# The true Origin of the Figure 137, the Reciprocal of the Fine Structure Constant

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## Abstract:

Since the Physicist Arnold Sommerfeld introduced the Fine Structure Constant more than 100 years ago, many Natural Scientists were occupied with the question:
Why possesses the reciprocal of the Fine Structure Constant the value close to 137?
And up to now nobody could answer this question, so far it is known to the author.
In this report the true origin of the Fine Structure Constant, namely its reciprocal value is revealed by a simple mathematical relation, what is further widened to a Formula of second order. It is shown, that several Primes take high significances referring to the origin of the Figure 137.
By use of derived figures and terms from this simple relation very accurate approximations for the impressive "Hans de Vries" Formula for the Fine Structure Constant are presented.


## 1) Significant Formula:

Ther figure 137 is close to the reciprocal value of the Fine Structure Constant[1.1, 1.2, 1.3, 1.4].
There is a relation using the figure 137, which leads closely to the figure 37 by use of the figure 10:

$\sqrt{(10 \cdot 137)} = (10 \cdot 137)^{1/2} = 37{,}013511 \quad [\approx 37 = 137 - 100 = 666/18]$ (SF0)

$\alpha_{SF0}^{-1} = (10 \cdot 137)^{1/2} + 10^2 = 137{,}013511$ (α-SF0)

Remarkable: sum of first 3 Primes is 10; sum of the first 9 (= $3^2$) Primes is $10^2$

One changes above Formula with the goal to solve the unknown figure $X_{SF}$: [SF: **S**ignificant **F**ormula]

$(10 \cdot X_{SF})^{1/2} + 10^2 = X_{SF}$ and rearranged $(10 \cdot X_{SF})^{1/2} = X_{SF} - 10^2$

$10 \cdot X_{SF} = (X_{SF} - 10^2)^2 = X_{SF}^2 - 200 \cdot X_{SF} + 100^2$ (X-SF)

By that one has an equation of second order with the form:

$X_{SF1}^2 - 210 \cdot X_{SF1} + 100^2 = 0$ what leads to

$X_{SF1} = \alpha_{SF1}^{-1} = 0{,}5 \cdot 210 + 0{,}5 \cdot \sqrt{(210^2 - 4 \cdot 100^2)} =$

$= 0{,}5 \cdot 210 + 0{,}5 \cdot \sqrt{4100} = 137{,}015\,621\,187$ (α-SF1)

with $\sqrt{\mathbf{4100}} = 64{,}031\,242\,374$

Use of Formula (α-SF1) is described on pages 4 and 5.

Remarkable: $210 = 137 + 73$; $73 \cdot 137 = 10001$; $2 \cdot 3 \cdot 5 \cdot 7 = 210$ [four primes in serie]
$137 - 73 = 64$ [$\approx \sqrt{\mathbf{4100}}$]; $4100 = 2^2 + 64^2$;

Another Approximation: $\alpha_{SF2}^{-1} = 73 + \sqrt{\mathbf{4100}} = 137{,}031\,242$ [see use of it in chapter 3] (α-SF2)

Formula (SF0) is quite simple and it is highly propable that already other persons have found it or even its derivation, the Formula (α-SF1).
After Researches by Internet it is still unknown to the author, if these relations were already found.

Using the full number 4096 within the root operator $\sqrt{\mathbf{4096}}$ (= 64) the result of Formula (α-SF1) is 137!

Using the full number 4101 within the root operator $\sqrt{\mathbf{4101}}$ the result (=137,039051) of Formula (α-SF1) is the closest one to the reciprocal of the Fine Structure Constant, which is very close to figure 137,036!

Remarkable, if one reduces 137 to the sum of square numbers: $1^2 + 6^2 + 10^2 = 137$;
Extension: $1^2 + (1+5)^2 + (1+5+4)^2 + (1+5+4+3)^2 + (1+5+4+3+2)^2 + (1+5+4+3+2+1)^2 = 787$;
or shorter: $1^2 + 6^2 + 10^2 + 13^2 + 15^2 + 16^2 = 787$ [$= 666 + 11^2$]; $787 - 2 \cdot 314 - 2 \cdot 11 = 137$
Please see the various use of figures Φ, π [≈314/100], 144, 666 and also 9, 11 in the authors report [2].

