The 13/12 schematic of thirteen fundamental constants and their twelve respective ratios that give rise to all constants

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July 4, 2016

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Abstract

It is proposed that fundamental particle physics is inherently comprised of a fundamental scheme (13/12) that gives rise to the constants. The approach taken has been to extrapolate from the known constants of the standard model to a proposed fundamental (Democritean) unit. A hierarchal relationship between the constants and their respective ratios, is shown. Every constant with an inherent ratio, e.g., the 2π ratio of the Planck constant h and the reduced Planck constant $\hbar$ ($\hbar = h/2\pi$). The 13/12 scheme theoretically calculates constants such as the Rydberg constant, Bohr magneton, the Compton wavelength, the Planck mass, etc., solely by dimensionless ratios.

Key words: Utrixical theory, Democritean unit, Planck circumference, half of the reduced Planck constant, Rydberg constant, proton charge radius, dimensionless ratios.

Introduction

Interconnectedness is undeniable. Everything in the universe, in some way, shape or form is connected. We attempt to show a viable scheme that calculates and classifies the constants, akin to the elements in the periodic table. A clue to the incompleteness of the standard model is the fact that not one constant has been calculated on theoretical grounds. All values of all constants have been experimentally determined (measured values). A viable theory will enumerate constants based on first principles. [3][5]

It is the basis of this paper to show an interconnectedness by utilizing some of the known constants and some new constants, both dimensional and dimensionless within the context of both the standard model and the 13/12 schematic of U-theory.[6]

Atomism as the theoretical foundation of the 13/12 schematic of Utrixical-theory. Atomism, a twenty-five hundred year old theory proposed by philosophers Leucippus and Democritus. Simply defined as all of creation comprised of indivisible particles and the void. [10]

U-theory's 13/12 schematic answers Lee Smolen's 4th biggest problem in fundamental particle physics. In his book "The Trouble with Physics" he suggests that a viable theory answer how the values of the free constants in the standard model of particle physics are chosen in nature. [8]

Discussion

13/12 schematic – a mechanism allowing the enumeration of the constants within the (NIST) CODATA uncertainty limits. The thirteen constants and twelve ratios is all that is needed to explain and calculate all constants. In this paper, over two dozen constants are enumerated. The 13/12 schematic calculates the Rydberg constant to one part in ten trillion. [7]

Nondimensionalization – Utilized in Utrixical theory as a process in fundamental physics where dimensions are equated to the same value, i.e., the Democritean fundamental unit ($8.134865168 \times 10^{-54}$). Thereby, not subjecting constants and equations to dimensional analysis.

Utrixical theory – *(U-theory)* a brick and mortar, bottom-up mass endowment theory predicated on the existence of a fundamental (Democritean) unit Y'. The Democritean unit initializes the hierarchal evolution of the constants.

Proton charge radius conundrum - In July of 2010, Dr. Pohl et al published the results of an experiment measuring the proton rms charge radius. The experiment entailed using a muon (200 times heavier) instead of an electron to probe the proton. The results show the proton radius [0.84184(67) fm] to be smaller by a factor of five, beyond the CODATA value [0.8768(69) fm] acceptable uncertainty limits. The physics community is not embracing Dr. Pohl's results. To do so, would mean that the sacrosanct theory of quantum electrodynamics has at least some aspect that is not so sacrosanct. The consensus is that there is an error in the calculations. [2]

In February of 2013, two-and-a-half years later, Dr. Antognini et al (co-author of the first paper) performed a new measurement, using for the first time laser spectroscopy of muonic hydrogen. The results were in good agreement with the 2010 value, but 1.7 times as precise, [0.84087(39) fm]. Therefore, the smaller value of the proton charge radius has been reaffirmed. The consensus is starting to shift in considering new physics beyond the standard model or an acknowledgement of an incomplete understanding of quantum electrodynamics. The muonic experimental results of Drs. Pohl, Antognini et al [0.84087(39) fm] are in qagreement with Utrixical theory's theoretically enumerated proton charge radius [0.84129 fm].In light of work by Drs. Pohl, Antognini et al. [1] U-theory predicts a 4% smaller value of the proton mass and the proton mass/electron mass ratio.

Planck circumference, Ⓟ - A new constant. Albeit, the product of two very well-known constants, the Planck length and pi. The Planck circumference [$5.077383865 \times 10^{-35}$] as a central player in the 13/12 schematic; when divided by the proposed fundamental Democritean unit Y' [$8.134865168 \times 10^{-54}$], gives the inverse of the elementary charge [$1/e = Ⓟ/Y'$] (The National Institute of Standards and Technology, CODATA group, does not list or acknowledge the Planck circumference constant.) [1]

Half of the reduced Planck constant, (½ħ) **"***The forgotten constant"***,** During the quantum revolution, Neils Bohr proposed that the reduced Planck constant, symbol ħ = h/2π, was the smallest attribute of a particle, .i.e., the quantization of its orbital angular momentum. Then, in 1925, physicists Sam Goudsmit and George Uhlenbech discovered that the electron also possessed spin angular momentum with a magnitude of half of the reduced Planck constant, symbol (½ħ). This gave Dirac the fourth quantum number to codify his equation. [4] Though, the importance of spin cannot be over-stated; Utrixical theory will demonstrate that half of the reduced Planck constant (½ħ), is a crucial player (above and beyond its definition of spin) in the scheme of fundamental physics. It will be shown to have a prominent role in the hierarchical evolution of the constants. The National Institute of Standards and Technology (NIST) does not list half of the reduced Planck constant (½ħ).[1]

The speed of light value: within the context of the 13/12 schematic is one of a dimensionless constant.

π ,2,2π,4π,8π and c, the ubiquitous numbers of fundamental physics. Any proposed fundamental theory must explain and incorporate these values within its theory:

1) π, the catalyst of structure and the creation of a new constant, the Planck circumference, Ⓟ = lp*π (the Planck length times pi)

2) 2, the ratio between the reduced Planck constant and half of the reduced Planck constant, (½ħ) = ħ/2

3) 2π, the ratio between the Planck constant h and the reduced Planck constant ħ, (ħ = h/2π)

4) 4π, as the combination of 2 and 2π, in the inverse fine structure constant schematic

5) The 8π in Einstein's gravity equation inherent in the 13/12 schematic, 2π*2*2.

6) The redundancy of c in the 13/12 schematic as the foundation of Einstein's mass/energy conversion, i.e., E= m(c^2). [9]

7) The expression c^5 found in fundamental expressions. And also, in the Newtonian constant of Gravitation derivation within the 13/12 schematic.

13/12 Schematic **NC = New Constant, NCR = New Constant Ratio**

(Symbol)	Proton mass*	constant
m_p	$1.672503106 \times 10^{-27}$	
m_p/m_e	1836.022569*	ratio
	Electron mass	constant
m_e	$9.109382065 \times 10^{-31}$	
α^{-1}	137.0359996	ratio
	New Constant 4	constant
NC_4	$6.647437236 \times 10^{-33}$	
NCR_3	10.03224887	ratio
	Planck constant	constant
h	$6.626068909 \times 10^{-34}$	
2π	6.283185307	ratio
	Red. Planck const.	constant
ħ	$1.054571620 \times 10^{-34}$	
2	2	ratio
	½ Red. Planck const.	constant
½ħ	$5.272858100 \times 10^{-35}$	
½ħ/Ⓟ	1.038499006	ratio
	Planck circumference	constant
Ⓟ	$5.077383865 \times 10^{-35}$	
π	3.141592654	ratio
	Planck length	constant
lp	$1.616181480 \times 10^{-35}$	
c	299792458	ratio
	Planck time	constant
tp	$5.391001321 \times 10^{-44}$	
c	299792458	ratio
	New constant 3	constant
NC_3	$1.798244414 \times 10^{-52}$	
NCR_2	10.50071140	ratio
	New constant 2	constant
NC_2	$1.712497702 \times 10^{-53}$	
2	2	ratio
	New constant 1	constant
NC_1	$8.562488511 \times 10^{-54}$	
NCR_1	1.052566740	ratio
	Democritean unit	constant
Y'	$8.134865168 \times 10^{-54}$	

Constants derived from the Democritean unit Y' and their respective ratios

Democritean unit, Y'

NIST 2014 CODATA value: not recognized
U-theory value: $8.134865168 \times 10^{-54}$

m_P	Proton mass $1.672503106 \times 10^{-27}$
m_P/m_e	1836.022569
m_e	Electron mass $9.109382065 \times 10^{-31}$
α^{-1}	137.0359996
NC_4	New Constant 4 $6.647437236 \times 10^{-33}$
NCR_3	10.03224887
h	Planck constant $6.626068909 \times 10^{-34}$
2π	6.283185307
ħ	Red. Planck const. $1.054571620 \times 10^{-34}$
2	2
½ħ	½ Red. Planck const. $5.272858100 \times 10^{-35}$
½ħ/Ⓟ	1.038499006
Ⓟ	Planck circumference $5.077383865 \times 10^{-35}$
π	3.141592654
lp	Planck length $1.616181480 \times 10^{-35}$
c	299792458
tp	Planck time $5.391001321 \times 10^{-44}$
c	299792458
NC_3	New constant 3 $1.798244414 \times 10^{-52}$
NR_2	10.5007114
NC_2	New constant 2 $1.712497702 \times 10^{-53}$
2	2
NC_1	New constant 1 $8.562488511 \times 10^{-54}$
NCR_1	1.05256674
Y'	Democritean unit $8.134865168 \times 10^{-54}$

Y'

Democritean unit Y' defined as the indivisible particle from which all of creation is comprised.

New Constant 1, NC_1

NIST 2014 CODATA value: (not recognized)
U-theory value: $8.562488511 \times 10^{-54}$

	Proton mass
m_p	$1.672503106 \times 10^{-27}$
m_p/m_e	1836.022569
	Electron mass
m_e	$9.109382065 \times 10^{-31}$
α^{-1}	137.0359996
	New Constant 4
NC_4	$6.647437236 \times 10^{-33}$
NCR_3	10.03224887
	Planck constant
h	$6.626068909 \times 10^{-34}$
2π	6.283185307
	Red. Planck const.
ħ	$1.054571620 \times 10^{-34}$
2	2
	½ Red. Planck const.
½ħ	$5.272858100 \times 10^{-35}$
½ħ/Ⓟ	1.038499006
	Planck circumference
Ⓟ	$5.077383865 \times 10^{-35}$
π	3.141592654
	Planck length
lp	$1.616181480 \times 10^{-35}$
c	299792458
	Planck time
tp	$5.391001321 \times 10^{-44}$
c	299792458
	New constant 3
NC_3	$1.798244414 \times 10^{-52}$
NCR_2	10.5007114
	New constant 2
NC_2	$1.712497702 \times 10^{-53}$
2	2
	New constant 1
NC_1	$8.562488511 \times 10^{-54}$
NCR_1	1.05256674
	Democritean unit
Y′	$8.134865168 \times 10^{-54}$

1.
0
5
2
5
6
6
7
1.052 4
*
Y′

$= NC_1 = 8.562488511 \times 10^{-54}$

New constant 1 defined as 1.05256674 Democritean Y′ units
$(1.05256674) * (8.134865168 \times 10^{-54}) = NC_1 = 8.562488511 \times 10^{-54}$

New Constant 2, NC_2

NIST 2014 CODATA value: not recognized
U-theory value: $1.712497702 \times 10^{-53}$

m_p	Proton mass $1.672503106 \times 10^{-27}$
m_p/m_e	1836.022569
m_e	Electron mass $9.109382065 \times 10^{-31}$
α^{-1}	137.0359996
NC_4	New Constant 4 $6.647437236 \times 10^{-33}$
NCR_3	10.03224887
h	Planck constant $6.626068909 \times 10^{-34}$
2π	6.283185307
ħ	Red. Planck const. $1.054571620 \times 10^{-34}$
2	2
½ħ	½ Red. Planck const. $5.272858100 \times 10^{-35}$
½ħ/Ⓟ	1.038499006
Ⓟ	Planck circumference $5.077383865 \times 10^{-35}$
π	3.141592654
l_p	Planck length $1.616181480 \times 10^{-35}$
c	299792458
t_p	Planck time $5.391001321 \times 10^{-44}$
c	299792458
NC_3	New constant 3 $1.798244414 \times 10^{-52}$
NCR_2	10.5007114
NC_2	New constant 2 $1.712497702 \times 10^{-53}$
2	2
NC_1	New constant 1 $8.562488511 \times 10^{-54}$
NCR_1	1.05256674
Y'	Democritean unit $8.134865168 \times 10^{-54}$

	2.
	1
	0
	5
	1
2	3
	3
*	4
1.052	8
*	
Y'	

New constant 2 defined as 2.10513348 Democritean Y' units
$(2.10513348) * (8.134865168 \times 10^{-54}) = NC_2 = 1.712497702 \times 10^{-53}$

New Constant 3, NC_3

NIST 2014 CODATA value: Not recognized
U-theory value: $1.7982444414 \times 10^{-52}$

	Proton mass
m_p	$1.672503106 \times 10^{-27}$
m_p/m_e	1836.022569
	Electron mass
m_e	$9.109382065 \times 10^{-31}$
α^{-1}	137.0359996
	New Constant 4
NC_4	$6.647437236 \times 10^{-33}$
NCR_3	10.03224887
	Planck constant
h	$6.626068909 \times 10^{-34}$
2π	6.283185307
	Red. Planck const.
ħ	$1.054571620 \times 10^{-34}$
2	2
	½ Red. Planck const.
½ħ	$5.272858100 \times 10^{-35}$
½ħ/Ⓟ	1.038499006
	Planck circumference
Ⓟ	$5.077383865 \times 10^{-35}$
π	3.141592654
	Planck length
lp	$1.616181480 \times 10^{-35}$
c	299792458
	Planck time
tp	$5.391001321 \times 10^{-44}$
c	299792458
	New constant 3
NC_3	$1.798244414 \times 10^{-52}$
NCR_2	10.5007114
	New constant 2
NC_2	$1.712497702 \times 10^{-53}$
2	2
	New constant 1
NC_1	$8.562488511 \times 10^{-54}$
NCR_1	1.05256674
	Democritean unit
Y'	$8.134865168 \times 10^{-54}$

	2
	2.
10.50	1
*	0
	5
2	3
	9
*	9
1.052	1
*	3
Y'	

