

Very Accurate Formulas for the Light Velocity dependent on the Figures 144 and 666 and on Wolfgang Pauli's Figure 137

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Abstract:

Firstly a very accurate formula for the Light Velocity is presented, at which the figures 144 and 666 are applied. An extremely accurate formula for the Light Velocity is presented in additional dependence of the figure 137. Furthermore an investigation about the figure 137 and its connection to other figures are given.

The Physicist Arnold Sommerfeld investigated the spectral lines of the hydrogen atom and derived a value, which he called the Fine Structure Constant and which became famous by its reciprocal 137. The Physician Wolfgang Pauli and also the Psychoanalyst Carl G. Jung were occupied with the significance of the figure 137 by a metaphysical view. Why their undertaking was not devious, that shows a proof at the end of this report.

Light Velocity c (=299792458 m/s)^[1.1] dependent on the figure 144 and 666:

(Approximations of Physical Constants are marked with the sign #)

Light Velocity c_{wU} without SI Units:

$$c_{wU} = 299792458 \quad [wU: \text{without SI Units}]$$

In the author's report [2] the well structured and good Approximation (c_1) is presented:

$$\begin{aligned} c_{wU1\#} = & (144^3 + 666^3) + 3 \cdot (144^2 + 666^2) + \\ & + 6 \cdot (144^1 + 666^1) + \\ & + 9 \cdot (144^{0,5} + 666^{0,5}) + \\ & + 12 \cdot (144^{0,25} + 666^{0,25}) = 299792458,79 \end{aligned} \quad (c_{wU1})$$

Deviation: $c_{wU1\#} - c_{wU} = 0,79268$; See the terms with multipliers starting from 3 and increasing by 3!
Exponents starting from 2 and decreasing by factor 0,5!

One has to consider, that each of the three terms " $666^{0,5}$, $666^{0,25}$ and $144^{0,25}$ " possesses a crooked value and all together deliver a value, which fits with the other terms very well to the set value c_{wU} .

Remarkable: with the second link of above Equation (c_{wU1}) this good approximation for the equatorial sun diameter in unit km is yielded: **$3 \cdot (144^2 + 666^2) \text{ km} = 1392876 \text{ km}$** [$\approx \varnothing_{\text{Sun}} = 1392684^{[3]}$]

The exact Formula for the Light Velocity is given at the Addendum, page 11.

The value of Formula (c_{wU1}) is little bigger than the set value c_{wU} . By that the next term has to possess a negative value to get a more accurate result. It is the goal to continue the pattern of the multipliers and exponents. This leads to the next Formula (c_{wU2}):

$$\begin{aligned} c_{2\#} = & (144^3 + 666^3) + 3 \cdot (144^2 + 666^2) + \\ & + 6 \cdot (144^1 + 666^1) + \\ & + 9 \cdot (144^{0,5} + 666^{0,5}) + \\ & + 12 \cdot (144^{0,25} + 666^{0,25}) - \\ & - 15 \cdot (144^{0,125} + 666^{0,125}) \cdot 0,999^{2,22} / 77,7 = 299792458,000022 \end{aligned} \quad (c_{wU2})$$

Deviation to the set value is: $c_{wU2\#} - c_{wU} = 0,000022$;

Remarkable: used figures of the term " $0,999^{2,22} / 77,7$ "; $999 - 222 = 777$; Question: is this random?

The exponent of the basis 0,999 of Formula (c_{wU2}), which leads to the exact value of the set value c_{wU} , takes the value 2,19204. In the following Formula (c_{wU3}) the exponent 2,192 (= 2192 / 1000) is used:

$$\begin{aligned} c_{wU3\#} = & (144^3 + 666^3) + 3 \cdot (144^2 + 666^2) + \\ & + 6 \cdot (144^1 + 666^1) + \\ & + 9 \cdot (144^{0,5} + 666^{0,5}) + \\ & + 12 \cdot (144^{0,25} + 666^{0,25}) - \\ & - 15 \cdot (144^{0,125} + 666^{0,125}) \cdot 0,999^{2,192} / 77,7 = 299792457,99999967 \end{aligned} \quad (c_{wU3})$$

Deviation to the set value is: $c_{wU3\#} - c_{wU} = -3,3 \cdot 10^{-7}$ [Value can vary for the applied Software, because 9 digits in front of the decimal point and 8 digits behind the decimal point are presented at Equation (c_{wU3}) and this lies over the accuracies (14 to 15 digits) of regular Softwares!]

Remarkable: $2,192 \cdot 1000 = 2192 = 16 \cdot 137$; $137 - 16 = 11^2$; $137 + 2 \cdot 16 = 13^2$; $11^2 \cdot 13^2 - 137^2 = 105 \cdot 16$;
 $137 - 105 = 2 \cdot 16$; figure 16 is often used at the topic "Investigations of Figure 137" (see next page);
 figure 137 possesses nearly the reciprocal value of the Fine Structure Constant^[1,2] α

$\ln(2192) = 7,69257$ [$\approx 7,7 = 77/10$]; $\ln(2192 + 16) = \ln(2192 + 2192/137) = 7,69984$;
 addition of full figure 16 delivers the best result close to figure 7,7;
 $222 - 77 - 16/2 = 137$;
 $222 + 77 - 5 \cdot 5 = 2 \cdot 137$; $222 - 7 \cdot 7 - 6 \cdot 6 = 137$;
 $999 - 77 - 6 \cdot 6 - 8 \cdot 8 = 6 \cdot 137$; $777 + 77 - 6 \cdot 6 + 2 \cdot 2 = 6 \cdot 137$;
 $999 + 77 + 6 \cdot 6 - 4 \cdot 4 = 8 \cdot 137$; $999 - 7 \cdot 7 + 3 \cdot 3 = 7 \cdot 137$;
 $999 + 222 + 77 + 7 \cdot 7 - 4 \cdot 4 = 9 \cdot 137$;

Please look at the figures of Formula (c_{wU3}) without decimal points: 15, 144, 666, 125, 999, 2192, 777
 $2192 - 999 - 777 - (125 + 144 + 15) / 2 = 2 \cdot 137$; see figure 2 just below
 $2192 - 999 - 777 - 144 + 2 = 2 \cdot 137$;
 $777 - 666 = 111$; $666 - 144 - 111 = 3 \cdot 137$; $2192 = 8 \cdot (2 \cdot 137)$ [$8 = 1000 / 125$];

Additional Information referring to figures 144 and 666:

Another proof of the significance of the figures 144 and 666 are the following formulas, which work with the sin- and cos-functions and which lead to the coefficient of the Golden Ratio.

The Golden Ratio can be written in dependence on the Figure 666:

$$\Phi = [2 - 1/\sin(666^\circ)] / 2 = 1,618033989$$

The Golden Ratio can be written in dependence on the Figure 144:

$$\Phi = [2 - 1/\cos(144^\circ)] / 2 = 1,618033989$$

The sum of the first 144 digits behind the decimal point of the circular π figure delivers the figure 666^[4].

The sum of the first 7 Primes (remarkable: $144 - 7 = 137$) each with exponent 2 delivers the figure 666:

$$2^2 + 3^2 + 5^2 + 7^2 + 11^2 + 13^2 + 17^2 = 666$$

The sum of the first 7 Primes delivers figure 58. Figures 144 and 666 are multiples of figure 9:

$$666 - 9 \cdot 58 = 144 \quad [2 + 3 + 5 + 7 + 11 + 13 + 17 = 58]$$

A Formula^[5] for the figure 666 and two other Formulas for the figures 144 and 30 - all with similar structures - are:

$$666 = 2 \cdot (1^3 + 2^3 + 3^3 + 4^3 + 5^3) + 6^3 \quad \text{with exponent 3;} \quad (\text{CC1})$$

$$144 = 2 \cdot (2^2 + 3^2 + 4^2 + 5^2) + 6^2 \quad \text{with exponent 2} \quad (\text{CC2})$$

$$30 = 2 \cdot (3^1 + 4^1 + 5^1) + 6^1 \quad \text{with exponent 1} \quad (\text{CC3})$$

$666 - 144 - 30 = 492$; see derivation of figure 4,92 (= 492 / 100) on the next page.