The Golden Ratio Φ is used in this report. The Golden Ratio and its root value are defined to:

$\Phi = (5 + 5 \cdot \sqrt{5}) / 10 = 1{,}61803399$ [≈ 1618/1000]; $\sqrt{\Phi} = 1{,}27201965$ [≈ 1272/1000]

Fascinating: equal Formula Structure with 144 and 666: $\Phi = [2 - 1/\cos(144°)]/2 = [2 - 1/\sin(666°)]/2$

## 2) Reference value ($\alpha^{-1}$ = 137,035 999 096) of the Fine Structure Constant α:

Firstly the formula of the Fine Structure Constant α of Hans de Vries[3] is presented, because its result value is also won by other formulas presented in this report:

The Hans de Vries Formula is based on a Serie Equation and it is written by use of the Circle Figure π, the Euler Figure e (= 2,7182818), and the Fine Structure Constant α itself:

$$\alpha^{-1} = \Gamma_\alpha^{2} \cdot e^{\pi \cdot \pi/2} \quad \text{with}$$
$$\Gamma_\alpha = 1 + [\alpha/(2\cdot\pi)^0 \cdot (1 + \alpha/(2\cdot\pi)^1 \cdot (1 + \alpha/(2\cdot\pi)^2 \cdot (1 + \alpha/(2\cdot\pi)^3 \cdot (1 + \alpha/(2\cdot\pi)^4 \cdot (1 + \ldots)\,)\,)\,)\,)\,)]$$

Equation for $\alpha^{-1}$ is only iteratively, but sufficiently exact to solve. Therefore the quantity $\boldsymbol{\Gamma_{\alpha 0}}$ is used:

$$\boldsymbol{\alpha_{HdV} = \Gamma_{\alpha 0}^{2} \cdot e^{-\pi \cdot \pi/2} = 7{,}297\,352\,568\,66 \cdot 10^{-3}} \qquad (\alpha\text{-HdV})$$

$$\boldsymbol{\alpha_{HdV}^{-1} = \Gamma_{\alpha 0}^{-2} \cdot e^{\pi \cdot \pi/2} = 137{,}035\,999\,096} \qquad (\alpha\text{-HdV-R})$$

$$\boldsymbol{\Gamma_{\alpha 0}} = 1 + [\alpha_0/(2\cdot\pi)^0 * (1 + \alpha_0/(2\cdot\pi)^1 * (1 + \alpha_0/(2\cdot\pi)^2 \cdot (1 + \alpha_0/(2\cdot\pi)^3 \cdot (1 + \ldots)\,)\,)\,)\,)] =$$
$$= 1{,}000\,730\,582\,9352 \qquad (\Gamma\alpha 0)$$

An appropriate exact input value for $\alpha_0^{-1}$ ($\alpha_0^{-1}$ between 137,035999084 and 137,035999110) is required to get the above result value **137,035999096** (with 9 digits behind the decimal point) for $\alpha^{-1}$.
One can interprete the value of Equation (α-HdV) as a Constant, which is correct and consistent by itself.

## 3) Formulas for the Reference (Hans de Vries) Value (= 1 / 137,035 999 096):

Multiplication of the two digit prime 73 and the three digit prime 137 is the one, of which the value (= 73 · 137 = 10001) is next to the full figure 10000.
The other full figure next to 10000 is the figure 9999, but reduced to primes there is: 3 · 3 · 11 · 101.

A Formula, which is very close to the reference value 137,035999096, is given by the following relations. Firstly the following terms $T_{SFa}$ and $T_{SF}$ are presented:

$T_{SFa} = (137 + 73) / (137 - 73) = 210 / 64 = 3{,}28125$ [≈ 2 π - 3 = 3,2832]

$T_{SF} = (T_{SFa} + \pi) / (T_{SFa} - \pi) = 45{,}990009253$ [≈ 46 = 2 · 23; please keep in mind prime 23] (TSF)

The significance of the figure 23 and 137 is described on page 10 of the section Addendum!