New constant 3 defined as 22.10539913 Democritean Y' units
(22.10539913) * ($8.134865168 \times 10^{-54}$) = $NC_3 = 1.7982444 \times 10^{-52}$

Planck time, t_p

NIST 2014 CODATA value: 5.39116 (13) $x10^{-44}$
NIST 2006 CODATA value: 5.39124 (27) $x10^{-44}$
U-theory value: 5.39110 $x10^{-44}$
(uncertainty limits in parenthesis)

m_p	Proton mass 1.672503106 $x10^{-27}$
m_p/m_e	1836.022569
m_e	Electron mass 9.109382065 $x10^{-31}$
α^{-1}	137.0359996
NC_4	New Constant 4 6.647437236 $x10^{-33}$
NCR_3	10.03224887
h	Planck constant 6.626068909 $x10^{-34}$
2π	6.283185307
ħ	Red. Planck const. 1.054571620 $x10^{-34}$
2	2
½ħ	½ Red. Planck const. 5.272858100 $x10^{-35}$
½ħ/Ⓟ	1.038499006
Ⓟ	Planck circumference 5.077383865 $x10^{-35}$
π	3.141592654
lp	Planck length 1.616181480 $x10^{-35}$
c	299792458
tp	Planck time 5.391001321 $x10^{-44}$
c	299792458
NC_3	New constant 3 1.798244414 $x10^{-52}$
NCR_2	10.5007114
NC_2	New constant 2 1.712497702 $x10^{-53}$
2	2
NC_1	New constant 1 8.562488511 $x10^{-54}$
NCR_1	1.05256674
Y'	Democritean unit 8.134865168 $x10^{-54}$

c	6.
	6
*	2
10.50	7
*	0
	3
2	1
	9
*	4
1.052	1
*	9
Y'	

= tp = 5.39110032 $x10^{-44}$

Planck time constant defined as 6.627031941 $x10^{9}$ Democritean Y' units. (6.627031941 $x10^{9}$) * (8.134865168 $x10^{-54}$) = tp = 5.39001132 x10-44 [7]

Planck length, lp

NIST 2014 CODATA value: 1.616229 (38) $\times 10^{-35}$
NIST 2006 CODATA value: 1.616252 (81)$\times 10^{-35}$
U-theory value: 1.616181 $\times 10^{-35}$

m_p	Proton mass 1.672503106 $\times 10^{-27}$
m_p/m_e	1836.022569
m_e	Electron mass 9.109382065 $\times 10^{-31}$
α^{-1}	137.0359996
NC_4	New Constant 4 6.647437236 $\times 10^{-33}$
NCR_3	10.03224887
h	Planck constant 6.626068909 $\times 10^{-34}$
2π	6.283185307
ħ	Red. Planck const. 1.054571620 $\times 10^{-34}$
2	2
½ħ	½ Red. Planck const. 5.272858100 $\times 10^{-35}$
½ħ/Ⓟ	1.038499006
Ⓟ	Planck circumference 5.077383865 $\times 10^{-35}$
π	3.141592654
lp	Planck length 1.616181480 $\times 10^{-35}$
c	299792458
tp	Planck time 5.391001321 $\times 10^{-44}$
c	299792458
NC_3	New constant 3 1.798244414 $\times 10^{-52}$
NCR_2	10.5007114
NC_2	New constant 2 1.712497702 $\times 10^{-53}$
2	2
NC_1	New constant 1 8.562488511 $\times 10^{-54}$
NCR_1	1.05256674
Y'	Democritean unit 8.134865168 $\times 10^{-54}$

c	1.
	9
*	8
c	6
	7
*	3
10.50	4
*	1
	9
2	5
	18
*	
1.052	
*	
Y'	

$= l_p = 1.616181 \times 10^{-35}$

Planck length defined as 1.986734195 $\times 10^{18}$ Democritean Y' units.
$(1.986734195 \times 10^{18}) * (8.134865168 \times 10^{-54}) = lp = 1.616181 \times 10^{-35}$ [7]

Planck circumference, Ⓟ = lp*π

NIST 2014 CODATA value: (undefined)
NIST 2006 CODATA value: (undefined)
U-theory value: $5.077383865 \times 10^{-35}$

	Proton mass
m_p	$1.672503106 \times 10^{-27}$
m_p/m_e	1836.022569
	Electron mass
m_e	$9.109382065 \times 10^{-31}$
α^{-1}	137.0359996
	New Constant 4
NC_4	$6.647437236 \times 10^{-33}$
NCR_3	10.03224887
	Planck constant
h	$6.626068909 \times 10^{-34}$
2π	6.283185307
	Red. Planck const.
ħ	$1.054571620 \times 10^{-34}$
2	2
	½ Red. Planck const.
½ħ	$5.272858100 \times 10^{-35}$
½ħ/Ⓟ	1.038499006
	Planck circumference
Ⓟ	$5.077383865 \times 10^{-35}$
π	3.141592654
	Planck length
lp	$1.616181480 \times 10^{-35}$
c	299792458
	Planck time
tp	$5.391001321 \times 10^{-44}$
c	299792458
	New constant 3
NC_3	$1.798244414 \times 10^{-52}$
NCR_2	10.5007114
	New constant 2
NC_2	$1.712497702 \times 10^{-53}$
2	2
	New constant 1
NC_1	$8.562488511 \times 10^{-54}$
NCR_1	1.05256674
	Democritean unit
Y'	$8.134865168 \times 10^{-54}$

π	
*	6.
c	2
	4
*	1
c	5
	0
*	9
10.50	5
*	5
	1
2	18
*	
1.052	
*	
Y'	

$= Ⓟ = lp*\pi = 5.077383865 \times 10^{-35}$

Planck circumference defined as $6.241509551 \times 10^{18}$ Democritean Y' units.
$(6.251509551 \times 10^{18}) * (8.143865168 \times 10^{-54}) = Ⓟ = lp*\pi = 5.077383865 \times 10^{-35}$ [4][7]

Half reduced Planck constant, ħ/2

NIST 2014 CODATA value: $5.272859001 \times 10^{-35}$
NIST 2006 CODATA value: $5.272858141 \times 10^{-35}$
U-theory value: $5.272858101 \times 10^{-35}$

	Proton mass
m_p	$1.672503106 \times 10^{-27}$
m_p/m_e	1836.022569
	Electron mass
m_e	$9.109382065 \times 10^{-31}$
α^{-1}	137.0359996
	New Constant 4
NC_4	$6.647437236 \times 10^{-33}$
NCR_3	10.03224887
	Planck constant
h	$6.626068909 \times 10^{-34}$
2π	6.283185307
	Red. Planck const.
ħ	$1.054571620 \times 10^{-34}$
2	2
	½ Red. Planck const.
½ħ	$5.272858100 \times 10^{-35}$
½ħ/Ⓟ	1.038499006
	Planck circumference
Ⓟ	$5.077383865 \times 10^{-35}$
π	3.141592654
	Planck length
lp	$1.616181480 \times 10^{-35}$
c	299792458
	Planck time
tp	$5.391001321 \times 10^{-44}$
c	299792458
	New constant 3
NC_3	$1.798244414 \times 10^{-52}$
NCR_2	10.5007114
	New constant 2
NC_2	$1.712497702 \times 10^{-53}$
2	2
	New constant 1
NC_1	$8.562488511 \times 10^{-54}$
NCR_1	1.05256674
	Democritean unit
Y'	$8.134865168 \times 10^{-54}$

1.038 * π 6.4 * 8 c 1 8 * 0 c 1 4 * 6 10.50 5 * 18 2 * Y'

$= \hbar/2 = ½\hbar = 5.272858101 \times 10^{-35}$

Half of the reduced Planck constant defined as $6.481801465 \times 10^{18}$ Democritean Y' units.
$(6.481801465 \times 10^{18}) * (8.134865168 \times 10^{-54}) = \hbar/2 = ½\hbar = 5.272858101 \times 10^{-35}$ [7]

Reduced Planck constant, ħ

NIST 2014 CODATA value: $1.054571800\ (13)\ \times 10^{-34}$
NIST 2006 CODATA value: $1.054571628\ (53) \times 10^{-34}$
U-theory value: $1.054571619 \times 10^{-34}$

	Proton mass			
m_p	$1.672503106 \times 10^{-27}$			
m_p/m_e	1836.022569			
	Electron mass			
m_e	$9.109382065 \times 10^{-31}$			
α^{-1}	137.0359996			
	New Constant 4			
NC_4	$6.647437236 \times 10^{-33}$			
NCR_3	10.03224887			
	Planck constant			
h	$6.626068909 \times 10^{-34}$			
2π	6.283185307			
	Red. Planck const.			
ħ	$1.054571620 \times 10^{-34}$			
2	2	2		
	½ Red. Planck const.			
½ħ	$5.272858100 \times 10^{-35}$	*		
½ħ/℗	1.038499006	1.038		
	Planck circumference		1.	
℗	$5.077383865 \times 10^{-35}$	*	2	
π	3.141592654	π	9	
	Planck length		6	
lp	$1.616181480 \times 10^{-35}$	*	3	
c	299792458	c	6	$= ħ = 1.054571619 \times 10^{-34}$
	Planck time		0	
tp	$5.391001321 \times 10^{-44}$	*	2	
c	299792458	c	3	
	New constant 3		19	
NC_3	$1.798244414 \times 10^{-52}$	*		
NCR_2	10.5007114	10.50		
	New constant 2	*		
NC_2	$1.712497702 \times 10^{-53}$			
2	2	2		
	New constant 1			
NC_1	$8.562488511 \times 10^{-54}$	*		
NCR_1	1.05256674	1.052		
	Democritean unit	*		
Y′	$8.134865168 \times 10^{-54}$	Y′		

Reduced Planck constant defined as $1.29636023 \times 10^{19}$ Democritean Y′ units
$(1.29636023 \times 10^{19}) * (8.134865168 \times 10^{-54}) = ħ = 1.054571619 \times 10^{-34}$ [7]

Planck constant, h

NIST 2014 CODATA value: $6.62607004\ 0(81) \times 10^{-34}$
NIST 2006 CODATA value: $6.62606896\ (33) \times 10^{-34}$
U-theory value: $6.62606890\ 9 \times 10^{-34}$

	Proton mass		
m_p	$1.672503106 \times 10^{-27}$		
m_p/m_e	1836.022569		
	Electron mass		
m_e	$9.109382065 \times 10^{-31}$		
α^{-1}	137.0359996		
	New Constant 4		
NC_4	$6.647437236 \times 10^{-33}$		
NCR_3	10.03224887		
	Planck constant		
h	$6.626068909 \times 10^{-34}$		
2π	6.283185307	2π	8.
	Red. Planck const.		1
$\hbar$	$1.054571620 \times 10^{-34}$	*	4
2	2	2	5
	½ Red. Planck const.		2
$½\hbar$	$5.272858100 \times 10^{-35}$	*	7
$½\hbar/Ⓟ$	1.038499006	1.038	1
	Planck circumference		9
Ⓟ	$5.077383865 \times 10^{-35}$	*	4
π	3.141592654	π	5
	Planck length		19
lp	$1.616181480 \times 10^{-35}$	*	
c	299792458	c	
	Planck time		
tp	$5.391001321 \times 10^{-44}$	*	
c	299792458	c	
	New constant 3		
NC_3	$1.798244414 \times 10^{-52}$	*	
NCR_2	10.5007114	10.50	
NC_2	$1.712497702 \times 10^{-53}$		
2	2	2	
	New constant 1		
NC_1	$8.562488511 \times 10^{-54}$	*	
NCR_1	1.05256674	1.052	
	Democritean unit	*	
Y'	$8.134865168 \times 10^{-54}$	Y'	

$= h = 6.62608903 \times 10^{-34}$

Planck constant defined as $8.145271945 \times 10^{19}$ Democritean Y' units
$(8.145271945 \times 10^{19}) * (8.134865168 \times 10^{-54}) = h = 6.62608903 \times 10^{-34}$ [7]

New Constant 4, NC_4

NIST 2014 CODATA value: not recognized
U-theory value: $6.647437236 \times 10^{-33}$

	Proton mass		
m_p	$1.672503106 \times 10^{-27}$		
m_p/m_e	1836.022569		
	Electron mass		
m_e	$9.109382065 \times 10^{-31}$		
α^{-1}	137.0359996		
	New Constant 4		
NC_4	$6.647437236 \times 10^{-33}$		
NCR_3	10.03224887	10.03	
	Planck constant		
h	$6.626068909 \times 10^{-34}$	*	
2π	6.283185307	2π	8.
	Red. Planck const.		1
$\hbar$	$1.054571620 \times 10^{-34}$	*	7
2	2	2	1
	½ Red. Planck const.		5
$½\hbar$	$5.272858100 \times 10^{-35}$	*	3
$½\hbar/Ⓟ$	1.038499006	1.038	9
	Planck circumference		5
Ⓟ	$5.077383865 \times 10^{-35}$	*	2
π	3.141592654	π	7
	Planck length		20
lp	$1.616181480 \times 10^{-35}$	*	
c	299792458	c	
	Planck time		
tp	$5.391001321 \times 10^{-44}$	*	
c	299792458	c	
	New constant 3		
NC_3	$1.798244414 \times 10^{-52}$	*	
NCR_2	10.5007114	10.50	
	New constant 2	*	
NC_2	$1.712497702 \times 10^{-53}$		
2	2	2	
	New constant 1		
NC_1	$8.562488511 \times 10^{-54}$	*	
NCR_1	1.05256674	1.052	
	Democritean unit	*	
Y'	$8.134865168 \times 10^{-54}$	Y'	

$= NC_4 = 6.647437236 \times 10^{-33}$

New constant 4 defined as $8.171539527 \times 10^{20}$ Democritean Y' units
$(8.171539527 \times 10^{20}) * (8.134865168 \times 10^{-54}) = NC4 = 6.647437236 \times 10^{-33}$