Sum of the small lenses of the Flower of Life in one of three directions (each times shifted by 120°) is each time 30^[4]. The order is there: 3 - 4 - 5 - 6 - 5 - 4 - 3

The sum of the full figures from 1 to 36 delivers the figure 666:

$$1 + 2 + 3 + 4 + 5 + 6 + 7 + 8 \dots + 29 + 30 + 31 + 32 + 33 + 34 + 35 + 36 = 666$$

Please see Table 1 at the Addendum, page 12! The shorter Version is: $(1 + 36) \cdot (36 / 2) = 666$

The sum of the full figures from 1 to 36 each with exponent 2 and with changing signs "+ and -" also delivers the figure 666: (Please see also Table 1 at the Addendum, page 12!)

$$-1^2 + 2^2 - 3^2 + 4^2 - 5^2 + 6^2 - 7^2 + 8^2 \dots - 29^2 + 30^2 - 31^2 + 32^2 - 33^2 + 34^2 - 35^2 + 36^2 = 666$$

The sum of the 36 full figures from 1 to 36 each with exponent 3 delivers the figure 443556 (=666 · 666):
 $1^3 + 2^3 + 3^3 + 4^3 + 5^3 + 6^3 + 7^3 + 8^3 \dots + 29^3 + 30^3 + 31^3 + 32^3 + 33^3 + 34^3 + 35^3 + 36^3 = 666 \cdot 666$

The system behind is referring to the last Equation:

$$\sum N^3 = (\sum N)^2 = (1 + 2 + 3 + \dots + M-2 + M-1 + M)^2 \quad \text{in the range } N = 1 \dots M$$

Examples: $N = 1 \dots 4; \quad 1^3 + 2^3 + 3^3 + 4^3 = 100 = (1 + 2 + 3 + 4)^2$
 $N = 1 \dots 6; \quad 1^3 + 2^3 + 3^3 + 4^3 + 5^3 + 6^3 = 441 = (1 + 2 + 3 + 4 + 5 + 6)^2 = (21)^2$
 $N = 1 \dots 36; \quad 1^3 + 2^3 + 3^3 + 4^3 + 5^3 + \dots + 32^3 + 33^3 + 34^3 + 35^3 + 36^3 =$
 $= 443556 = (666)^2 = (1 + 2 + 3 + 4 + \dots + 33 + 34 + 35 + 36)^2$

Investigations of Figure 137: derived result values are used without decimal point for the connections

Figure 137 possesses nearly the reciprocal value of the Fine Structure Constant α . The reciprocal value according to CODATA 2022 is **137,035999177**^{[1,2], [1,3]} and according to CODATA 2018 it is **137,035999084**^{[1,4], [1,5]}.

$\ln(137) = 4,91998093 \quad [\approx 4,92 = 492/100; 492 = 666 - 144 - 30; \text{ see figures of Formulas (CC1) to (CC3)}]$

$\ln(137 + 383^{-1}) = 4,91999998; \text{ reciprocal of full figure 383 delivers best result close to figure 4,92}$

$\ln(137,035999096 - 30^{-1}) = 4,92000038; \quad 137,035999096$ is the reciprocal value of the Fine Structure Constant according to the Hans de Vries-Formula^[6], which can be seen at the Addendum, page 11. see figure 30 at Equation CC3 above; subtraction of reciprocal of full figure 30 delivers best result close to figure 4,92.

Connections of the figures: $492 + 30 - (666 - 144) = 0; \quad 492 - 9 \cdot 9 = 3 \cdot 137;$
 $492 + 383 - 666 - 144/2 = 137 \quad [666 - 144/2 = 6 \cdot 99 = 6 \cdot (9 \cdot 11)^a];$
 $1618 + 314 - 144^{1/2} \cdot 137 = 2 \cdot 144 \quad [1618 \approx 1000 \cdot \Phi; 314 \approx 100 \cdot \pi];$
 $492 - 314 + 6 \cdot 16 = 2 \cdot 137; \quad 492 + 314 + 16 = 6 \cdot 137;$
 $2 \cdot 383 - 492 = 2 \cdot 137; \quad 666 - 144 - 383 - 2 = 137;$

Figure 137 and Primes: $666 - 23^2 = 137; \quad 23^2 + 29^2 = 10 \cdot 137 \quad [23 \text{ and } 29 \text{ are neighboring primes}];$
 $10^3 + 11^3 - 23^2 - 29^2 - 31^2 = 666; \quad [23, 29 \text{ and } 31 \text{ are neighboring primes}];$
 $666 - 17^2 - 19^2 = 16; \quad 23 \cdot 29 - 3 \cdot 137 = 16^2; \quad 13^2 - 137 = 2 \cdot 16; \quad 11^2 - 7^2 = 144/2;$
 $137 - 11^2 = 16 \quad [11, 13, 17, 19, 23, 29 \text{ are neighboring primes}]; \quad 3^2 \cdot 16 - 7 = 137;$
 $11 + 13 + 17 + 19 + 23 + 29 = 112 = 137 - 5^2 = 7 \cdot 16 \quad [\text{neighbor. Primes } 5 \text{ and } 7]$

a) Figures 9 and 11 are helpful figures and often used. Please see the author's report [2]!

Formula for figure 137: (Euler Figure e: $e = 2,7182818$; following exponent $4,92 = 492 / 100$)

$$e^{4,92} = 137,0026131865; \quad e^{4,92} - 383^{-1} = 137,000002220; \quad \text{please keep in mind figure 222!}$$

Connections: $492 + 383 + 222 - 137 = 960 = 10 \cdot 6 \cdot 16; \quad (\text{see use of term "6 \cdot 16" above});$
 $492 + 383 + 222 + 137 = 2 \cdot 617 = 1234 \quad (\text{next digit increase each time by } 1)$
 $666 - 1234/2 = 7^2 = 1618 - 666 - 492 - 3 \cdot 137; \quad 1618 - 1234 + 3^3 = 3 \cdot 137$

Formula for the Reciprocal of the Fine Structure Constant: (Euler Figure e: $e = 2,7182818$)

$$\alpha_{1\#}^{-1} = e^{4,92} + 30^{-1} = 137,035946520 \quad (\alpha_1)$$

$$\alpha_{2\#}^{-1} = e^{4,92} + 30^{-1} + 19020^{-1} = 137,035999096 \quad [\alpha_{2\#}^{-1} \text{ corresponds to the Hans de Vries-value}] \quad (\alpha_2)$$

Connections: used figures of Formula (α_2) without decimal points are: **492, 30, and 19020**
 $19020 - 30 \cdot 492 - 2 \cdot (1618 + 314) = 396 = 4 \cdot 99; \quad 19020 = 60 \cdot 317 \quad [\text{see use of } 317 \text{ below}];$
 $19020 - 30 \cdot 383 - 4 \cdot (1618 + 314) = -198 = -2 \cdot 99 \quad [\ln(137 + 383^{-1}) = 4,91999998];$
 $19020 - 11 \cdot 11^3 - 11 \cdot 3^3 = 13 \cdot 314 \quad [11^3 = 1331]; \quad 492 + 317 - 666 = 11 \cdot 13;$
 $19020 - 30 = 90 \cdot 211; \quad 211 - 90 = 11^2; \quad 211 + 90 - 3 \cdot 137 = -110; \quad 211 - 666 / 9 = 137$

Further: $7^2 + 88 = 137$; $15^2 - 88 = 137$; $[88 = 8 \cdot 11$; $15 - 7 = 8$; $(7 + 15) / 2 = 11]$;
 $11^2 + 4^2 = 137$ $[15 = 11 + 4]$; $13^2 - (13-11) \cdot 4^2 = 137$; $2 \cdot 9^2 - 5^2 = (11-9) \cdot 9^2 - 5^2 = 137$;
 $10^2 + 37 = 10^2 + 666 / (2 \cdot 9) = 137$

Connection of the Figures 144, 666, 137, 314 to Multiples of 11 (for example 22, 33, ... 88, 99):

$666 - 314 = 4 \cdot 88$; $7^2 + 88 = 137$; $666 + 314 = 20 \cdot 7^2$; $314 / 2 - 20 = 137$;
 $(1618 - 144 - 666) / 4^1 + 88 - 4^2 = 2 \cdot 137$; $(1618 + 144 + 666) / 4^1 - 3 \cdot 88 = 7^3$;
 $1618 + 314 + 2 \cdot 33 = 1998 = 3 \cdot 666$; $1618 - 314 + 2 \cdot 33 = 1370 = 10 \cdot 137$;
 $2 \cdot 11^3 / (3^3 \cdot 3,14^2) = 9,9996544$ $[\approx 10]$; $10 - 9,9996544 = 3456 \cdot 10^{-7}$; $3456 = 16 \cdot 6^3$;
 $\ln(666) = 6,50129$ $[\approx 6,5 = 65/10]$; $\ln(666 - 1,165^{-1}) = 6,500000$ $[1,165 = 1165/1000 = 5 \cdot 233/1000]$,
reciprocal of figure 1,165 (max. three digits behind the decimal point) delivers the best result
close to figure 6,5; $1165 = 100 \cdot 11 + 65$; $1165 - 11 \cdot 9^2 = 2 \cdot 137$; $666 - 233 - 22 = 3 \cdot 137$;
 $1165 - 2 \cdot 314 + 11 = 4 \cdot 137$; $1165 - 144 - 314 - 22 = 5 \cdot 137$;
One can find at the two lines before the results: $2 \cdot 137$; $3 \cdot 137$; $4 \cdot 137$; $5 \cdot 137$

Significance of the figures 9 and 11: please see the author's report [2]! Figures 396 (= $4 \cdot 9 \cdot 11$) and 9801 (= $9^2 \cdot 11^2$) are used at the fantastic Serie Equation^[7] of Srinivasa Ramanujan for the Circle Figure π .