Now one chooses an unusual exponent for the basis 1,001. The exponent Exp_TSF, which also possesses an exponent, is defined to:

$\text{Exp_TSF} = 1 / 1{,}0001^{0{,}036} = 0{,}999\,996\,4002$ [0,036 = 36 / 1000] (Exp-TSF)

With the basis 1,001 and its exponent Exp_TSF one is able to get a formula, of which the result corresponds to the Reciprocal of the reference value of the Fine Structure Constant.

$$\alpha_{TSF}^{-1} = 1{,}001^{\text{Exp_TSF}} \cdot T_{SF} + 91 = 137{,}035\,999\,096 \qquad (\alpha\text{-TSF})$$

Connection of the figures: 2 · 23 + 91 = 137; 1001 = 7 · 11 · 13 [three adjacent primes];
23 + 137 = 160 = 2+3+5+7+11+13+17+19+23+29+31 [sum of the first 11 primes];
next prime is 37, see result of Formula (SF0 on page 1); 36 · 37 = 2 · 666; 36 + 37 = 73;
the significance of the figures 666 and 144 is described in the author's report [2]!
1001 / 91 = 11; $46 \cdot 91 - 36^2 = 2890 = 1618 + 1272$; $46 \cdot 91 + 37^2 = 5555$;
91 - 36/2 = 73; 91 + 37 = 128 [128/2 ≈ **√4100;** see further figure 128 on page 3 on top]
$73 \cdot 73 - 46 \cdot 91 = 1143 = 23^2 + 2 \cdot 314 + 2 \cdot 137 - 2 \cdot 144$; $91^2 - 46^2 = 45 \cdot 137$; 91 - 46 = 45

Remarkable: with Exponent "$1 / 1{,}0001^{0{,}037}$" the result is: 137,035 999 092;
with Exponent "$1 / 1{,}0001^{0{,}035}$" the result is: 137,035 999 101

Sum total: use of exponent "$1 / 1{,}0001^{0{,}036}$" corresponds exactly to the reference value of the "Hans de Vries" Formula with 9 digits behind the decimal point!

[ A short annotation referring to Formula (TSF):
In the author's report [5] the Figures π, 4 and 6, with which the geometric values (circumference, surface area and volume) of the circle and the sphere, respectively are calculated, are connected to each other by the two relations:

$(6 + \pi) / (4 + \pi) = 1{,}28005 \approx 128/100$; $314 \approx 100 \cdot \pi$; $314 - 128 + 4 \cdot 6 = 210 = 137 + 73$;

$(6 - \pi) / (4 - \pi) = 3{,}329896 \approx 333/100$; $333 - 128 + 46 \cdot 6/4 = 274 = 2 \cdot 137$ ]

A formula, which is more close to the reference value 137,035999096 than Formula (α-SF1) and which also contains the term √4100, is written as follows:

$$\alpha_{SF2}^{-1} = 73 + \sqrt{\mathbf{4100}} = 137{,}031\,242\,374 \qquad (\alpha\text{-SF2})$$

A Formula, which corresponds to the reference value 137,035999096, is given by use of the just presented Formula (α-SF2) and the figure 1,0001 (= 0,073 · 137) as the basis of a Fine Tuning Term as follows:

$$\alpha_{SF2a}^{-1} = \alpha_{SF2}^{-1} \cdot 1{,}0001^{1/[2 \cdot 1{,}44 + 1/(2 \cdot 666) - 1/(137 \cdot 137)]} = 137{,}035\,999\,096 \qquad (\alpha\text{-SF2a})$$

Remarkable: each term of Exponent "$1 / [2 \cdot 1{,}44 + 1/(2 \cdot 666) - 1/137^2]$" contains the figure 2!
with Exponent "$1 / [2 \cdot 1{,}44 + 1/(2 \cdot 666) - 1/136^2]$" the result is: 137,035 999 098;
with Exponent "$1 / [2 \cdot 1{,}44 + 1/(2 \cdot 666) - 1/138^2]$" the result is: 137,035 999 095;

Sum total: use of third term "$1/137^2$" of the exponent of Formula (α-SF2a) corresponds exactly to the reference value of the "Hans de Vries" Formula with 9 digits behind the decimal point!