Electron mass, m_e

NIST 2014 CODATA value: 9.10938356 (11) $x10^{-31}$
NIST 2006 CODATA value: 9.10938215 (45) $x10^{-31}$
U-theory value: 9.10938206 $x10^{-31}$

m_p	Proton mass 1.672503106 $x10^{-27}$			
m_p/m_e	1836.022569			
m_e	Electron mass 9.109382065 $x10^{-31}$			
α^{-1}	137.0359996	137.0		
NC_4	New Constant 4 6.647437236 $x10^{-33}$	*		
NCR_3	10.03224887	10.03		
h	Planck constant 6.626068909 $x10^{-34}$	*		
2π	6.283185307	2π	1.	
$\hbar$	Red. Planck const. 1.054571620 $x10^{-34}$	*	1 1	
2	2	2	9	
$\frac{1}{2}\hbar$	½ Red. Planck const. 5.272858100 $x10^{-35}$	*	7 9	= m_e = 9.10938206 $x10^{-31}$
$\frac{1}{2}\hbar/Ⓟ$	1.038499006	1.038	5	
Ⓟ	Planck circumference 5.077383865 $x10^{-35}$	*	0 8	
π	3.141592654	π	7	
lp	Planck length 1.616181480 $x10^{-35}$	*	^{23}	
c	299792458	c		
tp	Planck time 5.391001321 $x10^{-44}$	*		
c	299792458	c		
NC_3	New constant 3 1.798244414 $x10^{-52}$	*		
NCR_2	10.5007114	10.50		
NC_2	New constant 2 1.712497702 $x10^{-53}$	*		
2	2	2		
NC_1	New constant 1 8.562488511 $x10^{-54}$	*		
NCR_1	1.05256674	1.052		
Y'	Democritean unit 8.134865168 $x10^{-54}$	* Y'		

Electron mass defined as 1.119795087 $x10^{23}$ Democritean Y' units

(1.119795087 $x10^{23}$) * (8.134865168 $x10^{-54}$) = m_e = 9.109382065 $x10^{-31}$ [7]

Proton mass, m_p

NIST 2014 CODATA value: $1.672621898\ (21) \times 10^{-27}$
Drs. Pohl, Antognini value: not determined
U-theory value: $1.672503106 \times 10^{-27}$

m_p	Proton mass $1.672503106 \times 10^{-27}$		
m_p/m_e	1836.022569	1836	
m_e	Electron mass $9.109382065 \times 10^{-31}$	*	
α^{-1}	137.0359996	α^{-1}	
NC_4	New Constant 4 6.647437236^{-33}	*	
NCR_3	10.03224887	10.03	
h	Planck constant $6.626068909 \times 10^{-34}$	*	
2π	6.283185307	2π	2.
$\hbar$	Red. Planck const. $1.054571620 \times 10^{-34}$	*	0 5
2	2	2	5
$½\hbar$	½ Red. Planck const. $5.272858100 \times 10^{-35}$	*	9 6
$½\hbar/Ⓟ$	1.038499006	1.038	9
Ⓟ	Planck circumference $5.077383865 \times 10^{-35}$	*	0 5
π	3.141592654	π	2
lp	Planck length $1.616181480 \times 10^{-35}$	*	26
c	299792458	c	
tp	Planck time $5.391001321 \times 10^{-44}$	*	
c	299792458	c	
NC_3	New constant 3 $1.798244414 \times 10^{-52}$	*	
NCR_2	10.5007114	10.50	
NC_2	New constant 2 $1.712497702 \times 10^{-53}$	*	
2	2	2	
NC_1	New constant 1 $8.562488511 \times 10^{-54}$	*	
NCR_1	1.05256674	1.052	
Y'	Democritean unit $8.134865168 \times 10^{-54}$	* Y'	

$= 1.672503106 \times 10^{-27}$

Constants derived solely by dimensionless ratios

Planck momentum, MOp

NIST CODATA value: 6.52485
U-theory value: 6.52508

m_p	Proton mass $1.672503106 \times 10^{-27}$
m_p/m_e	1836.022569
m_e	Electron mass $9.109382065 \times 10^{-31}$
α^{-1}	137.0359996
NC_4	New Constant 4 6.647437236^{-33}
NCR_3	10.03224887
h	Planck constant $6.626068909 \times 10^{-34}$
2π	6.283185307
$\hbar$	Red. Planck const. $1.054571620 \times 10^{-34}$
2	2
$\frac{1}{2}\hbar$	½ Red. Planck const. $5.272858100 \times 10^{-35}$
$\frac{1}{2}\hbar/Ⓟ$	1.038499006
Ⓟ	Planck circumference $5.077383865 \times 10^{-35}$
π	3.141592654
lp	Planck length $1.616181480 \times 10^{-35}$
c	299792458
tp	Planck time $5.391001321 \times 10^{-44}$
c	299792458
NC_3	New constant 3 $1.798244414 \times 10^{-52}$
NCR_2	10.50071140
NC_2	New constant 2 $1.712497702 \times 10^{-53}$
2	2
NC_1	New constant 1 $8.562488511 \times 10^{-54}$
NCR_1	1.052566740
Y'	Democritean unit $8.134865168 \times 10^{-54}$

2	
*	
1.038	
*	
π	

= MOp = 6.52508

Planck energy, Ep

NIST CODATA value: 1.9561×10^{9}
U-theory value: 1.9561×10^{9}

m_p	Proton mass $1.672503106 \times 10^{-27}$
m_p/m_e	1836.022569
m_e	Electron mass $9.109382065 \times 10^{-31}$
α^{-1}	137.0359996
NC_4	New Constant 4 6.647437236^{-33}
NCR_3	10.03224887
h	Planck constant $6.626068909 \times 10^{-34}$
2π	6.283185307
ħ	Red. Planck const. $1.054571620 \times 10^{-34}$
2	2
½ħ	½ Red. Planck const. $5.272858100 \times 10^{-35}$
½ħ/Ⓟ	1.038499006
Ⓟ	Planck circumference $5.077383865 \times 10^{-35}$
π	3.141592654
lp	Planck length $1.616181480 \times 10^{-35}$
c	299792458
tp	Planck time $5.391001321 \times 10^{-44}$
c	299792458
NC_3	New constant 3 $1.798244414 \times 10^{-52}$
NCR_2	10.5007114
NC_2	New constant 2 $1.712497702 \times 10^{-53}$
2	2
NC_1	New constant 1 $8.562488511 \times 10^{-54}$
NCR_1	1.05256674
Y'	Democritean unit $8.134865168 \times 10^{-54}$

2	1.
	9
*	5
1.038	6
	1
*	7
π	0
	2
*	8
c	9

= Ep = 1.9561×10^{9}

Planck mass, mp

NIST 2014 CODATA value: 2.176470 (51) x 10^{-8}
NIST 2006 CODATA value: 2.17644 (11) x10^{-8}
U-theory value: 2.1765329732 x10^{-8}

	Proton mass
m_p	1.672503106 x10^{-27}
m_p/m_e	1836.022569
	Electron mass
m_e	9.109382065 x10^{-31}
α^{-1}	137.0359996
	New Constant 4
NC_4	6.647437236^{-33}
NCR_3	10.03224887
	Planck constant
h	6.626068909 x10^{-34}
2π	6.283185307
	Red. Planck const.
$\hbar$	1.054571620 x10^{-34}
2	2
	½ Red. Planck const.
$½\hbar$	5.272858100 x10^{-35}
$½\hbar/Ⓟ$	1.038499006
	Planck circumference
Ⓟ	5.077383865 x10^{-35}
π	3.141592654
	Planck length
lp	1.616181480 x10^{-35}
c	299792458
	Planck time
tp	5.391001321 x10^{-44}
c	299792458
	New constant 3
NC_3	1.798244414 x10^{-52}
NCR_2	10.5007114
	New constant 2
NC_2	1.712497702 x10^{-53}
2	2
	New constant 1
NC_1	8.562488511 x10^{-54}
NCR_1	1.05256674
	Democritean unit
Y'	8.134865168 x10^{-54}

2	6.
	5
*	2
1.038	5
	0
*	8
π	1
	6
	9
	6

÷ c = mp = 2.1765329732 x10^{-8}

Inverse fine structure, α^{-1}

NIST 2014 CODATA value: 137.035999139(31)
NIST 2006 CODATA value: 137.035999679(94)
U-theory value: 137.035999605

m_p	Proton mass $1.672503106 \times 10^{-27}$	
m_p/m_e	1836.022569	
m_e	Electron mass $9.109382065 \times 10^{-31}$	
α^{-1}	137.0359996	
NC_4	New Constant 4 6.647437236^{-33}	
NCR_3	10.03224887	
h	Planck constant $6.626068909 \times 10^{-34}$	
2π	6.283185307	
ħ	Red. Planck const. $1.054571620 \times 10^{-34}$	
2	2	2
½ħ	½ Red. Planck const. $5.272858100 \times 10^{-35}$	*
½ħ/Ⓟ	1.038499006	1.038
Ⓟ	Planck circumference $5.077383865 \times 10^{-35}$	*
π	3.141592654	π
lp	Planck length $1.616181480 \times 10^{-35}$	
c	299792458	= α^{-1} = 137.035999605
tp	Planck time $5.391001321 \times 10^{-44}$	*
c	299792458	
NC_3	New constant 3 $1.798244414 \times 10^{-52}$	
NCR_2	10.5007114	10.50
NC_2	New constant 2 $1.712497702 \times 10^{-53}$	*
2	2	2
NC_1	New constant 1 $8.562488511 \times 10^{-54}$	
NCR_1	1.05256674	
Y'	Democritean unit $8.134865168 \times 10^{-54}$	

Quantum of circulation, $h/2m_e$

NIST 2014 CODATA value: 3.6369475486(17) x10-4
NIST 2006 CODATA value: 3.6369475199(50) x10-4
U-theory value: 3.6369475221 x10-4

m_p	Proton mass $1.672503106 \times 10^{-27}$
m_p/m_e	1836.022569
m_e	Electron mass $9.109382065 \times 10^{-31}$
α^{-1}	137.0359996
NC_4	New Constant 6.647437236^{-33}
NCR_3	10.03224887
h	Planck constant $6.626068909 \times 10^{-34}$
2π	6.283185307
ħ	Red. Planck const. $1.054571620 \times 10^{-34}$
2	2
½ħ	½ Red. Planck const. $5.272858100 \times 10^{-35}$
½ħ/Ⓟ	1.038499006
Ⓟ	Planck circumference $5.077383865 \times 10^{-35}$
π	3.141592654
lp	Planck length $1.616181480 \times 10^{-35}$
c	299792458
	Planck time
tp	$5.391001321 \times 10^{-44}$
c	299792458
NC_3	New constant 3 $1.798244414 \times 10^{-52}$
NCR_2	10.5007114
NC_2	New constant 2 $1.712497702 \times 10^{-53}$
2	2
NC_1	New constant 1 $8.562488511 \times 10^{-54}$
NCR_1	1.05256674
Y′	Democritean unit $8.134865168 \times 10^{-54}$

2π	6.		137.0	1		
	5		*	7		
	2			9		
	5		10.03	4		
*	0	÷	*	1.		
	8			0	=	$h/2m_e$
1.038	1		2π	9		
	6		*	3		
	9			8		
	6		2	9		
			*			
			1.038			

Compton wavelength, λ_C

NIST 2014 CODATA value: $2.4263102367(11) \times 10^{-12}$
NIST 2006 CODATA value: $2.4263102175(33) \times 10^{-12}$
U-theory value: $2.4263102201 \times 10^{-12}$

	Proton mass
m_p	$1.672503106 \times 10^{-27}$
m_p/m_e	1836.022569
	Electron mass
m_e	$9.109382065 \times 10^{-31}$
α^{-1}	137.0359996
	New Constant 4
NC_4	6.647437236^{-33}
NCR_3	10.03224887
	Planck constant
h	$6.626068909 \times 10^{-34}$
2π	6.283185307
	Red. Planck const.
$\hbar$	$1.054571620 \times 10^{-34}$
2	2
	½ Red. Planck const.
$\frac{1}{2}\hbar$	$5.272858100 \times 10^{-35}$
$\frac{1}{2}\hbar/Ⓟ$	1.038499006
	Planck circumference
Ⓟ	$5.077383865 \times 10^{-35}$
π	3.141592654
	Planck length
lp	$1.616181480 \times 10^{-35}$
c	299792458
	Planck time
tp	$5.391001321 \times 10^{-44}$
c	299792458
	New constant 3
NC_3	$1.798244414 \times 10^{-52}$
NCR_2	10.5007114
	New constant 2
NC_2	$1.712497702 \times 10^{-53}$
2	2
	New constant 1
NC_1	$8.562488511 \times 10^{-54}$
NCR_1	1.05256674
	Democritean unit
Y'	$8.134865168 \times 10^{-54}$

$$\frac{137.0 * 10.03 * 2\pi * 1.1197908 * 2 * 1.038 * 8.1415923}{2\pi * 2 * 1.038 * \pi * 4.5219479 * c * 7.1949419 * c * 10.50 * 2 * 1.052} \div c = \lambda_C$$

Compton wavelength, λ_C

NIST 2014 CODATA value: $2.4263102367(11) \times 10^{-12}$
NIST 2006 CODATA value: $2.4263102175(33) \times 10^{-12}$
U-theory value: $2.4263102201 \times 10^{-12}$

Via Inverse

	Proton mass
m_P	$1.672503106 \times 10^{-27}$
m_P/m_e	1836.022569
	Electron mass
m_e	$9.109382065 \times 10^{-31}$
α^{-1}	137.0359996
	New Constant 4
NC_4	6.647437236^{-33}
NCR_3	10.03224887
	Planck constant
h	$6.626068909 \times 10^{-34}$
2π	6.283185307
	Red. Planck const.
$\hbar$	$1.054571620 \times 10^{-34}$
2	2
	½ Red. Planck const.
$½\hbar$	$5.272858100 \times 10^{-35}$
$½\hbar/Ⓟ$	1.038499006
	Planck circumference
Ⓟ	$5.077383865 \times 10^{-35}$
π	3.141592654
	Planck length
lp	$1.616181480 \times 10^{-35}$
c	299792458
	Planck time
tp	$5.391001321 \times 10^{-44}$
c	299792458
	New constant 3
NC_3	$1.798244414 \times 10^{-52}$
NCR_2	10.5007114
	New constant 2
NC_2	$1.712497702 \times 10^{-53}$
2	2
	New constant 1
NC_1	$8.562488511 \times 10^{-54}$
NCR_1	1.05256674
	Democritean unit
Y'	$8.134865168 \times 10^{-54}$