Formula of the Light Velocity c in dependence on the Age of Universe (Large Number Hypothesis):

The later presented Formula (c0-4) is dependent on the classical Electron Radius^{[1.6], [1.7]} r_e , which is on the other side dependent on the (for the 4 Case Studies various) Physical Constants Fine Structure Constant α and Electron mass^{[1.8], [1.9]} m_e . The Planck's Constant h ^[1.10] and the Light Velocity^[1.11] c possess fixed values. The Formula of the Electron Radius r_e is:

$$r_e = \alpha \cdot h / (2 \cdot \pi \cdot m_e \cdot c)$$

By use of the CODATA2022 values the Electron Radius r_e takes the value:

$$\begin{aligned} r_{e_2022} &= \alpha_{2022} \cdot h / (2 \cdot \pi \cdot m_{e_2022} \cdot c) = \\ &= 137,035999177^{-1} \cdot 6,62607015 \cdot 10^{-34} \text{ J s} / (2 \cdot \pi \cdot 9,1093837139 \cdot 10^{-31} \text{ kg} \cdot 299792458 \text{ m/s}) = \\ &= 2,8179403205 \cdot 10^{-15} \text{ m} \end{aligned}$$

By use of the CODATA2018 values the Electron Radius^{[1.6], [1.7]} r_e takes the value:

$$\begin{aligned} r_{e_2018} &= \alpha_{2018} \cdot h / (2 \cdot \pi \cdot m_{e_2018} \cdot c) = \\ &= 137,035999084^{-1} \cdot 6,62607015 \cdot 10^{-34} \text{ J s} / (2 \cdot \pi \cdot 9,1093837015 \cdot 10^{-31} \text{ kg} \cdot 299792458 \text{ m/s}) = \\ &= 2,8179403262 \cdot 10^{-15} \text{ m} \end{aligned}$$

The accuracies of the following "Case Studies"-Formulas for the Light Velocity c are highly dependent on the fact, if one uses the values of CODATA2018 or CODATA2022 or the "Hans de Vries"-Formula for the Fine Structure Constant α and that in combination with the values of CODATA2018 or CODATA2022 for the Electron mass^{[1.8], [1.9]} m_e .

Please have a look at the List "Used Data of Physical Constants" for the values of the different Physical Constants at page 10. The list presents: Planck's Constant^[1.10] h ; Electron mass m_e ; Electron radius r_e ; Fine Structure Constant α and Light Velocity c .

The Large Number Hypothesis^[8] of Dirac/Weyl^[9] with its Formula (LN) is already presented in the author's report [10, page 3]. Large Number Formula LN is written as follows:

$$LN = \text{Age}_{\text{Universe}} \cdot c / r_e \tag{LN}$$

Large Number LN can be approximated by the Formula (LNc):

$$LNc = (4 \cdot \pi / \alpha)^{4 \cdot \pi} = 4,6273776550 \cdot 10^{40} \tag{LNc}$$

Formula (LNc) is rearranged, which delivers Formula (c0) for the Light Velocity c :

$$c_{0\#} = LNc \cdot r_e / \text{Age}_{\text{Univ}} \tag{c0}$$

4 Case Studies each including 8 Formulas for the Light Velocity c in dependence on the figures 144, 666, 137 and 314:

The four Case Studies of Table 3 at page 14 differ by use of the Electron mass m_e and the Fine Structure Constant α . In detail the four Case Studies use the following Input Data:

Case Study 1: m_e and α according to CODATA 2018

Case Study 2: m_e and α according to CODATA 2022

Case Study 3: m_e according to CODATA 2018 and α according to the “Hans de Vries”-Formula

Case Study 4: m_e according to CODATA 2022 and α according to the “Hans de Vries”-Formula

8 Formulas (c4a) to (c4h) for the Light Velocity c are presented in this section. Each of the 8 Formulas consist of the multiplication of a main term $c_{0\#}$ with an appropriate Fine Tuning Term.

Case Study 4 is exemplary chosen for this chapter and its Input Data follow to the Electron mass m_e according to CODATA2022 and the “Hans de Vries”-value α_{HdV} for the Fine Structure Constant.

The main term of the Light Velocity is exemplary for the Case Study 4 as follows:

$$c_{0-4\#} = \text{LN}_{c-4} \cdot r_{e-4} / \text{Age}_{\text{Univ}} = \tag{c0-4}$$

$$\text{with } \text{LN}_{c-4} = (4 \cdot \pi / \alpha_4)^{4 \cdot \pi} = 4,6273776550 \cdot 10^{40} \quad [\alpha_4 = \alpha_{HdV} = 1 / 137,035999096] \tag{LNc-4}$$

$$m_{e-4} = m_{e_2022} = 9,1093837139 \cdot 10^{-31} \text{ kg} \tag{me-4}$$

$$r_{e-4} = \alpha_4 \cdot h / (2 \cdot \pi \cdot m_{e-4} \cdot c) = 2,8179403221 \cdot 10^{-15} \text{ m} \tag{re-4}$$

The digit 4 in small letters stands for the used data of “Case Study 4”-Formulas!

There is a very accurate Formula for the Age of the Universe Age_{Univ} in Billions of years, which is dependent on the Figures 4,92 [see page 3: $\ln(137) = 4,91998093 \approx 4,92$] and the figure 4,8 [$3 \cdot 48 = 144$].

Formula Age_{Univ} with the SI-Unit s is written as follows:

$$\text{Age}_{\text{Univ}_a} = (10 \cdot 4,92 / 4,8)^{10} \cdot (4,92 / 4,8)^3 \text{ a} = 13,7851104485 \cdot 10^9 \text{ a} \tag{Age-Univ_a}$$

$$\begin{aligned} \text{Age}_{\text{Univ}} &= \text{S}_{\text{year}} \cdot \text{Age}_{\text{Univ}_a} = 31558149,540003 \text{ s/a} \cdot 13,7851104485 \cdot 10^9 \text{ a} = \\ &= 4,3503257696 \cdot 10^{17} \text{ s} \end{aligned} \tag{Age-Univ}$$

$$\text{with } \text{S}_{\text{year}} = 60 \cdot 60 \cdot 24 \cdot 365,2563604167 \text{ s/a} = 31558149,540003 \text{ s/a}$$

The value of the term “days / year” (= 365,2563604167 day / a) is taken from the website [11].

The Age of the Universe is $13,787 \cdot 10^9$ according to the website [12], which is close to the result value of Formula (Age-Univ_a). The relative deviation $[(13,78511 - 13,787) / 13,787]$ is about -0,014%.

Remarkable connection of the figures of Formula (Age-Univ_a) without decimal points: **492; 10; 48; 3**

$$\begin{aligned} 492 + 3 \cdot 48 &= 636 = 1272 / 2 \quad [1272 \approx 1000 \cdot \sqrt{\Phi}]; & 492 / 3 - 3^3 &= 137; & 636 - 3 \cdot 48 - 3^4 &= 3 \cdot 137; \\ 636 - 4 \cdot 137 &= 88 = 8 \cdot 11; & 636 - 2 \cdot 314 &= 8; & 1272 + 11^3 &= (8 + 11) \cdot 137; & 492 - 48 &= 444; \\ (4,92 \cdot 10 / 4,8)^{10} &= 128,00845 \cdot 10^8; & (492 + 128)^2 &= 620^2 = 384400 \quad (\text{Distance Earth to Moon in km}^{[19]}) \end{aligned}$$

Ongoing Connections referring to the Figures 8 and 11:

$$1618 - 2 \cdot 314 = 9 \cdot 10 \cdot 11 \quad [1618 \approx 1000 \cdot \Phi]; \quad 1618 - 666 + 144 = 8 \cdot 137$$

$$1618 - 11 \cdot 137 = 111; \quad 11 \cdot 111 = 1221; \quad \text{see use of figure 1,221 at Formula (c4b) below;}$$

[A short insert:

Figures 4,92 and 4,8 are part of the following "rough" Approximation (α_3) for the Reciprocal α^{-1} of the Fine Structure Constant.

$$\alpha_{\#3}^{-1} = e^{4,92} + 4,92^{-10/4,8} = 137,038787978 \tag{\alpha_3}$$

Please see the two more accurate Approximations for the Reciprocal α^{-1} at the Addendum, page 11!

The author made an investigation by use of the figures 4,92, 4,8 and 10 of Formula (α_3) with the goal to find an interesting formula and finally found the above Formula (Age-Univ_a). He was surprised to find a Formula for the Age of Universe (in years).

The author mentioned the following note already in his report [2]: it is like a paper chase, but here it is a

chase using figures of (earlier performed) formulas for finding new formulas with these figures!
 Again this Information: Approximations of Physical Constants are marked with the sign #. End of insert]

By use of these relations the Formula (c4-0) results to a - less accurate - value for the Light Velocity c:

$$c_{0-4\#} = LN_{c-4} \cdot r_e / Age_{Universe} = 4,627377655 \cdot 10^{40} \cdot 2,8179403221 \cdot 10^{-15} \text{ m} / 4,3503257696 \cdot 10^{17} \text{ s} = 299740175,110 \text{ m/s} \quad (c0-4)$$

Relative accuracy of quantity $c_{4a\#}$ to the set value c:

$$c_{0-4\#} / c = 299740175,110 / 299792458 = 0,9998256031$$

In the following Approximations (c4a) to (c4h) for the Light Velocity are presented by use of the Quantity $c_{0-4\#}$ and their Fine Tuning Terms, at which the figures 144, 666, 137 and 314 [$\approx 100 \cdot \pi$] are applied:

$$c_{4a\#} = c_{0-4\#} \cdot [1 + 314 / (10 \cdot 144 \cdot 666)]^{10000/(137 \cdot 137)} = 299792458,475 \text{ m/s} \quad (c4a)$$

Deviation of quantity $c_{4a\#}$ to the set value c:

$$c_{4a\#} - c = 299792458,475 \text{ m/s} - 299792458 \text{ m/s} = 0,475 \text{ m/s}$$

$$c_{4b\#} = c_{0-4\#} \cdot [1 + 137 / (10 \cdot 144 \cdot 666)]^{1,221} = 29972457,005 \text{ m/s} \quad (c4b)$$

Deviation of quantity $c_{4b\#}$ to the set value c:

$$c_{4b\#} - c = 29972457,005 \text{ m/s} - 299792458 \text{ m/s} = -0,995 \text{ m/s}$$

Remarkable: $1221 = 11 \cdot 111$; $1221 - (144 + 666) = 3 \cdot 137$; $11^3 - 1221 = 10 \cdot 11$

$$c_{4c\#} = c_{0-4\#} / [1 - 137 / (1000 \cdot 666)]^{2,662/3,14} = 29972457,116 \text{ m/s} \quad (c4c)$$

Deviation of quantity $c_{4d\#}$ to the set value c:

$$c_{4c\#} - c = 29972457,116 \text{ m/s} - 299792458 \text{ m/s} = -0,884 \text{ m/s}$$

Remarkable: $2662 = 2 \cdot 1331 = 2 \cdot 11^3$; see use of figure 1331 at the pages before!

$$c_{4d\#} = c_{0-4\#} / [1 - 137 / (100 \cdot 666)]^{0,2662 \cdot 7/22} = 29972458,007 \text{ m/s} \quad (c4d)$$

Deviation of quantity $c_{4d\#}$ to the set value c:

$$c_{4d\#} - c = 29972458,007 \text{ m/s} - 299792458 \text{ m/s} = 0,007 \text{ m/s}$$

Remarkable: see use of figure 1,331 ($= 2,662/2 = 1,1^3$) at the Formula (c4c)!