Formula (α-SF2b), which result is very close to the reference value 137,035999096, uses a different exponent as Formula (α-SF2a). This can be seen as follows:

$$\alpha_{SF2b}^{-1} = \alpha_{SF2}^{-1} \cdot 1{,}0001^{Exp_SF2b} = 137{,}035\,999\,097 \qquad (\alpha\text{-SF2b})$$

with the exponent $Exp_SF2b = 1 / (2 \cdot 1{,}44 \cdot 1{,}0001^{2 \cdot 1{,}1 \cdot 1{,}1})$

Remarkable: with Exponent "$1 / [(1 - 0{,}00003) \cdot 2 \cdot 1{,}44 \cdot 1{,}0001^{2 \cdot 1{,}1 \cdot 1{,}1})]$" the result is: 137,035 999 240;
with Exponent "$1 / [(1 + 0{,}00003) \cdot 2 \cdot 1{,}44 \cdot 1{,}0001^{2 \cdot 1{,}1 \cdot 1{,}1})]$" the result is: 137,035 998 954;
by the change ±0,003% of the exponent the results are outside the $\alpha^{-1}$ tolerance range of CODATA 2022 and far outside the one of CODATA 2018

Connection of the figures: $(11 \cdot 11)^2 - 10001 - 4100 = 540$; $666 - 540 + 11 = 137$; $23^2 + 11 = 540$;
$2 \cdot 144 - 2 \cdot 11 \cdot 11 = 46$ [see figure 46 at Formula (SF1)];
$4100 - 1618 - 1272 = 11^3 - 11^2$: $73^2 + 37^2 - 4100 - 1618 = 314 + 666$; $137 - 10^2 = 37$;
$37 + 73 = 10 \cdot 11$ [$314 \approx 100 \cdot \pi$; $1618 \approx 1000 \cdot \Phi$; $1272 \approx 1000 \cdot \sqrt{\Phi}$];

The connection of the figures 137 and 23 with the figure 144 or 666 (for example: $666 = 23 \cdot 23 + 137$) is described on page 10 of the section Addendum or originally from the author's report [4]!

There is another remarkable Formula in dependence of the reference value 137,035 999 096, which leads to a value very close to the reference value:

$$\alpha_{SF3}^{-1} = 1{,}0001^{4{,}76 + 1/(46 \cdot 60)} \cdot \sqrt{(10 \cdot 137{,}035999096) + 10^2} = 137{,}035\,999\,095 \qquad (\alpha\text{-SF3})$$

Connection of the figures: $476 - 46 - 60 = 10 \cdot 37$; $666 - 144 - 476 = 46 = 2 \cdot 23$; $476 + 144/2 = 4 \cdot 137$;
$2 \cdot 314 - 476 - 60 = 4 \cdot 23$; $476 - 314 + 60 = 222$;
$476 - 91 = 5 \cdot (2 + 3 + 5 + 7 + 11 + 13 + 17 + 19)$ [use of the first 7 primes];
$60 = 137 - 77 = 137 - (2 + 3 + 5 + 7 + 11 + 13 + 17 + 19)$;
$666 - 476 - 91 = 99 = 9 \cdot 11$ [see figure 91 at Formula (α-SF1a) on page 1]

Next Formula dependent on the reference value 137,035 999 096 delivers a very accurate result by use of figure 0,999:

$$\alpha_{SF3a}^{-1} = 1{,}0001^{4{,}76 + 1/(0{,}999 \cdot 46 \cdot 60)} \cdot \sqrt{(10 \cdot 137{,}035999096) + 10^2} = 137{,}035\,999\,096 \qquad (\alpha\text{-SF3a})$$

Connection of the figures: $11 \cdot 476 - 4100 - 999 = 137$; $476 - 314 - 18 = 144$; $91 - 18 = 73$;