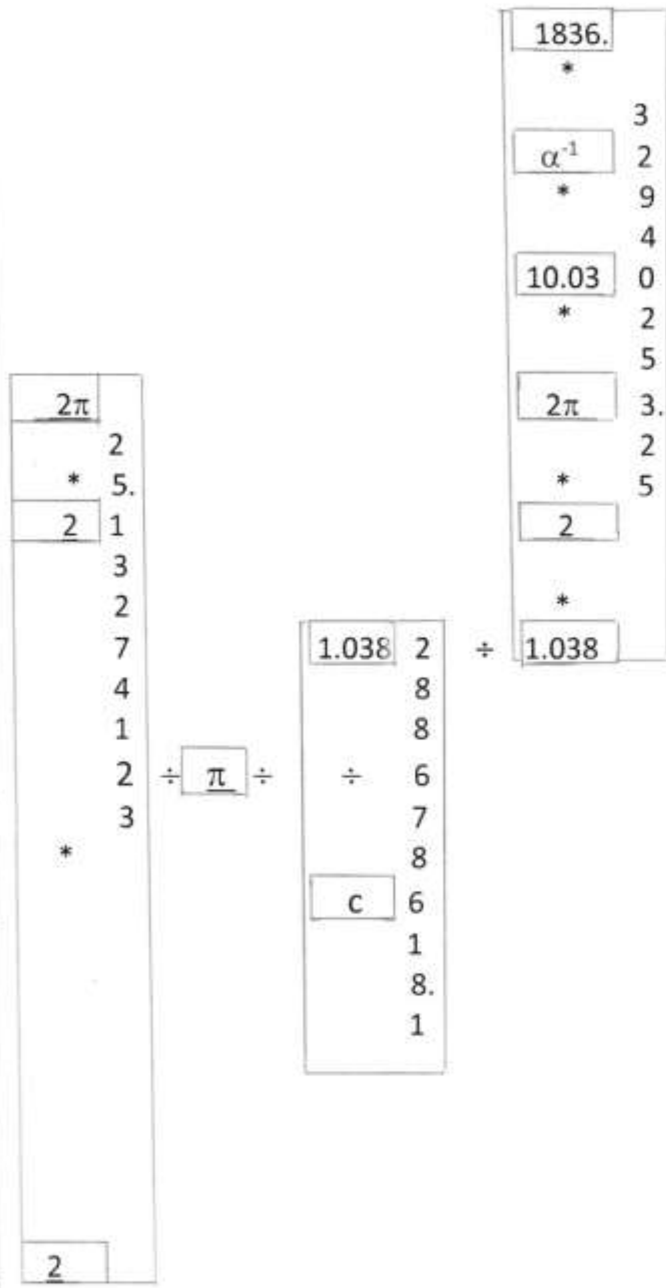
137.0		
*		
10.03		
		4.
		1
		2
		1
		4
		8
		4
*		5
		1
		2
		11
c		

$$= \frac{1}{4.121484512 \times 10^{11}} = 2.426310222 \times 10^{-12}$$

Proton rms charge radius

NIST 2014 CODATA value: $8.751\ (61) \times 10^{-16}$
Drs. Pohl, Antognini value: $8.4087\ (39) \times 10^{-16}$
U-theory value: $8.412952475 \times 10^{-16}$

	Proton mass
m_p	$1.672503106 \times 10^{-27}$
m_p/m_e	1836.022569
	Electron mass
m_e	$9.109382065 \times 10^{-31}$
α^{-1}	137.0359996
	New Constant 4
NC_4	6.647437236^{-33}
NCR_3	10.03224887
	Planck constant
h	$6.626068909 \times 10^{-34}$
2π	6.283185307
	Red. Planck const.
ħ	$1.054571620 \times 10^{-34}$
2	2
	½ Red. Planck const.
½ħ	$5.272858100 \times 10^{-35}$
½ħ/Ⓟ	1.038499006
	Planck circumference
Ⓟ	$5.077383865 \times 10^{-35}$
π	3.141592654
	Planck length
lp	$1.616181480 \times 10^{-35}$
c	299792458
	Planck time
tp	$5.391001321 \times 10^{-44}$
c	299792458
	New constant 3
NC_3	$1.798244414 \times 10^{-52}$
NCR_2	10.5007114
	New constant 2
NC_2	$1.712497702 \times 10^{-53}$
2	2
	New constant 1
NC_1	$8.562488511 \times 10^{-54}$
NCR_1	1.05256674
	Democritean unit
Y′	$8.134865168 \times 10^{-54}$



Bohr magneton, μ_B

NIST 2014 CODATA value: $927.4009994(57) \times 10^{-26}$
NIST 2006 CODATA value: $927.400915(23) \times 10^{-26}$
U-theory 2006 value: $927.400929 \times 10^{-26}$

	Proton mass
m_p	$1.672503106 \times 10^{-27}$
m_p/m_e	1836.022569
	Electron mass
m_e	$9.109382065 \times 10^{-31}$
α^{-1}	137.0359996
	New Constant 4
NC_4	6.647437236^{-33}
NCR_3	10.03224887
	Planck constant
h	$6.626068909 \times 10^{-34}$
2π	6.283185307
	Red. Planck const.
$\hbar$	$1.054571620 \times 10^{-34}$
2	2
	½ Red. Planck const.
$½\hbar$	$5.272858100 \times 10^{-35}$
$½\hbar/Ⓟ$	1.038499006
	Planck circumference
Ⓟ	$5.077383865 \times 10^{-35}$
π	3.141592654
	Planck length
lp	$1.616181480 \times 10^{-35}$
c	299792458
	Planck time
tp	$5.391001321 \times 10^{-44}$
c	299792458
	New constant 3
NC_3	$1.798244414 \times 10^{-52}$
NCR_2	10.50071140
	New constant 2
NC_2	$1.712497702 \times 10^{-53}$
2	2
	New constant 1
NC_1	$8.562488511 \times 10^{-54}$
NCR_1	1.052566740
	Democritean unit
Y'	$8.134865168 \times 10^{-54}$

$$1.038 \div \Big(137.0 * 10.03 * 2\pi * 2 * ½\hbar * \Ⓟ * \pi * lp * c * tp * c * 10.50 * 2 * NC_1 * 1.052\Big)$$

$$1.038 \div 1.038508 = \mu_B = 927.4009296 \times 10^{-26}$$

Electron energy, $m_e c^2$

$E = mc^2$

NIST 2014 CODATA value: $8.18710565\ (10) \times 10^{-14}$

NIST 2006 CODATA value: $8.18710438\ (41) \times 10^{-14}$

U-theory value: $8.18710430\ 6 \times 10^{-14}$

m_p	Proton mass $1.672503106 \times 10^{-27}$		
m_p/m_e	1836.022569		
m_e	Electron mass $9.109382065 \times 10^{-31}$		
α^{-1}	137.0359996	α^{-1}	
NC_4	New Constant 4 6.647437236^{-33}	*	
NCR_3	10.03224887	10.03	
h	Planck constant $6.626068909 \times 10^{-34}$	*	
2π	6.283185307	2π	1.
$\hbar$	Red. Planck const. $1.054571620 \times 10^{-34}$	*	1 1
2	2	2	9
$½\hbar$	½ Red. Planck const. $5.272858100 \times 10^{-35}$	*	7 9
$½\hbar/Ⓟ$	1.038499006	1.038	5
Ⓟ	Planck circumference $5.077383865 \times 10^{-35}$	*	0 8
π	3.141592654	π	7
l_p	Planck length $1.616181480 \times 10^{-35}$	*	23
c	299792458	c	
t_p	Planck time $5.391001321 \times 10^{-44}$	*	
c	299792458	c	
NC_3	New constant 3 $1.798244414 \times 10^{-52}$	*	
NCR_2	10.5007114	10.50	
NC_2	New constant 2 $1.712497702 \times 10^{-53}$	*	
2	2	2	
NC_1	New constant 1 $8.562488511 \times 10^{-54}$	*	
NCR_1	1.05256674	1.052	
Y'	Democritean unit $8.134865168 \times 10^{-54}$	* Y'	

$$* \begin{matrix} c \\ * \\ c \end{matrix} = 8.187104306 \times 10^{-14}$$

Elementary charge, e

NIST 2014 CODATA value: $1.6021766208\ (98) \times 10^{-19}$
NIST 2006 CODATA value: $1.602176487(40) \times 10^{-19}$
U-theory value: $1.602176511 \times 10^{-19}$

	Proton mass
m_p	$1.672503106 \times 10^{-27}$
m_p/m_e	1836.022569
	Electron mass
m_e	$9.109382065 \times 10^{-31}$
α^{-1}	137.0359996
	New Constant 4
NC_4	6.647437236^{-33}
NCR_3	10.03224887
	Planck constant
h	$6.626068909 \times 10^{-34}$
2π	6.283185307
	Red. Planck const.
$\hbar$	$1.054571620 \times 10^{-34}$
2	2
	½ Red. Planck const.
$½\hbar$	$5.272858100 \times 10^{-35}$
$½\hbar/Ⓟ$	1.038499006
	Planck circumference
Ⓟ	$5.077383865 \times 10^{-35}$
π	3.141592654
	Planck length
lp	$1.616181480 \times 10^{-35}$
c	299792458
	Planck time
tp	$5.391001321 \times 10^{-44}$
c	299792458
	New constant 3
NC_3	$1.798244414 \times 10^{-52}$
NCR_2	10.5007114
	New constant 2
NC_2	$1.712497702 \times 10^{-53}$
2	2
	New constant 1
NC_1	$8.562488511 \times 10^{-54}$
NCR_1	1.05256674
	Democritean unit
Y′	$8.134865168 \times 10^{-54}$

Ⓟ

÷

Y′

$= 1.602176511 \times 10^{-19}$

Planck temperature, Tp

NIST 2014 CODATA value: $1.4168808(33) \times 10^{32}$
NIST 2006 CODATA value: $1.416785(71) \times 10^{32}$
U-theory value: $1.41684693 \times 10^{32}$

	Proton mass
m_p	$1.672503106 \times 10^{-27}$
m_p/m_e	1836.022569
	Electron mass
m_e	$9.109382065 \times 10^{-31}$
α^{-1}	137.0359996
	New Constant
NC_4	6.647437236^{-33}
NCR_3	10.03224887
	Planck constant
h	$6.626068909 \times 10^{-34}$
2π	6.283185307
	Red. Planck const.
ħ	$1.054571620 \times 10^{-34}$
2	2
	½ Red. Planck const.
½ħ	$5.272858100 \times 10^{-35}$
½ħ/Ⓟ	1.038499006
	Planck circumference
Ⓟ	$5.077383865 \times 10^{-35}$
π	3.141592654
	Planck length
lp	$1.616181480 \times 10^{-35}$
c	299792458
	Planck time
tp	$5.391001321 \times 10^{-44}$
c	299792458
	New constant 3
NC_3	$1.798244414 \times 10^{-52}$
NCR_2	10.5007114
	New constant 2
NC_2	$1.712497702 \times 10^{-53}$
2	2
	New constant 1
NC_1	$8.562488511 \times 10^{-54}$
NCR_1	1.05256674
	Democritean unit
Y'	$8.134865168 \times 10^{-54}$

2	1.
*	9
	5
1.038	6
	1
*	7
π	0
	2
*	8
c	09

÷ K = $1.41684693 \times 10^{32}$

where: K is the Boltzmann constant = $1.38065048 \times 10^{-23}$

Atomic unit of length, a_o

NIST 2014 CODATA value: 0.52917721067 (12) $\times 10^{-10}$
NIST 2006 CODATA value: 0.52917720859 (36) $\times 10^{-10}$
U-theory value: 0.52917720887 $\times 10^{-10}$

	Proton mass
m_p	1.672503106 $\times 10^{-27}$
m_p/m_e	1836.022569
	Electron mass
m_e	9.109382065 $\times 10^{-31}$
α^{-1}	137.0359996
	New Constant 4
NC_4	6.647437236^{-33}
NCR_3	10.03224887
	Planck constant
h	6.626068909 $\times 10^{-34}$
2π	6.283185307
	Red. Planck const.
$\hbar$	1.054571620 $\times 10^{-34}$
2	2
	½ Red. Planck const.
$\frac{1}{2}\hbar$	5.272858100 $\times 10^{-35}$
$\frac{1}{2}\hbar/Ⓟ$	1.038499006
	Planck circumference
Ⓟ	5.077383865 $\times 10^{-35}$
π	3.141592654
	Planck length
lp	1.616181480 $\times 10^{-35}$
c	299792458
	Planck time
tp	5.391001321 $\times 10^{-44}$
c	299792458
	New constant 3
NC_3	1.798244414 $\times 10^{-52}$
NCR_2	10.5007114
	New constant 2
NC_2	1.712497702 $\times 10^{-53}$
2	2
	New constant 1
NC_1	8.562488511 $\times 10^{-54}$
NCR_1	1.05256674
	Democritean unit
Y'	8.134865168 $\times 10^{-54}$

Ⓟ
1.
6
0
2
1
7
6
5
1
1
-19
÷
Y'

*

c
3
1
5
5
5
* 1
5
7
0.
2
1.052

*

10.03
1.
0
4
6
6
9
5
6
6
4
÷
10.50

= 0.52917720887 $\times 10^{-10}$

Atomic unit of momentum, $\hbar/a_o$

NIST 2014 CODATA value: $1.992851882\ (24) \times 10^{-24}$
NIST 2006 CODATA value: $1.992851565\ (99) \times 10^{-24}$
U-theory value: $1.992851548 \times 10^{-24}$

