THE PYTHAGOREAN RATIOS OF FUNDAMENTAL PHYSICS - REALIZED?
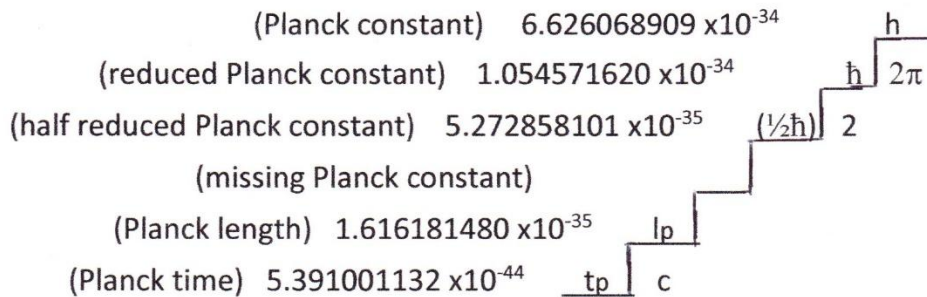
Vito R. D'Angelo - October 1, 2017
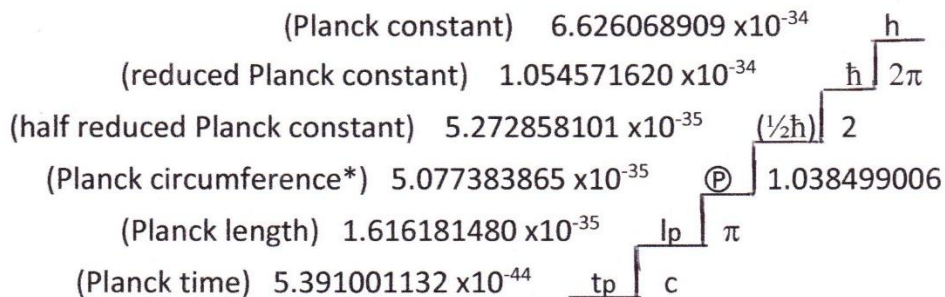(vrd156@gmail.com) (646-369-2506)

Abstract

From a mathematical perspective, the key to the universe lies at the central tenet of Pythagorean thought – that the universe can be explained by pure numbers, i.e. dimensionless ratios. A Planck constants hierarchy is created that postulates an undiscovered Planck constant – the Planck circumference, symbol Ⓟ. The Planck constants hierarchy produces dimensionless ratios, that allow for the first time the theoretical calculation of constants, e.g. the Planck momentum, Planck mass and Planck energy constants.

Standard model (incomplete) **Planck hierarchy schematic:**
(five well-known Planck constants in a hierarchical configuration)

$$
\begin{array}{lll}
\text{(Planck constant)} & 6.626068909 \times 10^{-34} & h \\
\text{(reduced Planck constant)} & 1.054571620 \times 10^{-34} & \hbar \quad 2\pi \\
\text{(half reduced Planck constant)} & 5.272858101 \times 10^{-35} & (\tfrac{1}{2}\hbar) \quad 2 \\
\text{(missing Planck constant)} & & \\
\text{(Planck length)} & 1.616181480 \times 10^{-35} & l_p \\
\text{(Planck time)} & 5.391001132 \times 10^{-44} & t_p \quad c
\end{array}
$$

Proposed (complete) **Planck hierarchy schematic, with the postulated Planck circumference* constant, symbol Ⓟ, and two respective ratios: π and 1.038499006**

$$
\begin{array}{lll}
\text{(Planck constant)} & 6.626068909 \times 10^{-34} & h \\
\text{(reduced Planck constant)} & 1.054571620 \times 10^{-34} & \hbar \quad 2\pi \\
\text{(half reduced Planck constant)} & 5.272858101 \times 10^{-35} & (\tfrac{1}{2}\hbar) \quad 2 \\
\text{(Planck circumference*)} & 5.077383865 \times 10^{-35} & Ⓟ \quad 1.038499006 \\
\text{(Planck length)} & 1.616181480 \times 10^{-35} & l_p \quad \pi \\
\text{(Planck time)} & 5.391001132 \times 10^{-44} & t_p \quad c
\end{array}
$$

(The speed of light value, c: 299792458, utilized as a dimensionless constant, same as c^2 in $E=mc^2$)

The theoretical calculation of fundamental constants via ratios of the Planck hierarchy schematic:

Planck momentum

$$MOp = 2 \left[\frac{(\frac{1}{2})\hbar}{ⓅP} \right] \pi = 6.525081696$$

where: $\frac{(\frac{1}{2})\hbar}{ⓅP}$ = 1.038499006 (ratio of attribute)

$\frac{1}{2}\hbar$ = 5.272858101 x10^{-35} (half of the reduced Planck)

ⓅP = 5.077383865 x 10^{-35} (postulated Planck circumference*, Planck length as diameter)

π = 3.141592653

Planck mass

$$mp = \frac{2 \left[\frac{(\frac{1}{2})\hbar}{ⓅP} \right] \pi}{c} = 2.176532972 \text{ x}10^{-8} \text{ kg}$$

where: $\frac{(\frac{1}{2})\hbar}{ⓅP}$ = 1.038499006 (ratio of attribute)

$\frac{1}{2}\hbar$ = 5.272858101 x10^{-35} (half of the reduced Planck)

ⓅP = 5.077383865 x 10^{-35} (Postulated Planck circumference*, Planck length as diameter)

π = 3.141592653

c = 299792458 (speed of light value)

Note: within the 2014 (NIST) CODATA value: 2.176470 (51) x10^{-8} kg
NIST lists the Planck mass equation (standard model) as: **mp = (ħc/G)$^{\frac{1}{2}}$**   [1]

Planck energy

$$Ep = 2 \left[\frac{(\frac{1}{2})\hbar}{ⓅP} \right] \pi c = 1.9561 \text{ x}10^9$$

Planck Temperature

$$T_P = \frac{2\left[\frac{(\frac{1}{2})\hbar}{\textcircled{P}}\right]\pi c}{k} = 1.41684693 \times 10^{32}$$

where: k = 1.38065048 x10^{-23} (Boltzmann constant)

$\textcircled{P}$ = 5.077383865 x 10^{-35} (postulated Planck circumference*, Planck length as diameter)

c = 299792458 (speed of light value)

π = 3.141592653

$\frac{(\frac{1}{2})\hbar}{\textcircled{P}}$ = 1.038499006 (ratio of attribute)

References

National Institute of Standards and Technology, Fundamental Physical Constants