((\text{planck time}) \times 0.5)) = 1.70377849e53}$$

$$\text{Bekenstein Hawking Entropy} = S_{bh} = A / (4 \times (\text{Planck Length})^2)$$

[http://www.scholarpedia.org/article/Bekenstein-Hawking\\_entropy#Formula\\_for\\_black\\_hole\\_entropy](http://www.scholarpedia.org/article/Bekenstein-Hawking_entropy#Formula_for_black_hole_entropy)

$$(4/c / ((\text{Planck Length})^3 / (\text{PlanckTime}))) = 1.70377849e+53$$

**Bekenstein Hawking Entropy .....  $8\pi$  should be  $(6.5248935/0.25)$**

Clearly based on Bulk Modulus, Wave Speed & Doppler shift.  
the (Planck length is just part of a Ratio, a piece of the Bulk Modulus Formula)

$$((1 \text{ joules}) / (1 \text{ pascal}))^{(1 / 3)} = 1 \text{ meter}$$
$$(\text{Planck Energy}/\text{Planck Pressure})^{(1/3)} = \text{Planck Length}$$

We're inside an Ideal Fluid or it's equivalent

Riemann rearrangement theorem

<https://photos.app.goo.gl/1oII4SZLeMu0HoRQ2>

<https://youtu.be/OBPpRqxY8Uw?t=18m12s>

<https://photos.app.goo.gl/1oII4SZLeMu0HoRQ2>

Susskind "GOES OF THE RAILS" into Copenhagen interpretation mysticism at

<https://youtu.be/OBPpRqxY8Uw?t=21m23s>

$$0.5 * 1.70377849e53 \text{ kg} * (c^2) = 7.65639871e69 \text{ joules}$$

$$(((6.5248935 / (2 * \pi)) * (1.70377849e53 \text{ kg}) * G) / (13.8880509 \text{ billion light year}))^{0.5} = 299792458 \text{ m} / \text{s}$$

$$((0.5 \text{ Planck Time}) / ((0.5 \text{ Planck Length})^3)) / 299792458 = 1.70377849e+53 \text{ s} / \text{m}^3$$

Bekenstein Hawking Entropy .....  $8\pi$  should be  $(6.5248935/0.25)$

$$1 / ((1.70377849e+53 ((\text{kg s}) / (\text{m}^3))) * ((0.25 \text{ Planck Length}) / c) * G) = 6.52489352$$

$$(1.70377849e+53 ((\text{kg s}) / (\text{m}^3))) * ((0.25 * \hbar) / c) * G = 1 \text{ m kg} / \text{s}$$

$$1 / ((1.70377849e+53 ((\text{kg s}) / (\text{m}^3))) * (0.25 / c) * G) = 1.0545718e-34 \text{ meters} = \hbar$$

The MODULUS is Planck Time

The Volume is Planck Volume

The (Volume of the Universe) is a Pseudo-Volume because of Bulk Modulus

$$(((1 / ((1.70377849e+53 * (\text{kg} / ((13.8880509 \text{ billion light years})^3)))) * (0.25 / c) * G)) * \text{planck length}) / c / (4\pi) = 1.02616783 \text{ m s}^2$$

[youtube.com - Liquid Helium II the superfluid \(part 6 Second sound\)](https://www.youtube.com/watch?v=...)

Superfluid Helium

$$((50000 \text{ pascals}) / (125 \text{ kg/m}^3))^{0.5} = 20 \text{ m / s}$$

$$((0.5 \text{ bar}) / (125 \text{ (kg / (m}^3))^{0.5} = 20 \text{ m / s}$$

The MODULUS is Planck Time

The Volume is Planck Volume

<https://photos.app.goo.gl/HjGaozufxoKHtYaP2>

<https://photos.app.goo.gl/uAHcnqP3nd9TFd8y1>

The (Volume of the Universe) is a Pseudo-Volume because of Bulk Modulus of a Surface Area over Time

Equations of Significance Tufail Abbas-Ruud Loeffen

[http://vixra.org/author/ruud\\_loeffen](http://vixra.org/author/ruud_loeffen)

[http://vixra.org/author/tufail\\_abbas](http://vixra.org/author/tufail_abbas)

<https://docs.google.com/spreadsheets/d/1QnqoVh2PIW8wh3LM077EpZCqfiTwu97xfpqYyDihxg8/>

Mass universe

$$((1.837362047382e+53 \text{ kg}) / (1.70377849e+53 \text{ kg})) / ((6.5248936 / (2 * \pi))^2) = 0.99998728698$$

Radius Universe

$$1.364426941885320E+26 / ((13.8880509 \text{ billion light years} * 6.5248935) / (2 * \pi)) = 1.00000008$$

Hubble Constant

$$((2.197204179988970E-18 \text{ s}) * 1 \text{ Mpc}) / (1 / ((((((6.5248935 / (2 * \pi)) * (\text{m / s})) / (1 \text{ Mpc})) / (160.390049 \text{ GHz}) / \text{G}) * (6.5248935 * (\text{kg}^{-1})) * (\text{m / s})) * (\text{c}^2) * (8 \text{ s}))) = 0.999999926$$