	Proton mass
m_p	$1.672503106 \times 10^{-27}$
m_p/m_e	1836.022569
	Electron mass
m_e	$9.109382065 \times 10^{-31}$
α^{-1}	137.0359996
	New Constant 4
NC_4	6.647437236^{-33}
NCR_3	10.03224887
	Planck constant
h	$6.626068909 \times 10^{-34}$
2π	6.283185307
	Red. Planck const.
$\hbar$	$1.054571620 \times 10^{-34}$
2	2
	½ Red. Planck const.
$½\hbar$	$5.272858100 \times 10^{-35}$
$½\hbar/Ⓟ$	1.038499006
	Planck circumference
Ⓟ	$5.077383865 \times 10^{-35}$
π	3.141592654
	Planck length
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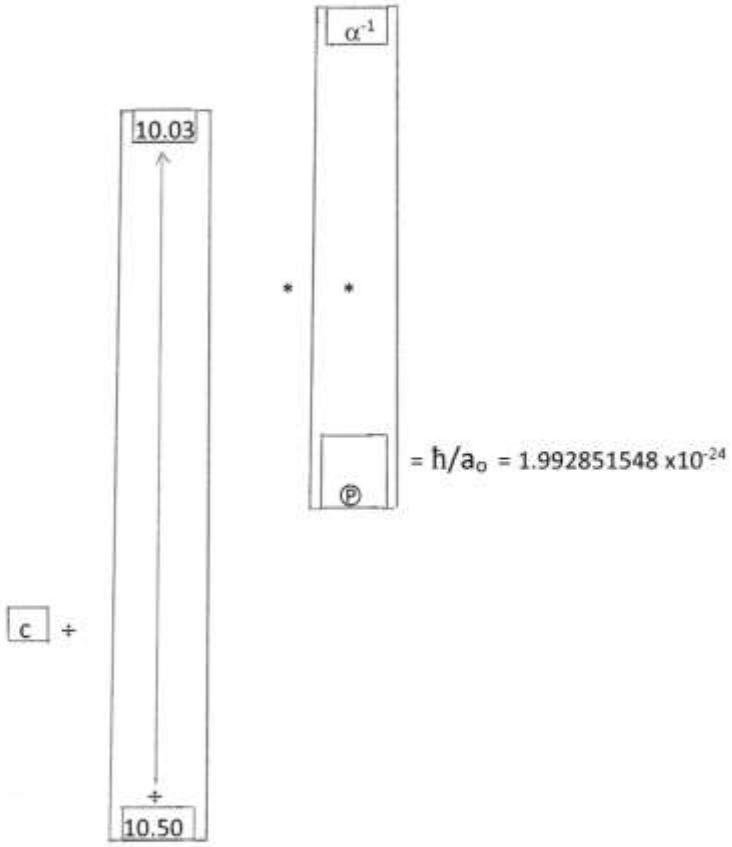
	Planck time
tp	$5.391001321 \times 10^{-44}$
c	299792458
	New constant 3
NC_3	$1.798244414 \times 10^{-52}$
NCR_2	10.5007114
	New constant 2
NC_2	$1.712497702 \times 10^{-53}$
2	2
	New constant 1
NC_1	$8.562488511 \times 10^{-54}$
NCR_1	1.05256674
	Democritean unit
Y'	$8.134865168 \times 10^{-54}$



h in eV s

NIST 2014 CODATA value: $4.13566766\ 2\ (25) \times 10^{-15}$
NIST 2006 CODATA value: $4.13566733\ (10) \times 10^{-15}$
U-theory value: $4.13566723\ 35 \times 10^{-15}$

m_p	Proton mass $1.672503106 \times 10^{-27}$	
m_p/m_e	1836.022569	
m_e	Electron mass $9.109382065 \times 10^{-31}$	
α^{-1}	137.0359996	
NC_4	New Constant 4 6.647437236^{-33}	
NCR_3	10.03224887	
h	Planck constant $6.626068909 \times 10^{-34}$	
2π	6.283185307	2π
$\hbar$	Red. Planck const. $1.054571620 \times 10^{-34}$	*
2	2	2
$\frac{1}{2}\hbar$	½ Red. Planck const. $5.272858100 \times 10^{-35}$	*
$\frac{1}{2}\hbar/Ⓟ$	1.038499006	1.038
Ⓟ	Planck circumference $5.077383865 \times 10^{-35}$	* Ⓟ
		*
π	3.141592654	π
lp	Planck length $1.616181480 \times 10^{-35}$	*
c	299792458	c
tp	Planck time $5.391001321 \times 10^{-44}$	*
c	299792458	c
NC_3	New constant 3 $1.798244414 \times 10^{-52}$	*
NCR_2	10.5007114	10.50
NC_2	New constant 2 $1.712497702 \times 10^{-53}$	*
2	2	2
NC_1	New constant 1 $8.562488511 \times 10^{-54}$	*
NCR_1	1.05256674	1.052
Y'	Democritean unit $8.134865168 \times 10^{-54}$	

= h in eV s = $4.135667235 \times 10^{-15}$

Hartree energy, E_h

NIST 2014 CODATA value: $4.359744650\ (54) \times 10^{-18}$
NIST 2006 CODATA value: $4.35974394\ (22) \times 10^{-18}$
U-theory value: $4.359743906 \times 10^{-18}$

	Proton mass
m_p	$1.672503106 \times 10^{-27}$
m_p/m_e	1836.022569
	Electron mass
m_e	$9.109382065 \times 10^{-31}$
α^{-1}	137.0359996
	New Constant 4
NC_4	6.647437236^{-33}
NCR_3	10.03224887
	Planck constant
h	$6.626068909 \times 10^{-34}$
2π	6.283185307
	Red. Planck const.
$\hbar$	$1.054571620 \times 10^{-34}$
2	2
	½ Red. Planck const.
$½\hbar$	$5.272858100 \times 10^{-35}$
$½\hbar/Ⓟ$	1.038499006
	Planck circumference
Ⓟ	$5.077383865 \times 10^{-35}$
π	3.141592654
	Planck length
lp	$1.616181480 \times 10^{-35}$
c	299792458
	Planck time
tp	$5.391001321 \times 10^{-44}$
c	299792458
	New constant 3
NC_3	$1.798244414 \times 10^{-52}$
NCR_2	10.5007114
	New constant 2
NC_2	$1.712497702 \times 10^{-53}$
2	2
	New constant 1
NC_1	$8.562488511 \times 10^{-54}$
NCR_1	1.05256674
	Democritean unit
Y'	$8.134865168 \times 10^{-54}$

π * c * tp * c * 2 * 1.052 * Y'

5.0773773 $\times 10^{-35}$

* 8.9875517 $\times 10^{16}$ ÷ 10.50

10.03 ÷ 10.50

1.0466695

= E_h

Newtonian Gravitation, G

NIST 2014 CODATA value: 6.67408 (31) $x10^{-11}$
NIST 2006 CODATA value: 6.67428 (67) $x10^{-11}$
U-theory value: 6.67369 3868 $x10^{-11}$

m_p	Proton mass $1.672503106 \times 10^{-27}$
m_p/m_e	1836.022569
m_e	Electron mass $9.109382065 \times 10^{-31}$
α^{-1}	137.0359996
NC_4	New Constant 4 6.647437236^{-33}
NCR_3	10.03224887
h	Planck constant $6.626068909 \times 10^{-34}$
2π	6.283185307
ħ	Red. Planck const. $1.054571620 \times 10^{-34}$
2	2
½ħ	½ Red. Planck const. $5.272858100 \times 10^{-35}$
½ħ/Ⓟ	1.038499006
Ⓟ	Planck circumference $5.077383865 \times 10^{-35}$
π	3.141592654
lp	Planck length $1.616181480 \times 10^{-35}$
c	299792458
tp	Planck time $5.391001321 \times 10^{-44}$
c	299792458
NC_3	New constant 3 $1.798244414 \times 10^{-52}$
NCR_2	10.50071140
NC_2	New constant 2 $1.712497702 \times 10^{-53}$
2	2
NC_1	New constant 1 $8.562488511 \times 10^{-54}$
NCR_1	1.052566740
Y′	Democritean unit $8.134865168 \times 10^{-54}$

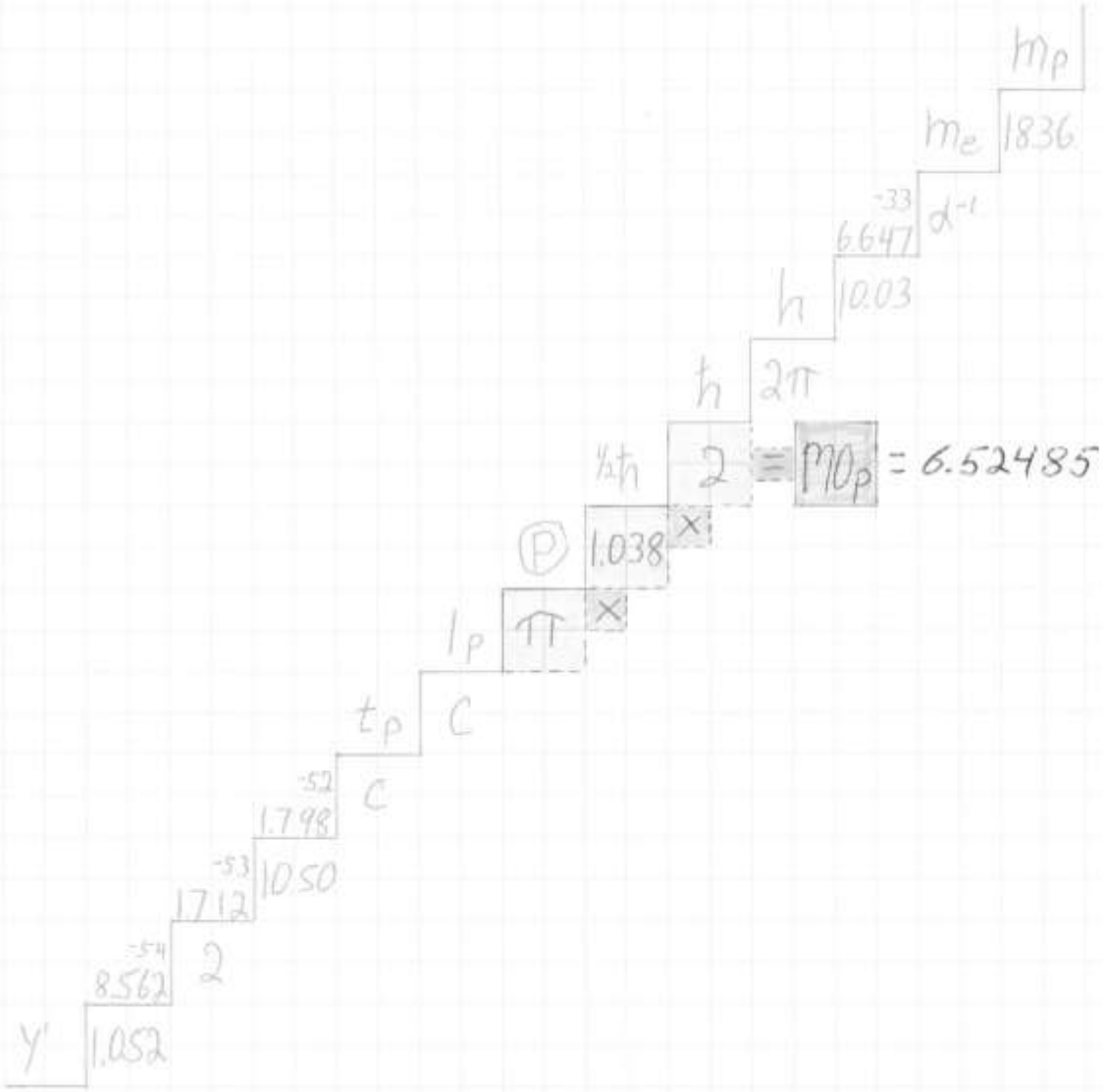
$$\frac{1.038}{\pi} = G$$

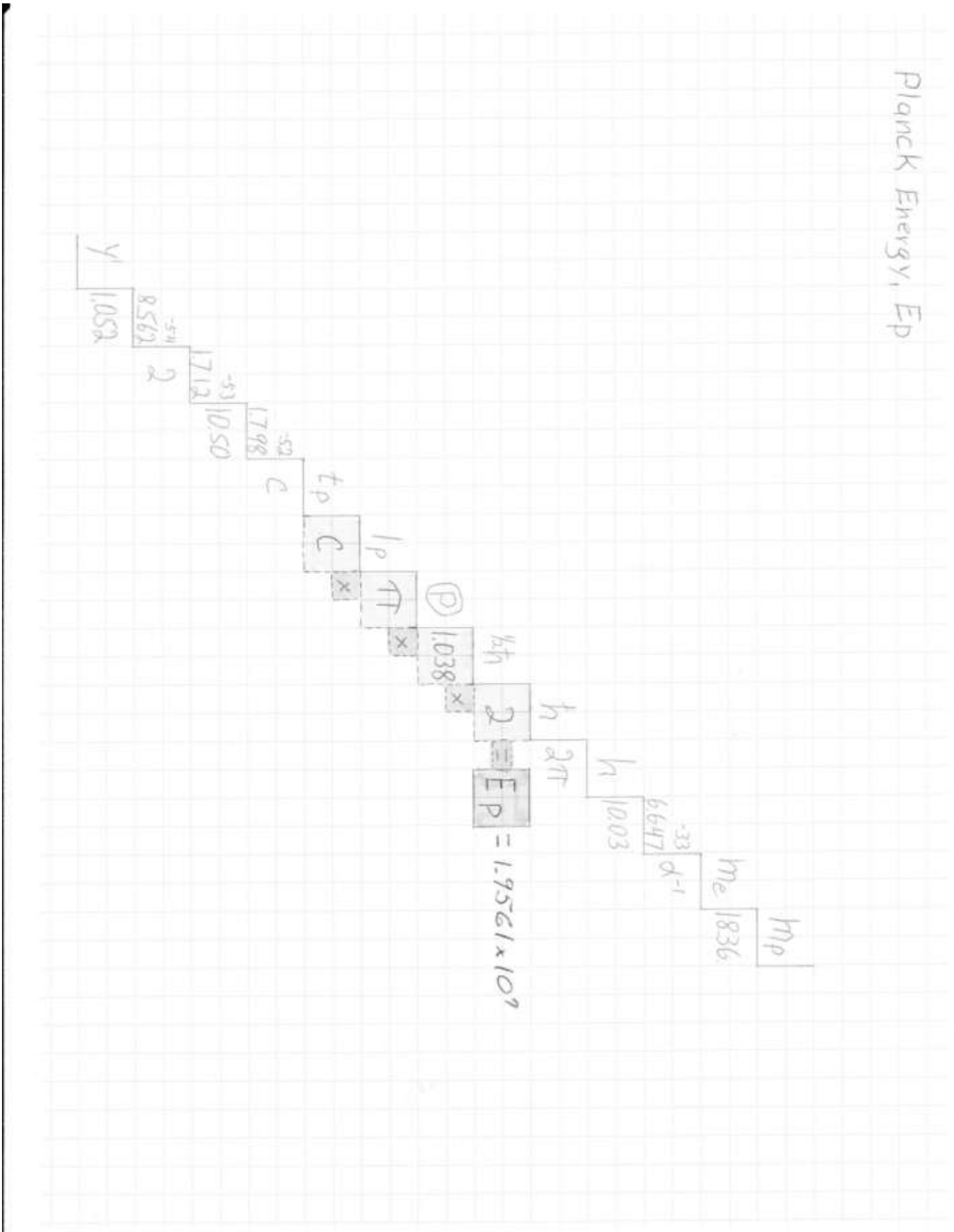
$$\frac{c}{c} * \left(\frac{c}{c} * \frac{c}{c} \right) * 10.50 * 1.052 * Y'$$