For many mathematicians in the antiquity the fraction $22/7$ ($= 3,14286$) was the value for the Circle Figure π ! The reciprocal $7/22$ is used at the exponent.

Formula (c4d) delivers the most accurate result ($= 299792458,007$) of all "Case Studies"-Formulas (see Table 3, page 14)!

The term " $\alpha / (2 \cdot \pi)$ " [$= \Delta_{JS}$] is dedicated to the deceased Nobel Prize-Winner Julian Schwinger^[13].

Next Formula is performed with the "Julian Schwinger"-Term Γ_{JS-4} [$= 1 + \Delta_{JS-4} = 1 + \alpha_{HdV} / (2 \cdot \pi)$]:

$$c_{4e\#} = c_{0-4\#} \cdot \Gamma_{JS-4}^{1/6,65511} = 29972458,167 \text{ m/s} \quad (c4e)$$

Deviation of quantity $c_{4e\#}$ to the set value c:

$$c_{4e\#} - c = 29972458,167 \text{ m/s} - 299792458 \text{ m/s} = 0,167 \text{ m/s}$$

Remarkable: $\ln(665511) = 13.40831$ [$\approx 1341/100$]; $\ln(665511 + 1125) = 13,4099994$; full figure 1125 delivers best result close to figure 13,41 ($= 1341/100$);

$$1125 = 3^2 \cdot 5^3; \quad 1341 + 1125 = 18 \cdot 137; \quad 1341 - 1125 = 6 \cdot 6 \cdot 6;$$

$$1341 - 3^2 \cdot 137 = 2^2 \cdot 3^3; \quad 66 + 55 + 11 = 132; \quad 1341 - 3^2 \cdot 132 - 4^2 = 137;$$

$$665511 - 5 \cdot 99 \cdot 11^3 = 665511 - 5 \cdot 3^2 \cdot 11^4 = 6666 = 66 \cdot 101; \quad 6 \cdot 6 + 101 = 137;$$

$$c_{4f\#} = c_{4-0\#} \cdot \Gamma_{JS-4}^{1/6,66} / 0,999^{1/(144 \cdot 55,1144)} = 29972457,569 \text{ m/s} \quad (c4f)$$

Deviation of quantity $c_{4f\#}$ to the set value c :

$$c_{4f\#} - c = 299792457,569 \text{ m/s} - 299792458 \text{ m/s} = -0,431 \text{ m/s}$$

Remarkable: $55 - 11 = 44$; $55 + 11 + 44 = 110$; $144 + 666 - 110 = 700$;

$$(144 \cdot 666) / 137 = 700,0292;$$

$$\ln(551144) = 13,21975 [\approx 1322/100]; \quad \ln(551144 + 137) = 13,220000;$$

full figure **137** delivers best result close to figure 13,22; $1322 = 2 \cdot 633$;

$$1322 - 144 - 666 = 512 = 2^9; \quad 2 \cdot 1272 - 1322 - 2 \cdot 314 = 6 \cdot 99;$$

$$551144 = 8 \cdot 11 \cdot 6263; \quad \ln(6263) \approx 8,74 + 1/(18 \cdot 23); \quad 874 + 5^3 = 999;$$

$$\ln(665511) + \ln(551144) - 1/(4 \cdot \pi^3) \approx 20 \cdot 1,1^3 \quad [314 \approx 100 \cdot \pi];$$

$$(3 \cdot 11^3 - 4 \cdot 3 \cdot 314) / 20 = 11,25; \text{ see use of figure 1125 at Formula (c4e) above}$$

$$c_{4g\#} = c_{4-0\#} \cdot \Gamma_{JS-4}^{1/6,66} / 0,999^{1/(62 \cdot 128)} = 29972457,571 \text{ m/s} \quad (c4g)$$

Deviation of quantity $c_{4g\#}$ to the set value c :

$$c_{4g\#} - c = 299792457,571 \text{ m/s} - 299792458 \text{ m/s} = -0,429 \text{ m/s}$$

Connections of the figures of Formula (c4g) without decimal points: **666**; **999**; **62**; **128**:

$$999 + 666 - 62 - 128 - 144 = 11^3; \quad 666 + 144 - 128 = 11 \cdot 62; \quad 128 = 2^7;$$

$$7 \cdot 128 + 314 = 11^3 - 11^2; \quad 62 \cdot 666 - 128 \cdot 314 = 1100; \quad 1100 + 7^3 + 2^2 \cdot 3 = 11 \cdot 137;$$

$$1100 + 7^3 - 11^3 + 5^2 = 137; \quad 1100 - 7^3 + 3^3 - 128 - 62 = 6 \cdot 99;$$

$$11^3 - 10^3 + 3^3 + 62 + 128 = 4 \cdot 137; \quad 314 - 128 - 49 = 314 - 2^7 - 7^2 = 137;$$

$$128 \cdot (144 + 666) - 62 \cdot 1618 = 3364 = 2 \cdot 2 \cdot 29 \cdot 29; \quad 2 + 2 + 29 + 29 = 62;$$

There is still the interesting Formula (c4h), even it is less accurate as the other presented Formulas:

$$c_{4h\#} = c_{4-0\#} \cdot [1 + 1000/(137 \cdot 666)]^{16/1000} = 29972455,510 \text{ m/s} \quad (c4h)$$

Deviation of quantity $c_{4h\#}$ to the set value c :

$$c_{4h\#} - c_{wU} = 299792455,510 \text{ m/s} - 299792458 \text{ m/s} = -2,490 \text{ m/s}$$

Remarkable: Figures 137, 666 and 1000 are also used at the Formula (c4c) within its rectangular brackets!

$$666 - 23^2 = 137; \quad (666 - 2 \cdot 23)^2 = 620^2 = 384400 \text{ (Distance Earth to Moon in km);}$$

What does the reader think: are the results of the Formulas, which are presented in this report, and their used figures random?

For example please have a look again at Formula (c_{wU3}) at page 1 with its exponent 2,192 (= 2192/1000):

$$2192 = 16 \cdot 137$$

Or have again a look on the page 6 at the Formula (c4d), where the exponent figure 0,2662 (= $0,2 \cdot 1,1^3$) and the fraction $7/22$ [$\approx 1/\pi$] are used.

Wolfgang Pauli and C.G.Jung and the Figure 137:

The highly talented Physician Wolfgang Pauli was occupied with the Fine Structure Constant and its reciprocal value, which is close to the Figure 137 (Wolfgang Pauli died 1958 in a hospital room with the number 137^[14]).

From the mid of the 1920 years Wolfgang Pauli had to face many problems and in the year 1928, when he was Professor of Theoretical Physics at the ETH in Zürich, he consulted the famous Psychoanalyst Carl Gustav Jung. They became friends and both were fascinated about the Figure 137.

The following German text part is taken from page 292 of the book^[14] *Das Zeitalter der Unschärfe* of the author Tobias Hürter.

German text:

137! Jung kennt diese Zahl aus der Kabbala. Ja, 137 ist die Kabbala! Im hebräischen Alphabet ist jeder Buchstabe mit einer Zahl verbunden, und wenn man die Buchstaben des Wortes "Kabbala" zusammennählt, kommt 137 heraus. Das kann doch kein Zufall sein, da sind Jung und Pauli sich einig.

English Translation [Translation may not be exactly correct]:

137! Jung knows this number from the cabbala. Yes, 137 is the cabbala! In the Hebrew alphabet, each letter is associated with a number, and if one adds up the letters of the word "cabbala," one gets 137. That can't be a random, Jung and Pauli agree.

Own Investigations about the significance of the Figure 137:

If one wants to understand the significance of the Figure 137, one has to consider its connection to the figures 144 and 666 and to the figure 23, the number of human pair of Chromosomes! And probably the Free Mason knew about this connection, because the 23 is the figure of the Freemasons. Please see some mathematical relations at the next section and at the end of Addendum, page 15.

