THE PYTHAGOREAN RATIOS OF FUNDAMENTAL PHYSICS - REALIZED?
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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 ②. 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)

(Planck constant) 6.626068909 x10^-34
(reduced Planck constant) 1.054571620 x10^-34
(half reduced Planck constant) 5.272858101 x10^-35
(missing Planck constant)
(Planck length) 1.616181480 x10^-35
(Planck time) 5.391001132 x10^-44

Proposed (complete) Planck hierarchy schematic, with the postulated Planck circumference* constant, symbol ②, and two respective ratios: π and 1.038499006

(Planck constant) 6.626068909 x10^-34
(reduced Planck constant) 1.054571620 x10^-34
(half reduced Planck constant) 5.272858101 x10^-35
(Planck circumference*) 5.077383865 x10^-35
(Planck length) 1.616181480 x10^-35
(Planck time) 5.391001132 x10^-44

(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**

\[ \text{MOp} = 2 \left( \frac{(\frac{1}{2})\hbar}{\mathcal{D}} \right) \pi = 6.525081696 \]

where: \( \frac{(\frac{1}{2})\hbar}{\mathcal{D}} = 1.038499006 \) (ratio of attribute)
\( \frac{1}{2}\hbar = 5.272858101 \times 10^{-35} \) (half of the reduced Planck)
\( \mathcal{D} = 5.077383865 \times 10^{-35} \) (Postulated Planck circumference*, Planck length as diameter)
\( \pi = 3.141592653 \)

**Planck mass**

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

where: \( \frac{(\frac{1}{2})\hbar}{\mathcal{D}} = 1.038499006 \) (ratio of attribute)
\( \frac{1}{2}\hbar = 5.272858101 \times 10^{-35} \) (half of the reduced Planck)
\( \mathcal{D} = 5.077383865 \times 10^{-35} \) (Postulated Planck circumference*, Planck length as diameter)
\( \pi = 3.141592653 \)
\( c = 299792458 \) (speed of light value)

Note: within the 2014 (NIST) CODATA value: 2.176470 (51) \times 10^{-8} \text{ kg}
NIST lists the Planck mass equation (standard model) as: \( mp = (\hbar c / G)^{\frac{1}{2}} \) \[1\]

**Planck energy**

\[ Ep = 2 \left( \frac{(\frac{1}{2})\hbar}{\mathcal{D}} \right) \pi c = 1.9561 \times 10^9 \]
Planck Temperature

\[ T_p = 2 \left( \frac{\sqrt{\frac{h}{\Theta}}}{\Theta} \right) \pi c = 1.41684693 \times 10^{32} \]

where: 
- \( k = 1.38065048 \times 10^{-23} \) (Boltzmann constant)
- \( \Theta = 5.077383865 \times 10^{-35} \) (postulated Planck circumference\(^*\), Planck length as diameter)
- \( c = 299792458 \) (speed of light value)
- \( \pi = 3.141592653 \)
- \( \frac{\sqrt{\frac{h}{\Theta}}}{\Theta} = 1.038499006 \) (ratio of attribute)

References

National Institute of Standards and Technology, Fundamental Physical Constants