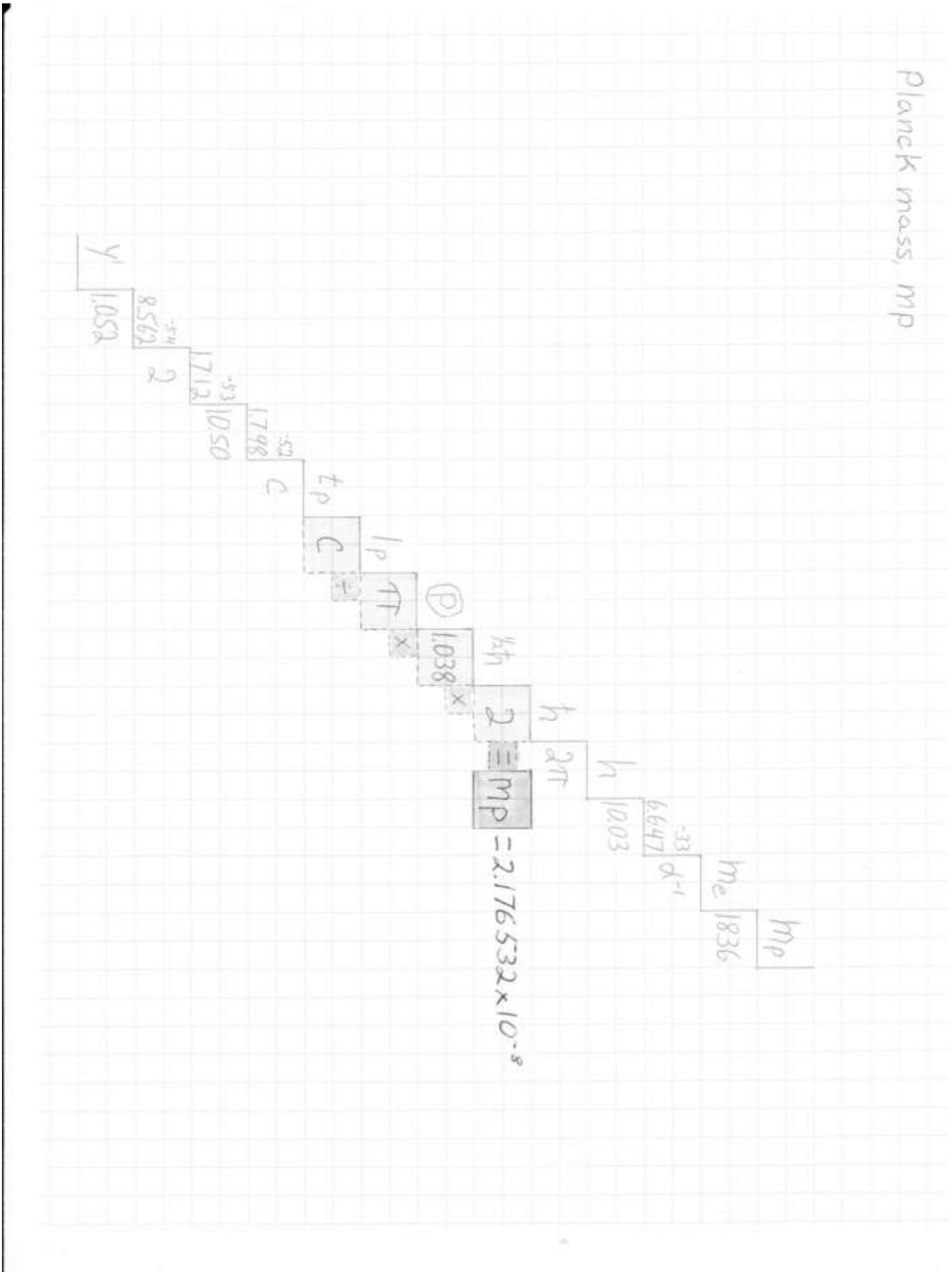
Correlation of c^5 equations

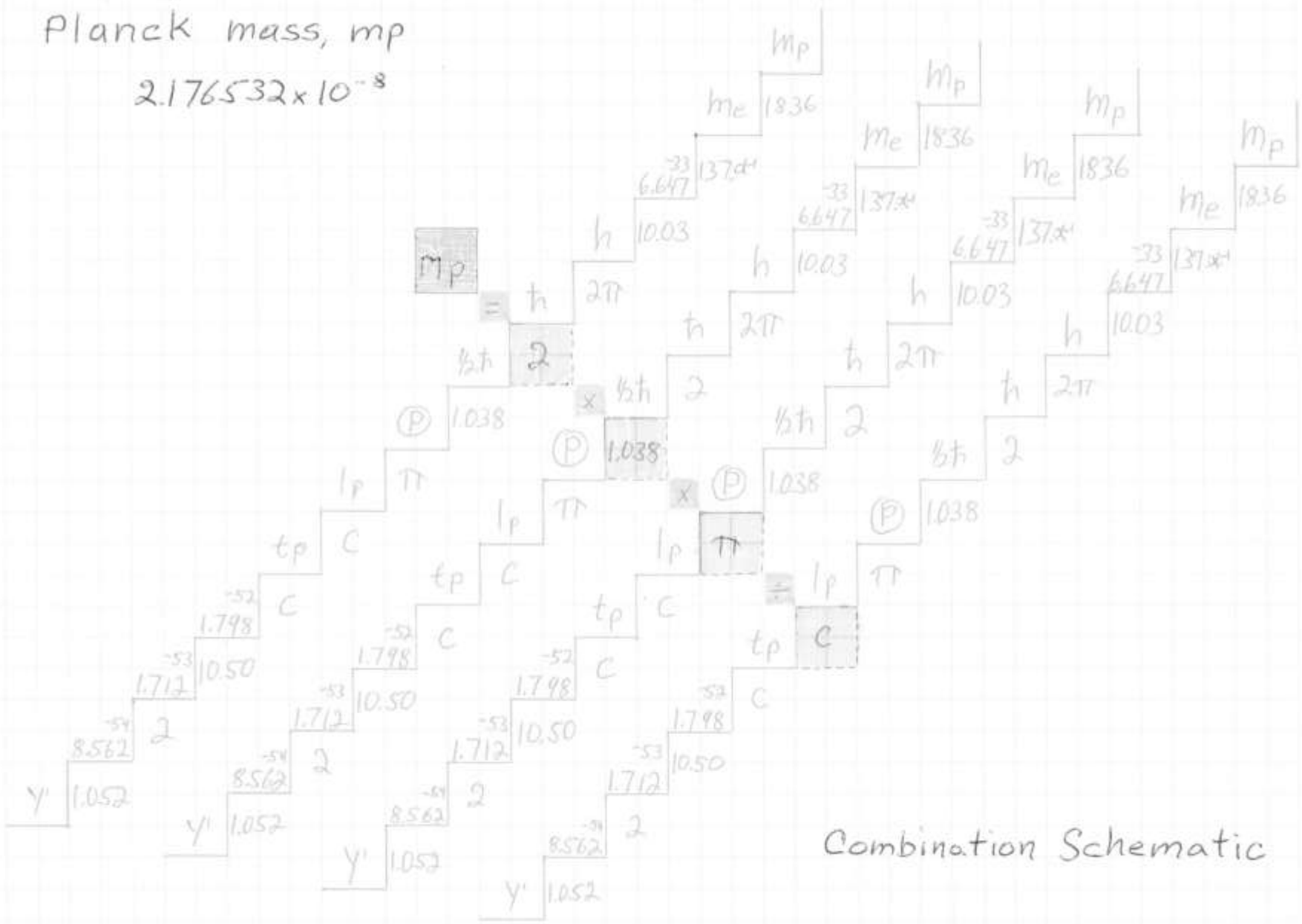
Staircase Schematics

Planck Momentum, mO_P Staircase schematic



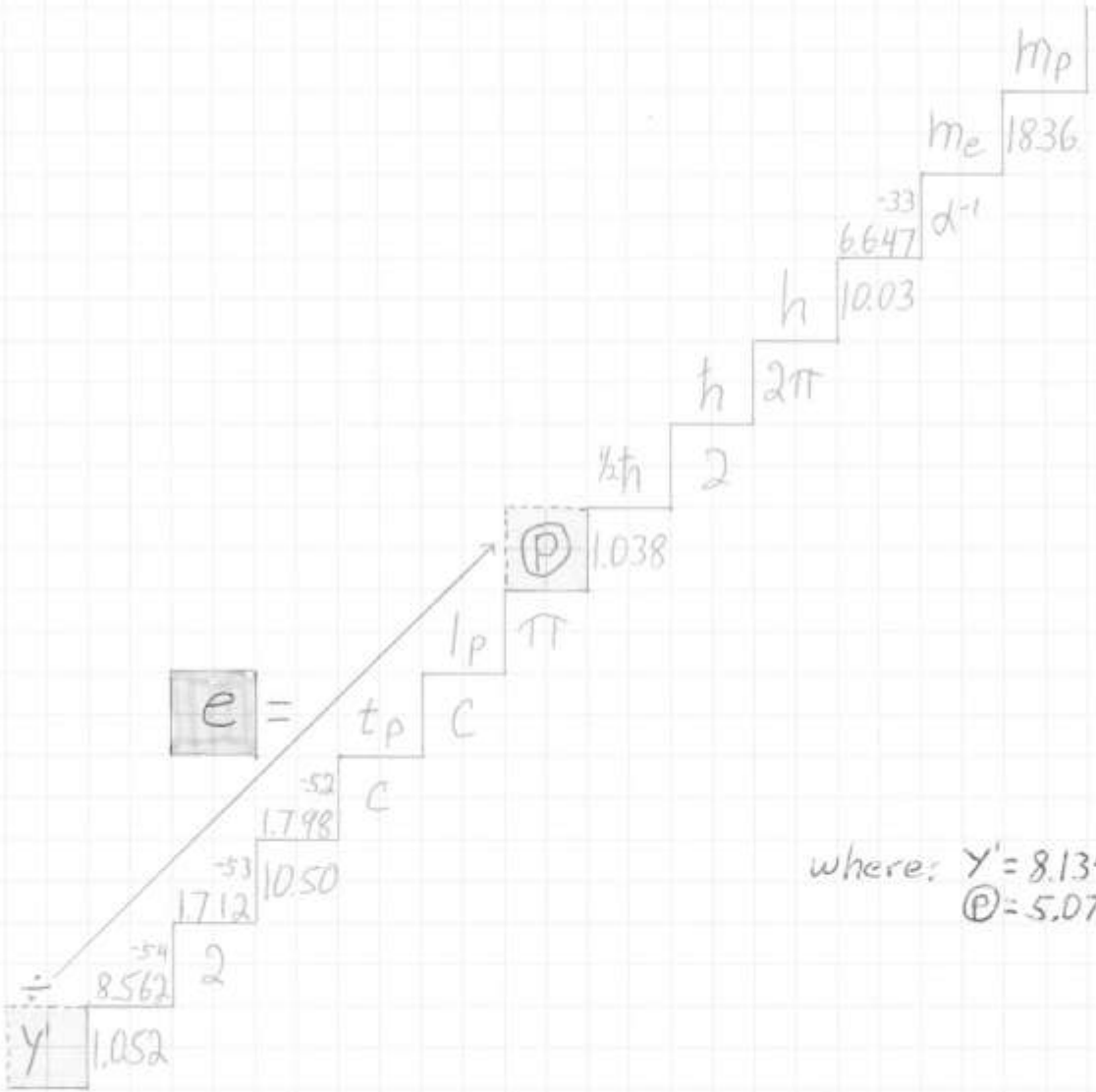

Planck Energy, Ep
mp
me
1836
-33
6.6417
d-1
h
10.03
h
2π
½h
2
Ⓟ
1.038
lp
π
tp
c
-52
1.798
c
-53
1.050
1.712
-54
8.562
2
y
1.052
Ep = 1.9561 x 10⁷


Planck mass, mp
mp
me
1836
α-1
-33
6.6477
h
10.03
h
2π
h
2
=mp
=2.176532×10-8
ħh
2
P
1.038
x
lp
π
x
tp
c
÷
c
-52
1.798
-53
10.50
1.712
-54
2
8.562
y'
1.052


Planck mass, mp
2.176532x10^-8
mp
=
h
2
½h
2
x
½h
2
x
lp
π
=
lp
c
tp
c
Combination Schematic

Elementary charge, e

$1.602176511 \times 10^{-19}$



where: $Y' = 8.134865168 \times 10^{-54}$

$Ⓟ = 5.077383865 \times 10^{-35}$

Conclusion: The theoretical enumeration of dozens of standard model constants. And, the specific enumeration of the Rydberg constant, solely with ratios, within an accuracy of one part in ten trillion [7]. If the math works an investigation is warranted.

Acknowledgement

Special thanks to Elizabeth Sheridan Rossi for the mathematical analysis and helpful insights.

And, to Espen G. Haug for his perspective on utilizing atomism in the search of the fundamental theory of physics.

A multitude of thanks to Lee Smolen for writing, “The trouble with physics”. The book that gave me the conviction and drive to write this paper.