Figure 137 can be derived by: $666 = 137 + 23 \cdot 23$; two times the figure 23! One has to imagine: $23 \cdot 23! \cdot 3 \cdot 144 - 314 = 23 \cdot 23 - 3 \cdot 137$ [$314 \approx 100 \cdot \pi$]

These are the significant metaphysical connections, which lead to the figure 137. The Reciprocal of the Fine Structure Constant - nearly 137 - stands for the Evolution of Universal Life and in particular case our Pair of Chromosomes "23 23" stands for the Evolution of human Life.

Approximations of Figure 137 in dependence on the Circle Figure π and/or the Golden Ratio Φ :

$$23 \cdot \Phi \cdot \pi + e^3 = 136,9992218 \quad [\approx 137]; \quad 23 \cdot \Phi \cdot \pi + e^3 + 1/1285 = 137,0000001; \quad 11^3 - 1285 = 2 \cdot 23; \\ 1618 - 1285 = 333; \quad 1285 - 23 \cdot 38 = 3 \cdot 137; \quad 3 \cdot 38 + 23 = 137;$$

$$23 \cdot \pi \cdot 1,896 + 1 / 700 = 137,000001; \quad 5 \cdot 23 + 13 \cdot 137 = 1896; \quad 1896 - 700 = 52 \cdot 23; \quad [\sqrt{\Phi} = 1,27202]$$

$$23 \cdot \pi \cdot (1,896 + 1 / 111^{2,3}) = 137,0000001; \quad 111 - 5 \cdot 13 = 2 \cdot 23; \quad 1896 - 5 \cdot 111 - 3 \cdot 23 = 1272;$$

$$\text{Exponent } E_p: \quad E_{pa} = 99,9 / \pi = 31,799158 \quad [\approx 31,8 = 318 / 10; \quad 4 \cdot 318 = 1272 \approx 1000 \cdot \sqrt{\Phi}]$$

$$F_{137a} = 0,999^{E_{pa}} \cdot (\pi^4 + \pi^3 + \pi^2 + \pi^1) = 136,99789$$

$$E_{pb} = 99,9 / (4 / \sqrt{\Phi}) = 31,768691;$$

$$F_{137b} = 0,999^{E_{pb}} \cdot (\pi^4 + \pi^3 + \pi^2 + \pi^1) = 137,00207$$

$$E_{pc} = 0,5 (E_{pa} + E_{pb}) = 31,783924;$$

$$F_{137c} = 0,999^{E_{pc}} \cdot (\pi^4 + \pi^3 + \pi^2 + \pi^1) = 136,99998$$

$$\text{Multiplier } M_p: \quad M_p = 0,999^{20 \cdot \Phi - 20} = 0,9877093; \quad \text{with Exponent } E_p (= 20 \cdot \Phi - 20 = 12,3606798);$$

$$T_{137} = M_p^3 \cdot \pi^4 + M_p^2 \cdot \pi^3 + M_p^1 \cdot \pi^2 + M_p^0 \cdot \pi^1 = 137,00005$$

$$\text{Multiplier } M_p: \quad M_p = 1,755; \quad T_{137} = M_p^1 \cdot 2,3^4 + M_p^2 \cdot 2,3^3 + M_p^3 \cdot 2,3^2 + M_p^4 \cdot 2,3^1 = 137,00063$$

$$\text{Connections of figure 1755: } 1755 - 1618 = 137; \quad 1755 - 314 - 11^3 + 3^3 = 137; \quad \text{Result is 137!}$$

There is another Equation with the Figure 1,755, which is written as follows:

$$(2,3 \cdot \pi + 1,8 \cdot \Phi / 2,3)^{2,3} + 1 / (1,755 \cdot 23 \cdot 23) = 137,000\,000\,03$$

In the book^[15] (page 339) with the title *137* the following Equation is given, which also uses the figures 144 and 666. In the book the exponent of the numerator is given to 82943,99629, which is not correct. It has to be exchanged by the figure 82942,77714. By that the correct equation is:

$$10^{82942,77714 / (32 \cdot 666)} / 666 = \sqrt{137}; \quad \text{exponent figure } 82942,77714 \approx 82944 = (2 \cdot 144)^2;$$

$$\log(666 \cdot \sqrt{137}) \cdot 32 \cdot 666 = 82942,77714; \quad \text{used exponent term } 82944 / (32 \cdot 666) = 144 / 37;$$

$$(10^{82944 / (32 \cdot 666)} / 666)^2 = (10^{144 / 37} / 666)^2 = 137,036206; \quad \text{value is closer to } \alpha^{-1} \text{ than to } 137;$$

$$(10^{144 / 37 - 1 / (11 \cdot 11 \cdot 12 \cdot 12)} / 666)^2 = 136,9999992; \quad (2 \cdot 144)^2 - 32 \cdot 666 / (11^2 \cdot 12^2) = 82942,77686;$$

$$11 + 12 = 23;$$

According to book [15] the figure 82944 was already mentioned in aztec and roman texts.

$$(666^2/8)^{1/2,22} = 137,04815; \quad (0,999222 \cdot 666^2/8)^{1/2,22} = 137,00011; \quad \text{by the way: } \ln(777) = 6,655440;$$

$$8 + 222 = 10 \cdot 23; \quad 999 - 222 = 777; \quad \text{see term "0,999}^{2,22} / 77,7\text{" of Formula (c}_{wU2}\text{) on page 1;}$$

$$(666^2/8)^{1/2,22} - 0,997755 \cdot 2,22/46 = 136,99999996; \quad 997755 - 665544 = 332211; \quad 7 \cdot 11 \cdot 13 = 1001;$$

$$\ln(997755) = 13,8133 \quad [\approx 1,001 \cdot 6 \cdot 2,3 = 13,8138]; \quad \ln(332211) \cdot 0,777/1,001 = 9,8685 \quad [\approx \pi^2]$$

$$(666^2/8)^{1/2,22} - 1/(4 \cdot 2,22^3 - 23) = 136,9999927;$$

$$(666^2/8)^{1/2,22} - 248 \cdot \pi / (10^4 \cdot \Phi) = 137,00000053; \quad 248 - 137 = 111; \quad 777 - 248 = 529 = 23 \cdot 23;$$

Equations dependent on Figures π , Φ , 9, 11 and 23:

$$(11 \cdot \pi^2 + 9 \cdot \Phi^2 + 11/\pi) \cdot 100 / (9 \cdot 11) = 136,999357; \quad \text{By the way: } 11 \cdot \pi - 9 \cdot \Phi = 19,995213 \quad [\approx 9 + 11];$$

$$(11 \cdot \pi^2 + 9 \cdot \Phi^2) + (\pi \cdot \Phi) - 1 / (\pi + \Phi) = 137,00106; \quad \text{By the way: } 0,9 \cdot \pi + 1,1 \cdot \Phi - (6 \cdot 23)^{-1} = 2 \cdot 2,30001;$$

$$(11 \cdot \pi^2 + 9 \cdot \Phi^2) + 23^2 \cdot (23^2 + 8 \cdot 7^2) / 10^5 = 137,000044; \quad 23^2 + 8 \cdot 7^2 = 921 = 144 + 777; \quad 23^2 - 8 \cdot 7^2 = 137$$

Equation of second order: $Y^2 - 2 \cdot Y \cdot (X \cdot 23) + (X \cdot 23)^2 = 4 \cdot \pi \cdot 23^2$

$$\text{with } X = 2 \cdot 9,99/\pi + \pi = 9,50142418 \quad \text{--->} \quad Y = 136,99988 \quad [\text{see use of 999 on the page before};]$$

$$\text{or with } X = 5 \cdot \sqrt{\Phi} + \pi = 9,5016909 \quad \text{--->} \quad Y = 137,00601$$

$$[12,87 / (2,3 \cdot \pi)^{0,5}]^\pi = 137,00041; \quad [1/1,287 = 0,777000777]; \quad \ln(1287) = 7,1601; \quad 1287 - 716 - 23 = 4 \cdot 137$$

Conclusion:

An extremely accurate Formula for the Light Velocity is presented in dependence on the Figures 144, 666 and 137.

By use of Logarithm Values interesting informations about the Figure 137 are found and their connections are presented.

Further eight Formulas for the Light Velocity, at which different Fine Tuning Terms - some with the form $[1 \pm x / (144 \cdot 666)]^y$ - , different Input Data of the Electron Mass and of the Fine Structure Constant are varied, deliver interesting Results.

Moreover a very accurate Formula of the Age of the Universe is found and applied at the Case Studies. One Formula, at which the Fine Structure Constant according to Hans de Vries and the figure 137 are applied at the Fine Tuning Term, delivers the most accurate result value.

As it was already done at formulas presented in other reports of the author [particularly report [2]], it is shown that by application of the Fine Tuning Terms with the described form it is quite simple to generate Formulas, which are very accurate and in many cases possess an elegant and similar structure.

The significant metaphysical connections, which lead to the figure 137, are presented on page 8.
It is repeated again:

The Reciprocal of the Fine Structure Constant - nearly 137 - stands for the Evolution of Universal Life
and in particular case our Pair of Chromosomes "2 times 23" stands for the Evolution of human Life.

It can be expressed by the simple Equation:

$$666 = 137 + 23 \cdot 23$$

There is two times the figure 23! One has to imagine: $23 + 23!$

As it was described in the author's report [4] on page 17. The positive meaning of the Figure 666 is:

One 6 stands for the Moon, another one stands for the Earth and the last one for the Sun.