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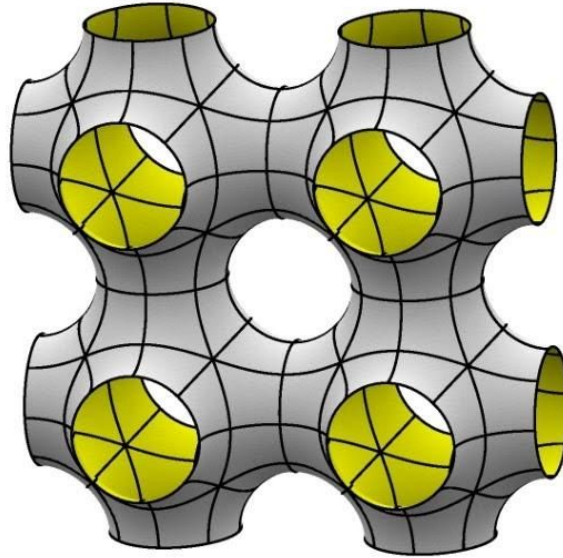
**schwartz p minimal surface**

$$\cos(x)+\cos(y)+\cos(z) = 0$$

$$e^{(-i x)/2} + e^{(i x)/2} + e^{(-i y)/2} + e^{(i y)/2} + e^{(-i z)/2} + e^{(i z)/2} = 0$$

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$$\frac{e^{-ix}}{2} + \frac{e^{ix}}{2} + \frac{e^{-iy}}{2} + \frac{e^{iy}}{2} + \frac{e^{-iz}}{2} + \frac{e^{iz}}{2} = 0$$

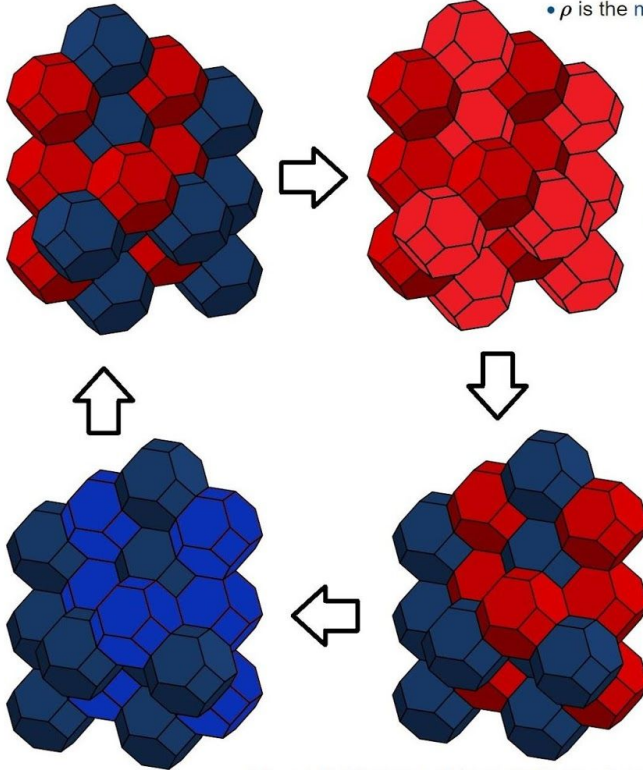


$$(((6.666666666e-11 / 2) * \text{pascals}) / (3.7037037037e-28 * (\text{kg} / (\text{meter}^3))))^{0.5} = 300000000 \text{ m / s}$$

where:

- $\gamma$  is the specific heat ratio of the gas
- $R_0$  is the steady state radius **3.7037e-28 meters**
- $p_0$  is the steady state pressure **6.666e-11/2 Pascals**
- $\rho$  is the mass density of the surrounding liquid **3.70373-28 kg**

$$f_0 = \frac{1}{2\pi R_0} \sqrt{\frac{3\gamma p_0}{\rho}}$$



**Pulsation**

When bubbles are disturbed, they pulsate (that is, they oscillate in size) at their natural frequency. Large bubbles (negligible surface tension and thermal conductivity) undergo adiabatic pulsations, which means that no heat is transferred either from the liquid to the gas or vice versa. The natural frequency of such bubbles is determined by the equation:

$$f_0 = \frac{1}{2\pi R_0} \sqrt{\frac{3\gamma p_0}{\rho}}$$

$$\frac{-p^2}{\hbar^2} + \frac{E^2}{\hbar^2 c^2} - \left(\frac{mc}{\hbar}\right)^2 = 0$$

$$-p^2 c^2 + E^2 - m^2 c^4 = 0$$

$$E^2 = p^2 c^2 + m^2 c^4$$

$$E = \pm \sqrt{p^2 c^2 + m^2 c^4}$$

$$(\hbar / (1.616229e-35 * 2\pi))^{0.5} = 1.01905282 = (\text{Planck Momentum})^{0.5}$$

$$((3.7037037037e-28 \text{ m}) / (1.666666666e-35 \text{ m})) / (3e+8 / 1822.5) = 135$$

$$((\text{Friedman Length m}) / (\text{Planck Length})) / (\text{speed of light} / (\text{Proton Electron Mass Ratio})) = \text{Fine Structure Constant}$$