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Fundamental Physical Constants --- Complete Listing

From: http://physics.nist.gov/constants

Quantity	Value	Uncertainty	Unit
{220} lattice spacing of silicon	192.015 5762 e-12	0.000 0050 e-12	m
alpha particle-electron mass ratio	7294.299 5365	0.000 0031	
alpha particle mass	6.644 656 20 e-27	0.000 000 33 e-27	kg
alpha particle mass energy equivalent	5.971 919 17 e-10	0.000 000 30 e-10	J
alpha particle mass energy equivalent in MeV	3727.379 109	0.000 093	MeV
alpha particle mass in u	4.001 506 179 127	0.000 000 000 062	u
alpha particle molar mass	4.001 506 179 127 e-3	0.000 000 000 062 e-3	kg mol^-1
alpha particle-proton mass ratio	3.972 599 689 51	0.000 000 000 41	
Angstrom star	1.000 014 98 e-10	0.000 000 90 e-10	m
atomic mass constant	1.660 538 782 e-27	0.000 000 083 e-27	kg
atomic mass constant energy equivalent	1.492 417 830 e-10	0.000 000 074 e-10	J
atomic mass constant energy equivalent in MeV	931.494 028	0.000 023	MeV
atomic mass unit-electron volt relationship	931.494 028 e6	0.000 023 e6	eV
atomic mass unit-hartree relationship	3.423 177 7149 e7	0.000 000 0049 e7	E_h
atomic mass unit-hertz relationship	2.252 342 7369 e23	0.000 000 0032 e23	Hz
atomic mass unit-inverse meter relationship	7.513 006 671 e14	0.000 000 011 e14	m^-1
atomic mass unit-joule relationship	1.492 417 830 e-10	0.000 000 074 e-10	J
atomic mass unit-kelvin relationship	1.080 9527 e13	0.000 0019 e13	K
atomic mass unit-kilogram relationship	1.660 538 782 e-27	0.000 000 083 e-27	kg
atomic unit of 1st hyperpolarizablity	3.206 361 533 e-53	0.000 000 081 e-53	C^3 m^3 J^-2
atomic unit of 2nd hyperpolarizablity	6.235 380 95 e-65	0.000 000 31 e-65	C^4 m^4 J^-3
atomic unit of action	1.054 571 628 e-34	0.000 000 053 e-34	J s
atomic unit of charge	1.602 176 487 e-19	0.000 000 040 e-19	C
atomic unit of charge density	1.081 202 300 e12	0.000 000 027 e12	C m^-3
atomic unit of current	6.623 617 63 e-3	0.000 000 17 e-3	A
atomic unit of electric dipole mom.	8.478 352 81 e-30	0.000 000 21 e-30	C m
atomic unit of electric field	5.142 206 32 e11	0.000 000 13 e11	V m^-1
atomic unit of electric field gradient	9.717 361 66 e21	0.000 000 24 e21	V m^-2
atomic unit of electric polarizablity	1.648 777 2536 e-41	0.000 000 0034 e-41	C^2 m^2 J^-1
atomic unit of electric potential	27.211 383 86	0.000 000 68	V
atomic unit of electric quadrupole mom.	4.486 551 07 e-40	0.000 000 11 e-40	C m^2
atomic unit of energy	4.359 743 94 e-18	0.000 000 22 e-18	J
atomic unit of force	8.238 722 06 e-8	0.000 000 41 e-8	N
atomic unit of length	0.529 177 208 59 e-10	0.000 000 000 36 e-10	m
atomic unit of mag. dipole mom.	1.854 801 830 e-23	0.000 000 046 e-23	J T^-1
atomic unit of mag. flux density	2.350 517 382 e5	0.000 000 059 e5	T
atomic unit of magnetizability	7.891 036 433 e-29	0.000 000 027 e-29	J T^-2
atomic unit of mass	9.109 382 15 e-31	0.000 000 45 e-31	kg
atomic unit of momentum	1.992 851 565 e-24	0.000 000 099 e-24	kg m s^-1
atomic unit of permittivity	1.112 650 056... e-10	(exact)	F m^-1
atomic unit of time	2.418 884 326 505 e-17	0.000 000 000 016 e-17	s
atomic unit of velocity	2.187 691 2541 e6	0.000 000 0015 e6	m s^-1
Avogadro constant	6.022 141 79 e23	0.000 000 30 e23	mol^-1
Bohr magneton	927.400 915 e-26	0.000 023 e-26	J T^-1
Bohr magneton in eV/T	5.788 381 7555 e-5	0.000 000 0079 e-5	eV T^-1
Bohr magneton in Hz/T	13.996 246 04 e9	0.000 000 35 e9	Hz T^-1
Bohr magneton in inverse meters per tesla	46.686 4515	0.000 0012	m^-1 T^-1
Bohr magneton in K/T	0.671 7131	0.000 0012	K T^-1
Bohr radius	0.529 177 208 59 e-10	0.000 000 000 36 e-10	m
Boltzmann constant	1.380 6504 e-23	0.000 0024 e-23	J K^-1
Boltzmann constant in eV/K	8.617 343 e-5	0.000 015 e-5	eV K^-1
Boltzmann constant in Hz/K	2.083 6644 e10	0.000 0036 e10	Hz K^-1
Boltzmann constant in inverse meters per kelvin	69.503 56	0.000 12	m^-1 K^-1
characteristic impedance of vacuum	376.730 313 461...	(exact)	ohm
classical electron radius	2.817 940 2894 e-15	0.000 000 0058 e-15	m
Compton wavelength	2.426 310 2175 e-12	0.000 000 0033 e-12	m
Compton wavelength over 2 pi	386.159 264 59 e-15	0.000 000 53 e-15	m
conductance quantum	7.748 091 7004 e-5	0.000 000 0053 e-5	S
conventional value of Josephson constant	483 597.9 e9	(exact)	Hz V^-1
conventional value of von Klitzing constant	25 812.807	(exact)	ohm
Cu x unit	1.002 076 99 e-13	0.000 000 28 e-13	m
deuteron-electron mag. mom. ratio	-4.664 345 537 e-4	0.000 000 039 e-4	
deuteron-electron mass ratio	3670.482 9654	0.000 0016	
deuteron g factor	0.857 438 2308	0.000 000 0072	
deuteron mag. mom.	0.433 073 465 e-26	0.000 000 011 e-26	J T^-1
deuteron mag. mom. to Bohr magneton ratio	0.466 975 4556 e-3	0.000 000 0039 e-3	
deuteron mag. mom. to nuclear magneton ratio	0.857 438 2308	0.000 000 0072	
deuteron mass	3.343 583 20 e-27	0.000 000 17 e-27	kg
deuteron mass energy equivalent	3.005 062 72 e-10	0.000 000 15 e-10	J
deuteron mass energy equivalent in MeV	1875.612 793	0.000 047	MeV
deuteron mass in u	2.013 553 212 724	0.000 000 000 078	u
deuteron molar mass	2.013 553 212 724 e-3	0.000 000 000 078 e-3	kg mol^-1
deuteron-neutron mag. mom. ratio	-0.448 206 52	0.000 000 11	
deuteron-proton mag. mom. ratio	0.307 012 2070	0.000 000 0024	
deuteron-proton mass ratio	1.999 007 501 08	0.000 000 000 22	
deuteron rms charge radius	2.1402 e-15	0.0028 e-15	m
electric constant	8.854 187 817... e-12	(exact)	F m^-1

http://physics.nist.gov/cuu/Constants/Table/allascii.txt

electron charge to mass quotient	-1.758 820 150 e11	0.000 000 044 e11	C kg^-1
electron-deuteron mag. mom. ratio	-2143.923 490	0.000 018	
electron-deuteron mass ratio	2.724 437 1093 e-4	0.000 000 0012 e-4	
electron g factor	-2.002 319 304 3622	0.000 000 000 0015	
electron gyromag. ratio	1.760 859 770 e11	0.000 000 044 e11	s^-1 T^-1
electron gyromag. ratio over 2 pi	28 024.953 64	0.000 70	MHz T^-1
electron mag. mom.	-928.476 377 e-26	0.000 023 e-26	J T^-1
electron mag. mom. anomaly	1.159 652 181 11 e-3	0.000 000 000 74 e-3	
electron mag. mom. to Bohr magneton ratio	-1.001 159 652 181 11	0.000 000 000 000 74	
electron mag. mom. to nuclear magneton ratio	-1838.281 970 92	0.000 000 80	
electron mass	9.109 382 15 e-31	0.000 000 45 e-31	kg
electron mass energy equivalent	8.187 104 38 e-14	0.000 000 41 e-14	J
electron mass energy equivalent in MeV	0.510 998 910	0.000 000 013	MeV
electron mass in u	5.485 799 0943 e-4	0.000 000 0023 e-4	u
electron molar mass	5.485 799 0943 e-7	0.000 000 0023 e-7	kg mol^-1
electron-muon mag. mom. ratio	206.766 9877	0.000 0052	
electron-muon mass ratio	4.836 331 71 e-3	0.000 000 12 e-3	
electron-neutron mag. mom. ratio	960.920 50	0.000 23	
electron-neutron mass ratio	5.438 673 4459 e-4	0.000 000 0033 e-4	
electron-proton mag. mom. ratio	-658.210 6848	0.000 0054	
electron-proton mass ratio	5.446 170 2177 e-4	0.000 000 0024 e-4	
electron-tau mass ratio	2.875 64 e-4	0.000 47 e-4	
electron to alpha particle mass ratio	1.370 933 555 70 e-4	0.000 000 000 58 e-4	
electron to shielded helion mag. mom. ratio	864.058 257	0.000 010	
electron to shielded proton mag. mom. ratio	-658.227 5971	0.000 0072	
electron volt	1.602 176 487 e-19	0.000 000 040 e-19	J
electron volt-atomic mass unit relationship	1.073 544 188 e-9	0.000 000 027 e-9	u
electron volt-hartree relationship	3.674 932 540 e-2	0.000 000 092 e-2	E_h
electron volt-hertz relationship	2.417 989 454 e14	0.000 000 060 e14	Hz
electron volt-inverse meter relationship	8.065 544 65 e5	0.000 000 20 e5	m^-1
electron volt-joule relationship	1.602 176 487 e-19	0.000 000 040 e-19	J
electron volt-kelvin relationship	1.160 4505 e4	0.000 0020 e4	K
electron volt-kilogram relationship	1.782 661 758 e-36	0.000 000 044 e-36	kg
elementary charge	1.602 176 487 e-19	0.000 000 040 e-19	C
elementary charge over h	2.417 989 454 e14	0.000 000 060 e14	A J^-1
Faraday constant	96 485.3399	0.0024	C mol^-1
Faraday constant for conventional electric current	96 485.3401	0.0048	C_90 mol^-1
Fermi coupling constant	1.166 37 e-5	0.000 01 e-5	GeV^-2
fine-structure constant	7.297 352 5376 e-3	0.000 000 0050 e-3	
first radiation constant	3.741 771 18 e-16	0.000 000 19 e-16	W m^2
first radiation constant for spectral radiance	1.191 042 759 e-16	0.000 000 059 e-16	W m^2 sr^-1
hartree-atomic mass unit relationship	2.921 262 2986 e-8	0.000 000 0042 e-8	u
hartree-electron volt relationship	27.211 383 86	0.000 000 68	eV
Hartree energy	4.359 743 94 e-18	0.000 000 22 e-18	J
Hartree energy in eV	27.211 383 86	0.000 000 68	eV
hartree-hertz relationship	6.579 683 920 722 e15	0.000 000 000 044 e15	Hz
hartree-inverse meter relationship	2.194 746 313 705 e7	0.000 000 000 015 e7	m^-1
hartree-joule relationship	4.359 743 94 e-18	0.000 000 22 e-18	J
hartree-kelvin relationship	3.157 7465 e5	0.000 0055 e5	K
hartree-kilogram relationship	4.850 869 34 e-35	0.000 000 24 e-35	kg
helion-electron mass ratio	5495.885 2765	0.000 0052	
helion mass	5.006 411 92 e-27	0.000 000 25 e-27	kg
helion mass energy equivalent	4.499 538 64 e-10	0.000 000 22 e-10	J
helion mass energy equivalent in MeV	2808.391 383	0.000 070	MeV
helion mass in u	3.014 932 2473	0.000 000 0026	u
helion molar mass	3.014 932 2473 e-3	0.000 000 0026 e-3	kg mol^-1
helion-proton mass ratio	2.993 152 6713	0.000 000 0026	
hertz-atomic mass unit relationship	4.439 821 6294 e-24	0.000 000 0064 e-24	u
hertz-electron volt relationship	4.135 667 33 e-15	0.000 000 10 e-15	eV
hertz-hartree relationship	1.519 829 846 006 e-16	0.000 000 000 010 e-16	E_h
hertz-inverse meter relationship	3.335 640 951... e-9	(exact)	m^-1
hertz-joule relationship	6.626 068 96 e-34	0.000 000 33 e-34	J
hertz-kelvin relationship	4.799 2374 e-11	0.000 0084 e-11	K
hertz-kilogram relationship	7.372 496 00 e-51	0.000 000 37 e-51	kg
inverse fine-structure constant	137.035 999 679	0.000 000 094	
inverse meter-atomic mass unit relationship	1.331 025 0394 e-15	0.000 000 0019 e-15	u
inverse meter-electron volt relationship	1.239 841 875 e-6	0.000 000 031 e-6	eV
inverse meter-hartree relationship	4.556 335 252 760 e-8	0.000 000 000 030 e-8	E_h
inverse meter-hertz relationship	299 792 458	(exact)	Hz
inverse meter-joule relationship	1.986 445 501 e-25	0.000 000 099 e-25	J
inverse meter-kelvin relationship	1.438 7752 e-2	0.000 0025 e-2	K
inverse meter-kilogram relationship	2.210 218 70 e-42	0.000 000 11 e-42	kg
inverse of conductance quantum	12 906.403 7787	0.000 0088	ohm
Josephson constant	483 597.891 e9	0.012 e9	Hz V^-1
joule-atomic mass unit relationship	6.700 536 41 e9	0.000 000 33 e9	u
joule-electron volt relationship	6.241 509 65 e18	0.000 000 16 e18	eV
joule-hartree relationship	2.293 712 69 e17	0.000 000 11 e17	E_h
joule-hertz relationship	1.509 190 450 e33	0.000 000 075 e33	Hz
joule-inverse meter relationship	5.034 117 47 e24	0.000 000 25 e24	m^-1
joule-kelvin relationship	7.242 963 e22	0.000 013 e22	K
joule-kilogram relationship	1.112 650 056... e-17	(exact)	kg
kelvin-atomic mass unit relationship	9.251 098 e-14	0.000 016 e-14	u
kelvin-electron volt relationship	8.617 343 e-5	0.000 015 e-5	eV
kelvin-hartree relationship	3.166 8153 e-6	0.000 0055 e-6	E_h
kelvin-hertz relationship	2.083 6644 e10	0.000 0036 e10	Hz
kelvin-inverse meter relationship	69.503 56	0.000 12	m^-1