Used Data of Physical Constants:

Fine Structure Constant $\alpha^{[1.2]}$, CODATA 2022:	$7,297\,352\,5643(11) \cdot 10^{-3}$
Reciprocal $1/\alpha^{[1.3]}$, CODATA 2022:	$137,035\,999\,177(21)$
Fine Structure Constant $\alpha^{[1.4]}$, CODATA 2018:	$7,297\,352\,5693(11) \cdot 10^{-3}$
Reciprocal $1/\alpha^{[1.5]}$, CODATA 2018:	$137,035\,999\,084(21)$
Reciprocal of Fine Structure Constant $1/\alpha_{\text{Hav}}$ due to the "Hans de Vries"-Formula ^[6] :	$137,035\,999\,096$
Light Velocity $c^{[1.1]}$:	$299\,792\,458 \text{ m/s}$
Mass of Electron $m_e^{[1.8]}$, CODATA 2022:	$9,109\,383\,7139(28) \cdot 10^{-31} \text{ kg}$
Mass of Electron $m_e^{[1.9]}$, CODATA 2018:	$9,109\,383\,7015(28) \cdot 10^{-31} \text{ kg}$
Planck's Constant $h^{[1.10]}$:	$6,626\,070\,15 \cdot 10^{-34} \text{ J s}$
Radius of Electron $r_e^{[1.6]}$, CODATA 2022:	$2,817\,940\,3205(13) \cdot 10^{-15} \text{ m}$
Radius of Electron $r_e^{[1.7]}$, CODATA 2018:	$2,817\,940\,3262(13) \cdot 10^{-15} \text{ m}$

The figures in the brackets behind the data describe the uncertainty referring to the last digits of the given value^[1].

Interesting Relations with the Figures Φ and π without decimal points:

Golden Ratio Φ : $\Phi = (5 + 5\sqrt{5}) / 10 = 1,618034$ [1618 \approx 1000 \cdot Φ]
 $\sqrt{\Phi} = 1,27202$ [1272 \approx 1000 \cdot $\sqrt{\Phi}$]

Circle Figure π : $\pi = 3,14159265$ [314 \approx 100 \cdot π]

$$1618 - 314 + 2 \cdot (3 + 11) = 1332 = 2 \cdot 666; \quad 1618 + 314 + 2 \cdot 3 \cdot 11 = 1998 = 3 \cdot 666;$$

$$1618 + 314 - 2 \cdot 144 = 144^{1/2} \cdot 137; \quad 1618 - 2 \cdot 666 - 144^{1/2} = 2 \cdot 137;$$

$$1618 - 1272 - 144/2 = 2 \cdot 137; \quad 1618 - 1272 + 5^3 = 314 \cdot 3/2;$$

$$144 \cdot 666 / 137 = 700,0292 \text{ } [\approx 700]; \quad 144 + 666 - 700 + 3^3 = 137; \quad 700 + 666 = 2^3 + 3^3 + 11^3;$$

$$700 + 666 - 1111 = 2 \cdot 137 + 2^3 - 3^3; \quad 1111 - 700 = 3 \cdot 137; \quad 700 - 144 - 314 = 2 \cdot 11 \cdot 11;$$

Connection of terms 3^3 , 10^3 , 11^3 by figures 2 and 314: $314/2 - 2 \cdot 10 = 137$; $1618 - 314 = 1304 = 11^3 - 3^3$;
 $(3^3 \cdot 314^2) / 2 \cdot 11^3 = 1000,0345604808$ [$\approx 10^3$]; $3456 = 16 \cdot 6 \cdot 6 \cdot 6 = 2^7 \cdot 3^3$; $3456 / 48 = 144 / 2$

Connections of terms with exponent 3:

$$1618 + 144 + 666 - 11^3 = 1097; \quad \ln(1097) = 7,000334 \text{ } [\approx 7]; \quad \ln(1097 - 3^{-1}) = 7,000031 \text{ } [\text{reciprocal of a full figure (namely 3) delivers closest value to 7}];$$

$$1097 + 3 = 100 \cdot 11; \quad 11^3 - 1097 + 314 = 4 \cdot 137; \quad 1097 + 7^3 = 10 \cdot 144; \quad 1097 - 2 \cdot 7^3 = 3 \cdot 137;$$

Addendum:

Approximations are marked with a double cross #

Light Velocity c without SI Units:

$$c_{wU} = 299792458 \quad [wU: \text{without SI Units}]$$

Exact Formula for the light velocity c_{wU} :

$$c_{\#2} = 144^3 + 666^3 + 3 \cdot (144^2 + 666^2) + (40/9) \cdot 144 + 7 \cdot 666 = 299792458 \quad (c2)$$

This is the exact value, deviation Zero !!!

The figures of the last two termes are: 40, 9, 144, 7, 666

$$\begin{aligned} \text{Connections: } 7^2 &= 40 + 9; & 40 \cdot 144 - 7 \cdot 666 - 9 &= 1089 = 33^2 = (3 \cdot 11)^2; & 666 - 9 \cdot 40 - 144 + 7 &= 13^2; \\ & & 666 - 9 \cdot 40 - 144 &= 2 \cdot 9^2; & 7 \cdot 40 - 144 - 11 &= 5^3; & 7 \cdot 40 + 9^1 &= 17^2; & 7 \cdot 40 + 9^2 &= 19^2; \\ & & 666 - 144 - 9^2 &= 3^2 \cdot 7^2; & \text{Primes from 2 to 19 are given or derived;} & & 144 - 7 &= 137 \quad [\approx \alpha^{-1}] \end{aligned}$$

"Hans de Vries Formula"^[6] with Euler Figure e (= 2.7182818) and Circle Figure π :

$$\begin{aligned} \alpha_1 &= \Gamma_{\alpha 1}^2 \cdot e^{-\pi \cdot \pi / 2} \quad \text{with} \\ \Gamma_{\alpha 1} &= 1 + \alpha_1 / (2 \cdot \pi)^0 \cdot (1 + \alpha_1 / (2 \cdot \pi)^1 \cdot (1 + \alpha_1 / (2 \cdot \pi)^2 \cdot (1 + \alpha_1 / (2 \cdot \pi)^3 \cdot (1 + \dots)))) \end{aligned}$$

Equation α_1 is only iteratively, but sufficient exactly to solve. Therefore the quantity $\Gamma_{\alpha 0}$ is used:

$$\begin{aligned} \alpha_{HdV}^{-1} &= \Gamma_{\alpha 0}^{-2} \cdot e^{\pi \cdot \pi / 2} = 137.035999096 \quad (\alpha\text{-HdV}) \\ \Gamma_{\alpha 0} &= 1 + \alpha_0 / (2 \cdot \pi)^0 \cdot (1 + \alpha_0 / (2 \cdot \pi)^1 \cdot (1 + \alpha_0 / (2 \cdot \pi)^2 \cdot (1 + \alpha_0 / (2 \cdot \pi)^3 \cdot (1 + \dots)))) \end{aligned}$$

An appropriate exact input value for α_0^{-1} (α_0^{-1} between 137.035999084 and 137.035999110) is required to get the above result value (with 9 digits behind the decimal point) for α_{HdV}^{-1} .

Reciprocal α^{-1} of the Fine Structure Constant dependent on the Figures 4,92 and 48:

$$\alpha_{\#}^{-1} = e^{4,92} + 4,92^{-100/48} = 137,038\,787\,978 \quad (\alpha 0)$$

Formula with an additional Fine Tuning Term dependent on the Figures 492, 137 and the result $\alpha_{\alpha\#}^{-1}$:

$$\alpha_{\alpha\#}^{-1} = \alpha_{\#}^{-1} \cdot (1 - 1/492)^{137,03599909795/(100 \cdot 137)} = 137,035\,999\,097\,95 \quad (\alpha 0a)$$

Result value corresponds to the figure at the exponent!

For comparison: exponent with figure 137,036 instead of figure 137,035 999 097 95

$$\alpha_{0\#}^{-1} = \alpha_{\#}^{-1} \cdot (1 - 1/492)^{137,036/(100 \cdot 137)} = 137,035\,999\,097\,94 \quad (\alpha 0b)$$

For comparison: exponent with figure 137,037037037 [= 100 · 999 / 9 · 9 · 9]

$$\alpha_{0c}^{-1} = \alpha_{\#}^{-1} \cdot (1 - 1/492)^{137,037037037/(100 \cdot 137)} = 137,035\,999\,077 \quad (\alpha 0c)$$

Formula with an additional Fine Tuning Term dependent on the Figures 48, 137 and the Golden Ratio Φ :

$$\alpha_{0d}^{-1} = \alpha_{\#}^{-1} \cdot [1 - 1/(10 \cdot 48 \cdot 137)]^{10 \cdot 48 / (137 \cdot \Phi \cdot \Phi)} = 137,035\,999\,123 \quad (\alpha 0d)$$

Gravitational Constant dependent on the Figure 8,848 (8848 m is the highest mountain height):

There is the interesting Equation G_{EK} for the Gravitational Constant G of Dr. Endre Kereszturi, which is described in the author's report [2]. The result is very exact, but Dr. Kereszturi had to add the units $\mathbf{m}^{-5} \mathbf{s}$ to his Equation. This discrepancy is solved by use of the term " $r_e / (r_p^5 \cdot c)$ ", the Large Number $(5 \pi / \alpha)^{5 \pi}$ and the Fine Tuning Term $\Gamma_{JS}^{8,848}$ [with $\Gamma_{JS} = 1 + \alpha / (2 \cdot \pi)$], which can be seen at the second Equation $G_{EK\#}$:

$$G_{EK} = h^5 \cdot \alpha^2 / [(c^2 \cdot m_e^6) \cdot (4 \cdot \pi)^3] \mathbf{m}^{-5} \mathbf{s} = 6,6743016 \cdot 10^{-11} \mathbf{m}^3 \mathbf{kg}^{-1} \mathbf{s}^{-2} \quad (G\text{-EK})$$

$$G_{EK\#} = \{h^5 \cdot \alpha^2 / [(c^2 \cdot m_e^6) \cdot (4 \cdot \pi)^3]\} \cdot [r_e / (r_p^5 \cdot c)] \cdot \Gamma_{JS}^{8,848} / (5 \pi / \alpha)^{5 \pi} = 6,6742936 \cdot 10^{-11} \mathbf{m}^3 \mathbf{kg}^{-1} \mathbf{s}^{-2}$$

The exponent 8,848 means the highest mountain height (=8848 m) divided by 1000 m! Please see another relations with the figure 8848 on page 15! Data are chosen according to CODATA2022.

