

Brownian Motion = Kinematic Planck Viscosity

The Brownian Motion Relation is $D = (R \cdot T / (NA \cdot 6 \pi \eta a)) = (K_b \cdot T) / (6 \pi \eta a)$

<http://physics.gu.se/~frtbn/joomla/media/mydocs/LennartSjogren/kap6.pdf>

$((c^7) / (\hbar \cdot (G^2))) \cdot (\text{planck length} / c) = 2.49785931e+70 \text{ pascal seconds}$

$(\text{Planck Pressure}) \cdot (\text{Planck Time}) = \text{Planck Viscosity} = 2.49785931e+70 \text{ pascal seconds}$

$((c^7) / (\hbar \cdot (G^2))) \cdot (\text{planck length} / c) / ((c^5) / (\hbar \cdot (G^2))) = 4.84533077e-27 \text{ m}^2 / \text{s}$
Kinematic Planck viscosity

$(\text{Planck Pressure}) \cdot (\text{Planck Time}) / (\text{Planck Density}) = \text{Kinematic Planck viscosity} = 4.84533077e-27 \text{ m}^2 / \text{s}$

$(\text{Boltzmann constant} \cdot (1.416808e32 \text{ kelvin})) / (((c^7) / (\hbar \cdot (G^2))) \cdot (\text{planck length} / c)) \cdot \text{planck length} = 4.84533079e-27 \text{ m}^2 / \text{s}$

$(\text{Boltzmann constant} \cdot (\text{Planck Temperature})) / (((\text{Planck Pressure}) \cdot (\text{Planck Time})) \cdot \text{Planck Length}) = \text{Kinematic Planck viscosity} = 4.84533077e-27 \text{ m}^2 / \text{s}$

Friedmann Kinematic viscosity

$(\text{Boltzmann constant} \cdot (2.77672013 \text{ kelvin})) / (((6.67408e-11 / 2) \cdot \text{pascals}) \cdot (2 \text{ s})) \cdot (1 \text{ m}) = 5.74412434e-13 \text{ m}^2 / \text{s}$

$(2.1327691e-40 \text{ pascal} \cdot \text{s}) / ((3.71295774e-28 \text{ (kg} / (\text{m}^3))) \cdot ((5.74412434e-13 \text{ (m}^2) / \text{s})) = 1$

$(2.1327691e-40 \text{ pascal} \cdot \text{s}) / (3.71295774e-28 \cdot (\text{kg} / (\text{m}^3))) = 5.74412436 \times 10^{-13} \text{ m}^2 / \text{s}$

$((2.1327691e-40 \text{ pascal} \cdot \text{s}) \cdot (c^2)) / \text{Boltzmann constant} = 1.38836007 \text{ m}^{-1} \text{ s}^{-1} \text{ K}$

$1.38836007 \cdot 2 = 2.77672014 \text{ Kelvin}$

$((((\text{Boltzmann constant} \cdot (2.77672013 \text{ kelvin})) / (((6.67408e-11 / 2) \cdot \text{pascals}) \cdot (2 \text{ s})) \cdot (1 \text{ m}))) \cdot (c^2)) / 137.03599912) / 376.730313462 = 1$

$((1.60389183e+11 \text{ Hz}) / (20836617636.1328 \text{ hertz}))^{0.5} = 2.7744309876 \text{ Kelvin}$

$((\text{CMBR Hz}) / (\text{kelvin-hertz relationship}))^{0.5} = 2.7744309876 \text{ Kelvin}$

<https://physics.nist.gov/cgi-bin/cuu/Value?khz> = $2.0836612e+10 \text{ Hz}$

Hydrodynamic Fluctuations Broken Symmetry and Correlation Jun 1975
by Dieter Forster dieter@temple(dot)edu

<http://physics.gu.se/~frtbm/joomla/media/mydocs/LennartSjogren/kap6.pdf>

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<https://docs.google.com/document/d/1Ljusv5jFVliNWHzOEejwQJyrToKbJkoq68XLLuOnEkk>

CMBR is Brownian Motion Temperature

$((2.1327691e-40 \text{ pascal} \cdot \text{s}) \cdot (c^2)) / \text{Boltzmann constant} \cdot 2 = 2.77672014 \text{ m}^{-1} \text{ s}^{-1} \text{ K}$

Brownian Motion: Langevin Equation

The theory of Brownian motion is perhaps the simplest approximate way to treat the dynamics of nonequilibrium systems. The fundamental equation is called the Langevin equation; it contains both frictional forces and random forces. The fluctuation-dissipation theorem relates these forces to each other.

The random motion of a small particle (about one micron in diameter) immersed in a fluid with the same density as the particle is called Brownian motion. Early investigations of this phenomenon were made by the biologist Robert Brown on pollen grains and also dust particles or other objects of colloidal size.

The modern era in the theory of Brownian motion began with Albert Einstein. He obtained a relation between the macroscopic diffusion constant D and the atomic properties of matter.

The relation is

$$D = \frac{R \cdot T}{N_A \cdot 6\pi\eta a} = \frac{k_B \cdot T}{6\pi\eta a}$$

where R is the gas constant, $N_A = 6.06e+23/\text{mol}$ is Avogadro's number, T is the temperature, η is the viscosity of the liquid and a is the radius of the Brownian particle. Also $k_B = R/N_A$ is Boltzmann's constant.

The theory of Brownian motion has been extended to situations where the fluctuating object is not a real particle at all, but instead some collective property of a macroscopic system. This might be, for example, the instantaneous concentration of any component of a chemically reacting system near thermal equilibrium. Here the irregular fluctuation in time of this concentration corresponds to the irregular motion of the dust particle.