kelvin-joule relationship	1.380 6504 e-23	0.000 0024 e-23	J
kelvin-kilogram relationship	1.536 1807 e-40	0.000 0027 e-40	kg
kilogram-atomic mass unit relationship	6.022 141 79 e26	0.000 000 30 e26	u
kilogram-electron volt relationship	5.609 589 12 e35	0.000 000 14 e35	eV
kilogram-hartree relationship	2.061 486 16 e34	0.000 000 10 e34	E_h
kilogram-hertz relationship	1.356 392 733 e50	0.000 000 068 e50	Hz
kilogram-inverse meter relationship	4.524 439 15 e41	0.000 000 23 e41	m^-1
kilogram-joule relationship	8.987 551 787... e16	(exact)	J
kilogram-kelvin relationship	6.509 651 e39	0.000 011 e39	K
lattice parameter of silicon	543.102 064 e-12	0.000 014 e-12	m
Loschmidt constant (273.15 K, 101.325 kPa)	2.686 7774 e25	0.000 0047 e25	m^-3
mag. constant	12.566 370 614... e-7	(exact)	N A^-2
mag. flux quantum	2.067 833 667 e-15	0.000 000 052 e-15	Wb
molar gas constant	8.314 472	0.000 015	J mol^-1 K^-1
molar mass constant	1 e-3	(exact)	kg mol^-1
molar mass of carbon-12	12 e-3	(exact)	kg mol^-1
molar Planck constant	3.990 312 6821 e-10	0.000 000 0057 e-10	J s mol^-1
molar Planck constant times c	0.119 626 564 72	0.000 000 000 17	J m mol^-1
molar volume of ideal gas (273.15 K, 100 kPa)	22.710 981 e-3	0.000 040 e-3	m^3 mol^-1
molar volume of ideal gas (273.15 K, 101.325 kPa)	22.413 996 e-3	0.000 039 e-3	m^3 mol^-1
molar volume of silicon	12.058 8349 e-6	0.000 0011 e-6	m^3 mol^-1
Mo x unit	1.002 099 55 e-13	0.000 000 53 e-13	m
muon Compton wavelength	11.734 441 04 e-15	0.000 000 30 e-15	m
muon Compton wavelength over 2 pi	1.867 594 295 e-15	0.000 000 047 e-15	m
muon-electron mass ratio	206.768 2823	0.000 0052	
muon g factor	-2.002 331 8414	0.000 000 0012	
muon mag. mom.	-4.490 447 86 e-26	0.000 000 16 e-26	J T^-1
muon mag. mom. anomaly	1.165 920 69 e-3	0.000 000 60 e-3	
muon mag. mom. to Bohr magneton ratio	-4.841 970 49 e-3	0.000 000 12 e-3	
muon mag. mom. to nuclear magneton ratio	-8.890 597 05	0.000 000 23	
muon mass	1.883 531 30 e-28	0.000 000 11 e-28	kg
muon mass energy equivalent	1.692 833 510 e-11	0.000 000 095 e-11	J
muon mass energy equivalent in MeV	105.658 3668	0.000 0038	MeV
muon mass in u	0.113 428 9256	0.000 000 0029	u
muon molar mass	0.113 428 9256 e-3	0.000 000 0029 e-3	kg mol^-1
muon-neutron mass ratio	0.112 454 5167	0.000 000 0029	
muon-proton mag. mom. ratio	-3.183 345 137	0.000 000 085	
muon-proton mass ratio	0.112 609 5261	0.000 000 0029	
muon-tau mass ratio	5.945 92 e-2	0.000 97 e-2	
natural unit of action	1.054 571 628 e-34	0.000 000 053 e-34	J s
natural unit of action in eV s	6.582 118 99 e-16	0.000 000 16 e-16	eV s
natural unit of energy	8.187 104 38 e-14	0.000 000 41 e-14	J
natural unit of energy in MeV	0.510 998 910	0.000 000 013	MeV
natural unit of length	386.159 264 59 e-15	0.000 000 53 e-15	m
natural unit of mass	9.109 382 15 e-31	0.000 000 45 e-31	kg
natural unit of momentum	2.730 924 06 e-22	0.000 000 14 e-22	kg m s^-1
natural unit of momentum in MeV/c	0.510 998 910	0.000 000 013	MeV/c
natural unit of time	1.288 088 6570 e-21	0.000 000 0018 e-21	s
natural unit of velocity	299 792 458	(exact)	m s^-1
neutron Compton wavelength	1.319 590 8951 e-15	0.000 000 0020 e-15	m
neutron Compton wavelength over 2 pi	0.210 019 413 82 e-15	0.000 000 000 31 e-15	m
neutron-electron mag. mom. ratio	1.040 668 82 e-3	0.000 000 25 e-3	
neutron-electron mass ratio	1838.683 6605	0.000 0011	
neutron g factor	-3.826 085 45	0.000 000 90	
neutron gyromag. ratio	1.832 471 85 e8	0.000 000 43 e8	s^-1 T^-1
neutron gyromag. ratio over 2 pi	29.164 6954	0.000 0069	MHz T^-1
neutron mag. mom.	-0.966 236 41 e-26	0.000 000 23 e-26	J T^-1
neutron mag. mom. to Bohr magneton ratio	-1.041 875 63 e-3	0.000 000 25 e-3	
neutron mag. mom. to nuclear magneton ratio	-1.913 042 73	0.000 000 45	
neutron mass	1.674 927 211 e-27	0.000 000 084 e-27	kg
neutron mass energy equivalent	1.505 349 505 e-10	0.000 000 075 e-10	J
neutron mass energy equivalent in MeV	939.565 346	0.000 023	MeV
neutron mass in u	1.008 664 915 97	0.000 000 000 43	u
neutron molar mass	1.008 664 915 97 e-3	0.000 000 000 43 e-3	kg mol^-1
neutron-muon mass ratio	8.892 484 09	0.000 000 23	
neutron-proton mag. mom. ratio	-0.684 979 34	0.000 000 16	
neutron-proton mass ratio	1.001 378 419 18	0.000 000 000 46	
neutron-tau mass ratio	0.528 740	0.000 086	
neutron to shielded proton mag. mom. ratio	-0.684 996 94	0.000 000 16	
Newtonian constant of gravitation	6.674 28 e-11	0.000 67 e-11	m^3 kg^-1 s^-2
Newtonian constant of gravitation over h-bar c	6.708 81 e-39	0.000 67 e-39	(GeV/c^2)^-2
nuclear magneton	5.050 783 24 e-27	0.000 000 13 e-27	J T^-1
nuclear magneton in eV/T	3.152 451 2326 e-8	0.000 000 0045 e-8	eV T^-1
nuclear magneton in inverse meters per tesla	2.542 623 616 e-2	0.000 000 064 e-2	m^-1 T^-1
nuclear magneton in K/T	3.658 2637 e-4	0.000 0064 e-4	K T^-1
nuclear magneton in MHz/T	7.622 593 84	0.000 000 19	MHz T^-1
Planck constant	6.626 068 96 e-34	0.000 000 33 e-34	J s
Planck constant in eV s	4.135 667 33 e-15	0.000 000 10 e-15	eV s
Planck constant over 2 pi	1.054 571 628 e-34	0.000 000 053 e-34	J s
Planck constant over 2 pi in eV s	6.582 118 99 e-16	0.000 000 16 e-16	eV s
Planck constant over 2 pi times c in MeV fm	197.326 9631	0.000 0049	MeV fm
Planck length	1.616 252 e-35	0.000 081 e-35	m
Planck mass	2.176 44 e-8	0.000 11 e-8	kg
Planck mass energy equivalent in GeV	1.220 892 e19	0.000 061 e19	GeV
Planck temperature	1.416 785 e32	0.000 071 e32	K
Planck time	5.391 24 e-44	0.000 27 e-44	s

proton charge to mass quotient	9.578 833 92 e7	0.000 000 24 e7	C kg^-1
proton Compton wavelength	1.321 409 8446 e-15	0.000 000 0019 e-15	m
proton Compton wavelength over 2 pi	0.210 308 908 61 e-15	0.000 000 000 30 e-15	m
proton-electron mass ratio	1836.152 672 47	0.000 000 80	
proton g factor	5.585 694 713	0.000 000 046	
proton gyromag. ratio	2.675 222 099 e8	0.000 000 070 e8	s^-1 T^-1
proton gyromag. ratio over 2 pi	42.577 4821	0.000 0011	MHz T^-1
proton mag. mom.	1.410 606 662 e-26	0.000 000 037 e-26	J T^-1
proton mag. mom. to Bohr magneton ratio	1.521 032 209 e-3	0.000 000 012 e-3	
proton mag. mom. to nuclear magneton ratio	2.792 847 356	0.000 000 023	
proton mag. shielding correction	25.694 e-6	0.014 e-6	
proton mass	1.672 621 637 e-27	0.000 000 083 e-27	kg
proton mass energy equivalent	1.503 277 359 e-10	0.000 000 075 e-10	J
proton mass energy equivalent in MeV	938.272 013	0.000 023	MeV
proton mass in u	1.007 276 466 77	0.000 000 000 10	u
proton molar mass	1.007 276 466 77 e-3	0.000 000 000 10 e-3	kg mol^-1
proton-muon mass ratio	8.880 243 39	0.000 000 23	
proton-neutron mag. mom. ratio	-1.459 898 06	0.000 000 34	
proton-neutron mass ratio	0.998 623 478 24	0.000 000 000 46	
proton rms charge radius	0.8768 e-15	0.0069 e-15	m
proton-tau mass ratio	0.528 012	0.000 086	
quantum of circulation	3.636 947 5199 e-4	0.000 000 0050 e-4	m^2 s^-1
quantum of circulation times 2	7.273 895 040 e-4	0.000 000 010 e-4	m^2 s^-1
Rydberg constant	10 973 731.568 527	0.000 073	m^-1
Rydberg constant times c in Hz	3.289 841 960 361 e15	0.000 000 000 022 e15	Hz
Rydberg constant times hc in eV	13.605 691 93	0.000 000 34	eV
Rydberg constant times hc in J	2.179 871 97 e-18	0.000 000 11 e-18	J
Sackur-Tetrode constant (1 K, 100 kPa)	-1.151 7047	0.000 0044	
Sackur-Tetrode constant (1 K, 101.325 kPa)	-1.164 8677	0.000 0044	
second radiation constant	1.438 7752 e-2	0.000 0025 e-2	m K
shielded helion gyromag. ratio	2.037 894 730 e8	0.000 000 056 e8	s^-1 T^-1
shielded helion gyromag. ratio over 2 pi	32.434 101 98	0.000 000 90	MHz T^-1
shielded helion mag. mom.	-1.074 552 982 e-26	0.000 000 030 e-26	J T^-1
shielded helion mag. mom. to Bohr magneton ratio	-1.158 671 471 e-3	0.000 000 014 e-3	
shielded helion mag. mom. to nuclear magneton ratio	-2.127 497 718	0.000 000 025	
shielded helion to proton mag. mom. ratio	-0.761 766 558	0.000 000 011	
shielded helion to shielded proton mag. mom. ratio	-0.761 786 1313	0.000 000 0033	
shielded proton gyromag. ratio	2.675 153 362 e8	0.000 000 073 e8	s^-1 T^-1
shielded proton gyromag. ratio over 2 pi	42.576 3881	0.000 0012	MHz T^-1
shielded proton mag. mom.	1.410 570 419 e-26	0.000 000 038 e-26	J T^-1
shielded proton mag. mom. to Bohr magneton ratio	1.520 993 128 e-3	0.000 000 017 e-3	
shielded proton mag. mom. to nuclear magneton ratio	2.792 775 598	0.000 000 030	
speed of light in vacuum	299 792 458	(exact)	m s^-1
standard acceleration of gravity	9.806 65	(exact)	m s^-2
standard atmosphere	101 325	(exact)	Pa
Stefan-Boltzmann constant	5.670 400 e-8	0.000 040 e-8	W m^-2 K^-4
tau Compton wavelength	0.697 72 e-15	0.000 11 e-15	m
tau Compton wavelength over 2 pi	0.111 046 e-15	0.000 018 e-15	m
tau-electron mass ratio	3477.48	0.57	
tau mass	3.167 77 e-27	0.000 52 e-27	kg
tau mass energy equivalent	2.847 05 e-10	0.000 46 e-10	J
tau mass energy equivalent in MeV	1776.99	0.29	MeV
tau mass in u	1.907 68	0.000 31	u
tau molar mass	1.907 68 e-3	0.000 31 e-3	kg mol^-1
tau-muon mass ratio	16.8183	0.0027	
tau-neutron mass ratio	1.891 29	0.000 31	
tau-proton mass ratio	1.893 90	0.000 31	
Thomson cross section	0.665 245 8558 e-28	0.000 000 0027 e-28	m^2
triton-electron mag. mom. ratio	-1.620 514 423 e-3	0.000 000 021 e-3	
triton-electron mass ratio	5496.921 5269	0.000 0051	
triton g factor	5.957 924 896	0.000 000 076	
triton mag. mom.	1.504 609 361 e-26	0.000 000 042 e-26	J T^-1
triton mag. mom. to Bohr magneton ratio	1.622 393 657 e-3	0.000 000 021 e-3	
triton mag. mom. to nuclear magneton ratio	2.978 962 448	0.000 000 038	
triton mass	5.007 355 88 e-27	0.000 000 25 e-27	kg
triton mass energy equivalent	4.500 387 03 e-10	0.000 000 22 e-10	J
triton mass energy equivalent in MeV	2808.920 906	0.000 070	MeV
triton mass in u	3.015 500 7134	0.000 000 0025	u
triton molar mass	3.015 500 7134 e-3	0.000 000 0025 e-3	kg mol^-1
triton-neutron mag. mom. ratio	-1.557 185 53	0.000 000 37	
triton-proton mag. mom. ratio	1.066 639 908	0.000 000 010	
triton-proton mass ratio	2.993 717 0309	0.000 000 0025	
unified atomic mass unit	1.660 538 782 e-27	0.000 000 083 e-27	kg
von Klitzing constant	25 812.807 557	0.000 018	ohm
weak mixing angle	0.222 55	0.000 56	
Wien frequency displacement law constant	5.878 933 e10	0.000 010 e10	Hz K^-1
Wien wavelength displacement law constant	2.897 7685 e-3	0.000 0051 e-3	m K