Position P	Position P with exponent 2	Multiplication Factor Mf	Result P^2*Mf	Sum of Results
1	1	-1	-1	-1
2	4	1	4	3
3	9	-1	-9	-6
4	16	1	16	10
5	25	-1	-25	-15
6	36	1	36	21
7	49	-1	-49	-28
8	64	1	64	36
9	81	-1	-81	-45
10	100	1	100	55
11	121	-1	-121	-66
12	144	1	144	78
13	169	-1	-169	-91
14	196	1	196	105
15	225	-1	-225	-120
16	256	1	256	136
17	289	-1	-289	-153
18	324	1	324	171
19	361	-1	-361	-190
20	400	1	400	210
21	441	-1	-441	-231
22	484	1	484	253
23	529	-1	-529	-276
24	576	1	576	300
25	625	-1	-625	-325
26	676	1	676	351
27	729	-1	-729	-378
28	784	1	784	406
29	841	-1	-841	-435
30	900	1	900	465
31	961	-1	-961	-496
32	1024	1	1024	528
33	1089	-1	-1089	-561
34	1156	1	1156	595
35	1225	-1	-1225	-630
36	1296	1	1296	666
37	1369	-1	-1369	-703
38	1444	1	1444	741
39	1521	-1	-1521	-780
40	1600	1	1600	820

Table 1: List of Primes and the sum of their Squares with changing signs

At Position 36 the sum of the square of position numbers is the 666.

The next position number is 37. Figure 666 is reduced to primes: $666 = 36 \cdot 37 / 2 = 2 \cdot 3^2 \cdot 37$.

Position P	Result R $R = P^3$	Sum S of Results R	Root of the Sum S
1	1	1	1,00
2	8	9	3,00
3	27	36	6,00
4	64	100	10,00
5	125	225	15,00
6	216	441	21,00
7	343	784	28,00
8	512	1296	36,00
9	729	2025	45,00
10	1000	3025	55,00
11	1331	4356	66,00
12	1728	6084	78,00
13	2197	8281	91,00
14	2744	11025	105,00
15	3375	14400	120,00
16	4096	18496	136,00
17	4913	23409	153,00
18	5832	29241	171,00
19	6859	36100	190,00
20	8000	44100	210,00
21	9261	53361	231,00
22	10648	64009	253,00
23	12167	76176	276,00
24	13824	90000	300,00
25	15625	105625	325,00
26	17576	123201	351,00
27	19683	142884	378,00
28	21952	164836	406,00
29	24389	189225	435,00
30	27000	216225	465,00
31	29791	246016	496,00
32	32768	278784	528,00
33	35937	314721	561,00
34	39304	354025	595,00
35	42875	396900	630,00
36	46656	443556	666,00
37	50653	494209	703,00
38	54872	549081	741,00
39	59319	608400	780,00
40	64000	672400	820,00

Table 2: List of Positions P and the sum of the terms P^3

Position 15: the sum of the Position numbers with exponent 3 is 14400 (= $100 \cdot 144$).

Position 36: the sum of the Position numbers with exponent 3 is square of 666 (= $666 \cdot 666 = 443556$).

Remarkable: the root values of the sum of the terms P^3 is the square of the sum of Postions P (1 ... N)

CODATA 2022 for m_e (kg)	CODATA 2018 for m_e (kg)	Relat. Deviation m _e	CODATA 2022 for 1/α	CODATA 2018 for 1/α	Relative Deviation α
9,1093837139E-31	9,1093837015E-31		3,403E-10	137,035999177	

s / day = 86400,00 days / year = 365,2563604167 AgeUniv_a = 1,378511045E+10 = (10⁻⁴·9,2/4,8)¹⁰ · (4,92/4,8)³ years

Formulas (c4a) to (c4h), Case Study 1:

Used Data: CODATA2018 for α and m_e

1/α = 1/α₂₀₁₈ = 137,035999084 m_{e-0} = 9,1093837015E-31 c = 299792458,00 h = 6,62607015E-34
 LNc = (4 π / α)⁴(4π) = 4,627377650E+40 r_{e-0} = 2,8179403262E-15 = h · α / (2 π · m_{e-0} · c) Γ_{JS} = 1 + α / (2 π) = 1,001161409733
 c4.# = LNc · r_{e-0} / [(s / year) · Age_{years}] = 299740175,214 AgeUniv = (60·60·24 · s/day) · days/year · AgeUniv_a = 4,35032577E+17

C#4a	C#4b	C#4c	C#4d	C#4e	C#4f	C#4g	C#4h
314,00	137,00	137,00	137,00	1,001161409733	1,001161409733	1,001161409733	1000,00
1440,00	1440,00	1000,00	100,00				137,00
666,00	666,00	666,00	666,00	6,65511	6,66	6,66	666,00
1,000000	1,000000	-1,000000	-1,000000				1,000000
10000,00	1,2210	-2,6620	-0,2662		0,9990	0,9990	
137,00	1,00	3,14	7,00		-144,00	-128,00	16,00
137,00	1,00	1,00	22,00		55,1144	62,00	1000,00
1,00017442896	1,00017442405	1,00017442442	1,00017442739	1,00017442793	1,00017442593	1,00017442594	1,00017441906
299792458,580	299792457,109	299792457,220	299792458,111	299792458,272	299792457,673	299792457,676	299792455,615

Formulas (c4a) to (c4h), Case Study 2:

Used Data: CODATA2022 for α and m_e

1/α = 1/α₂₀₂₂ = 137,035999177 m_{e-0} = 9,1093837139E-31 c = 299792458,00 h = 6,62607015E-34
 LNc = (4 π / α)⁴(4π) = 4,627377689E+40 r_{e-0} = 2,8179403205E-15 = h · α / (2 π · m_{e-0} · c) Γ_{JS} = 1 + α / (2 π) = 1,001161409732
 c4.# = LNc · r_{e-0} / [(s / year) · Age_{years}] = 299740177,159 AgeUniv = (60·60·24 · s/day) · days/year · AgeUniv_a = 4,35032577E+17

C#4a#	C#4b#	C#4c#	C#4d#	C#4e#	C#4f#	C#4g#	C#4h#
				1,001161409732	1,001161409732	1,001161409732	
1,00017442896	1,00017442405	1,00017442442	1,00017442739	1,00017442793	1,00017442593	1,00017442594	1,00017441906
299792460,525	299792459,054	299792459,165	299792460,057	299792460,217	299792459,618	299792459,621	299792457,560

Formulas (c4a) to (c4h), Case Study 3:

Used Data: "Hans de Vries"-Formula for α and CODATA2018 for m_e

1/α = 1/α_{HdV} = 137,035999096 m_{e-0} = 9,1093837015E-31 c = 299792458,00 h = 6,62607015E-34
 LNc = (4 π / α)⁴(4π) = 4,627377655E+40 r_{e-0} = 2,8179403260E-15 = h · α / (2 π · m_{e-0} · c) Γ_{JS} = 1 + α / (2 π) = 1,001161409733
 c4.# = LNc · r_{e-0} / [(s / year) · Age_{years}] = 299740175,518 AgeUniv = (60·60·24 · s/day) · days/year · AgeUniv_a = 4,35032577E+17

C#4a#	C#4b#	C#4c#	C#4d#	C#4e#	C#4f#	C#4g#	C#4h#
				1,001161409733	1,001161409733	1,001161409733	
1,00017442896	1,00017442405	1,00017442442	1,00017442739	1,00017442793	1,00017442593	1,00017442594	1,00017441906
299792458,883	299792457,413	299792457,524	299792458,415	299792458,575	299792457,977	299792457,979	299792455,918

Formulas (c4a) to (c4h), Case Study 4:

Used Data: "Hans de Vries"-Formula for α and CODATA2022 for m_e

1/α = 1/α_{HdV} = 137,035999096 m_{e-0} = 9,1093837139E-31 c = 299792458,00 h = 6,62607015E-34
 LNc = (4 π / α)⁴(4π) = 4,627377655E+40 r_{e-0} = 2,8179403221E-15 = h · α / (2 π · m_{e-0} · c) Γ_{JS} = 1 + α / (2 π) = 1,001161409733
 c4.# = LNc · r_{e-0} / [(s / year) · Age_{years}] = 299740175,110 AgeUniv = (60·60·24 · s/day) · days/year · AgeUniv_a = 4,35032577E+17

C#4a#	C#4b#	C#4c#	C#4d#	C#4e#	C#4f#	C#4g#	C#4h#
				1,001161409733	1,001161409733	1,001161409733	
1,00017442896	1,00017442405	1,00017442442	1,00017442739	1,00017442793	1,00017442593	1,00017442594	1,00017441906
299792458,475	299792457,005	299792457,116	299792458,007	299792458,167	299792457,569	299792457,571	299792455,510

Yellow Fields: Fixed Data Orange Fields: Chosen Data Aquamarin Fields: only dependent on α Green Fields: dependent on h, α, m_e, c

Table 3: List of Results of the Formulas (c4a) to (c4h) of the different Case Studies

The Fine Tuningterms (in grey fields) of Formulas (c4a) to (c4d) and (c4h) possess the same values at the four Case Studies, because these terms use the same input figures at each Case Study.

