Derivation of the Rydberg Constant, Utilizing Dimensionless Ratios of : the Elementary Charge, e; Planck length, l_p; Pi, π; Speed of Light, c; Half of the Reduced Planck Constant, (½ħ); Planck Constant, h; and the Electron Mass, m_e; Constants.

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Abstract

In the spirit of the Pythagorean school of thought, that everything in the universe can be reduced to pure numbers; utilizing the Rydberg constant, arguably the most precise value in physics, an attempt is made to bring to fruition the aforementioned tenet. The relationships of seven well known constants are utilized within the context of four equations.

$$R_\infty = \alpha^2 m_e c/2h$$

standard (CODATA) value: 10973731.568508 (65) m^{-1}

U-theory value: 10973731.5685479918130... m^{-1}

The Rydberg constant dimensionless equation:

$$\mathbf{R}_\infty = [e/(lp*\pi*c)] * [½\hbar/(lp*\pi)] * [h/(13(lp*\pi)] * [c/(c-(m_e/(lp*\pi)))]$$

$$\downarrow \qquad \downarrow \qquad \downarrow \qquad \downarrow$$

$$= 10525667.79 * 1.038499006 * 1.003858723 * 1.000059849$$

where: $\alpha = 7.29735254153237665 \times 10^{-3}$ (fine structure constant)
$m_e = 9.10938206542160392521 \times 10^{-31}$ kg (electron mass)
$c = 299792458\ m\ s^{-1}$ (speed of light)
$½\hbar = 5.272858100881268408473 \times 10^{-35}$ J s (half reduced Planck constant)
$h = 6.6260689092600086850614 \times 10^{-34}$ J s (Planck constant)
$l_p = 1.61618148047550... \times 10^{-35}$ m (Planck length)
$(lp*\pi) = Ⓟ = 5.07738386529706655814494592 \times 10^{-35}$ m (Planck circumference)
$e = 1.6021765111531501826566 \times 10^{-19}$ C (elementary charge)
$\pi = 3.14159265358979323846 2643$ (pi)

(note: all values within 2006 CODATA uncertainty limits. Research within U-theory shows that some of the 2010 and 2014 CODATA uncertainty values are incorrect.

Conclusion

If the math works, an investigation is warranted.

References

[1] National Institute of Standards and Technology (2006, ’10, ’14, CODATA values)
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[3] Philip, James A. Pythagoras and early Pythagoreanism, University of Toronto Press,1966