The basis of the Fine Tuning Terms of Formulas (c4e) to (c4g) depend on the Fine Structure Constant α and therefore differ (imperceptibly) at the first three Case Studies.

Case Studies 3 and 4 possess the same Input Data for the Fine Structure Constant α, namely the "Hans de Vries"-value (=1/137,035999096).

The most accurate result values - a) 29979458,111, b) 29979457,977, c) 29979457,979, d) 29979458,007 - are won by a) Case Study 1, Formula (c4-d), b) Case Study 3, Formula (c4-f), c) Case Study 3, Formula (c4-g), d) Case Study 4, Formula (c4-d)

Eminent Relations with the Figures 144, 636, 666, 137 and 23: one may call it Dance of the Figures!

Figure 8848 (biggest mountain height): Earth-Ø^[18]: 12756,27 [km]
 $88,48^{1.44} = 635,9998$ [≈ 636 ; $\sqrt{\Phi} / 2 = 1,27202 / 2 = 0,636$]; $8,848^{1.1} = 11,0035$;
 $88,48^{1.9} = 5000,41$; $88,48^{1.44} / \sqrt{\Phi} = 499,992$; $88,48^{1.44} \cdot \pi = 2 \cdot 999,026$;
 $\sqrt{\text{Ø}_{\text{Earth}}} \cdot 8,848 = \sqrt{12756,27} \cdot 8,848 = 112,944 \cdot 8,848 = 999,326$ [$\approx 999 + 1 / \sqrt{8,848}$];
 $\sqrt{\text{Ø}_{\text{Earth}}} / 8,848 = \sqrt{12756,27} / 8,848 = 112,944 / 8,848 = 12,7649$ [$\approx (12756,27 + 8,848) / 1000$];
 $2 \cdot 636 - 2 \cdot 88,48^{1.44} = 1272 - 1271,999556 = 4,4386 / 10^4$ [$\approx 4,44 / 10000$]

Figure 636:
 $636 \approx 88,48^{1.44} = 635,9998$; $2 \cdot 0,636 = 1,272$ [$\approx \sqrt{\Phi} = 1,27202\dots$]
 $666^{1.44} = 11635,978$ [$\approx 11000 + 636$]; $636^{1.44} = 10888,76$ [$\approx 10000 + 888,8$]
 $0,636^{0.9} = 0,66544$ [$\approx 0,666$]; $0,636^{0.9} + 636^{0.9} / 1000 = 0,998956$ [$\approx 0,999$]
 $6,66^{0.1273} = 1,27299961$; [$\approx 10 \cdot 0,1273$ (0,1273 is the exponent)]; **1273** = $2 \cdot 636 + 1$
 $6,66^{\text{Ep}} = 1,272999499$ with $\text{Ep} = (2 \cdot 88,48^{1.44} + 1) / 10000 = 0,1272999556$ [$\approx 0,1 \cdot \mathbf{1,273}$]

Figure 11000 (ca. maximal see depth): $636^{1.44 + 1/636} = 10999,84$ [≈ 11000];
 $11000 - 8848 - 1272 - 3 \cdot (144 + 137) = 666 / \mathbf{18}$; $666 \cdot \mathbf{18} - 8848 = 10 \cdot 314$;
 $(11000 / 8848) \cdot [\ln(11000) / \ln(8848)] = \mathbf{1,2730004}$; $\mathbf{1,273} \cdot \pi = 3,99925$ [≈ 4];
 $[\ln(11000) - \ln(8848)]^{-1} = 4,5934$ [$\approx 4,6$]; $88,48^{0.9} / \pi = 17,9892$ [$\approx \mathbf{18}$];
 $88,48^{0.9} / \pi + 1 / (2 \cdot 46) = \mathbf{18,00002}$;
 $[\ln(11000) - \ln(8848)]^{-1} - 4,6 + (4,884 \cdot \pi^3)^{-1} = 6,7 / 10^{10}$ [nearly 0]; $2 \cdot \mathbf{4884} - 8848 = 20 \cdot \mathbf{46}$;
 $\mathbf{4884} - 2 \cdot 11^3 = 2222$; $\mathbf{4884} = 11 \cdot 444$; $\ln(\mathbf{4884}) \approx 8,5 - 2 \cdot 314 / 10^5$; $137 + 85 = 222$

Surface Data of Earth^[16] and Moon^[17] (taken from english Wikipedia-Entries):

Earth-Surface: 510072000 km²; Land-Surface: 148940000 km²; Moon-Surface: 37930000 km²
 $\text{Sf}_{\text{Earth_Land}} / \text{Sf}_{\text{Earth}} = 148940000 / 510072000 = 0,29200$ [$\approx 1 / (2 + \sqrt{2}) = 0,29289$]
 $[\approx \pi^{-1} - 1 / (4 \pi^2) = 0,29298]$;
 $\text{Sf}_{\text{Earth_Land}} / \text{Sf}_{\text{Moon}} = 148940000 / 37930000 = 3,92671$ [$\approx \pi + \pi / 4 = 3,92699$];
 $[\approx 4 - 10 / 137 = 3,92700]$;

Diameter-Data in km from german Wikipedia-Entries:

Sun-Ø^[3]: 1392684 [km]; Earth-Ø^[18]: 12756,27 [km]; Moon-Ø^[19]: 3746 [km]
 $\text{Ø}_{\text{Sun}} / \text{Ø}_{\text{Earth}} = 1392684 / 12756,27 = 109,1764$;
 $2000 \cdot \pi / (12 \cdot \sqrt{23}) = 109,1779$; $(12756,27 \cdot 12 / \pi)^{1/2,3} = 109,1828$;
 $666 \cdot \Phi / \pi^2 = 109,1848$; $0,666 \cdot \mathbf{515} / \pi = 109,1771$; $\mathbf{515} - 23^2 + 2 \cdot 144 - 2 \cdot 137 = 0$
 $\text{Ø}_{\text{Earth}} / \text{Ø}_{\text{Moon}} = 12756,27 / 3746 = 3,66981$; $666^{0.2} = 3,67024$; $e^{1.3} = 3,66930$;
 $(e^{13/2} + 23 - 1,2 \cdot \Phi^2) / 5 = 136,999998$; $\ln(666^2 - \mathbf{0,2}^2 \cdot 13^4) = 13,0000004$;
 $\text{Ø}_{\text{Sun}} / \text{Ø}_{\text{Moon}} = 1392684 / 3746 = \mathbf{400,65708}$;
 $\text{Ø}_{\text{Sun}} / \text{Ø}_{\text{Moon}} = 1392684 / 3746 - 0,9 / 1,37 = \mathbf{400,00014}$; $137 - 9 = 2^7$; $0,9 \cdot 400 - 314 = 46$;
 $\ln(\text{Ø}_{\text{Sun}} \cdot \text{Ø}_{\text{Earth}}) / \ln(666) = 3,63013$ [$\approx 363 / 100$; $363 = 3 \cdot 11^2$]; $0,9 \cdot 400 + 314 = 400 + 2 \cdot 137$;
 $\ln(\text{Ø}_{\text{Sun}} \cdot \text{Ø}_{\text{Moon}}) / \ln(666) = 3,43015$ [$\approx 343 / 100$; $343 = 7^3$]; $(1618 + 314 + 144 + 666) - 3^7 = 555$;
 $\ln(\text{Ø}_{\text{Sun}} \cdot \text{Ø}_{\text{Earth}} \cdot \text{Ø}_{\text{Moon}}) / \ln(666) = 4,88429$ [$\approx 4,884$; see use of figure **4884** at section *Figure 11000*]

Data Earth to Sun and Earth to Moon in km from german Wikipedia-Entries:

Distance Earth to Sun^[3]: 149,6 · 10⁶ km; Distance Earth to Moon^[19]: 384400 km;
 Rotation Time of Earth^[18]: 365,256 days; Rotation Time of the Moon^[19]: 27,3217 days;
 $\ln(149,6 \cdot 10^6 / 384400) / \ln(365,256 / 27,3217) = 2,30013$ [$\approx 2,3$]; $(\pi / \Phi)^{2,3} = \mathbf{4,6002} \approx \mathbf{4,6}$;
 $\ln(149,6 \cdot 10^6 / 384400) \cdot (365,256 / 27,3217) + 1 / (2,3 \cdot \Phi) = 80,0002$; $2 \cdot 80 - 23 = 137$;
 $23 \cdot 80 - 1618 = 222$; $314 - 222 = 4 \cdot 23$

Literature and wikipedia.de-Entries:

The data of the physical Constants are taken from the entries of Wikipedia Germany. The Physical Constants given in the corresponding entries refer mostly to CODATA2018 and CODATA 2022.

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