Remarkable: $\ln(476) / 0{,}37 = 16{,}6632915$ [$\approx 100/6$]; $1/[100/6 - \ln(476)/0{,}37]^{1/3} = 6{,}666\,555\,563$;
$666/37 = 18$; $\ln(66665555) = 18{,}01519896$; $[\ln(66665555) - 18]^{-1}/\pi^2 = 6{,}666321525$;
$(6{,}6665555/6{,}666321525)^3 = 1{,}0001046$ [$\approx 1{,}0001$]; $1{,}0001046/0{,}0073 = 137{,}00063$

Before presenting the Formula (α-SF4) some mathematical relations are given, which are visibly connected in this context. The relations (137a) to (137c) lead close to the figure 137 and are written to:

$$(0{,}999222 \cdot 666^2/8)^{1/2{,}22} = 137{,}000114 \qquad (137a)$$

Connection of the figures: $999 - 222 = 777$; $777 - 137 = (2 + 8) \cdot 8^2$; $\ln(777) = 6{,}655440$;
Please keep in mind figure 6,65544! See another use of Figure 0,999222 on page 7!
$\ln(999222) \cdot 6{,}66 = 92{,}0061$ [$\approx 4 \cdot 23 = 2 \cdot 46$; use of figure 46 at Formula (α-SF3a) above]

$$(0{,}999222 \cdot 666^2/8)^{1/2{,}22} - 1/8800 = 136{,}999\,999\,991 \qquad (137b)$$

Connection of the figures: $8 \cdot 999 - 8800 + 1618 = 666 + 144$ [$1618 \approx 1000 \cdot \Phi$]; $11 \cdot (777 + 23) = 8800$

$$(666^2/8)^{Exp1} = 136{,}9999656 \qquad (137c)$$
with $Exp1 = 1/[2{,}22 + 1/(46 \cdot 137)] = 0{,}45041826$

Connection of the figures: $314 - 222 = 92 = 2 \cdot 46 = 4 \cdot 23$ [$314 \approx 100 \cdot \pi$]; $222 + 2 \cdot 23 + 6 = 2 \cdot 137$;
$222/6 + 23 = 60$; see the exponent figures 46 and 60 of formula (α-SF3)

Another exact Formula, which corresponds to the reference value 137,035 999 096, is Formula (α-SF4a). But firstly the basic Formula (α-SF4), at which the figures 137 and 222 are applied, is written as follows:

$$\alpha_{SF4}^{-1} = 1{,}0001^{222 \cdot 222/(137 \cdot 137)} \cdot 137 = 137{,}035\,976\,647 \qquad (\alpha\text{-SF4})$$

Figure 222 is already used at the connections of the figures of Formulas (137a) to (137c).

Formula (α-SF4a) uses besides the basic term $\alpha_{SF4}$ a fine tuning term with basis 1,00001 and is written to:

$$\alpha_{SF4a}^{-1} = \alpha_{SF4}^{-1} \cdot 1{,}00001^{Exp_SF4a} = 137{,}035\,999\,096 \qquad (\alpha\text{-SF4a})$$
with the exponent $Exp_SF4a = 1 / (0{,}445566 \cdot 137)$

Remarkable: with Exponent "$(1 + 0{,}005) / (0{,}445566 \cdot 137)$" the result is: 137,035 999 208;
with Exponent "$(1 - 0{,}005) / (0{,}445566 \cdot 137)$" the result is: 137,035 998 984;
by the change ±0,5% of the exponent the results are outside the $\alpha^{-1}$ tolerance range of CODATA 2022 and far outside the one of CODATA 2018

Remarkable: similar structure of figure 445566 compared to figure 665544 and same digits 4, 5 and 6!
$445566 = 0{,}445566 \cdot 10^6$ and $665544 \approx \ln(777) \cdot 10^5$; $\ln(777) = 6{,}655440$

Connection of the figures: $\ln(445566) = 13{,}00710$ [$\approx 13$]; $\ln(445566 - 23 \cdot 137) = 13{,}000\,004$;
$23 + 137 = 160$ [$160 / 100 = 1{,}6$]; $\ln(445566 - 23 \cdot 137 - 1{,}6) = 13{,}000\,000\,02$;
$665544 - 445566 = 2 \cdot 11 \cdot 9999 = 2 \cdot 11 \cdot 11 \cdot 909$; $11 \cdot 11 + 16 = 137$; $13^2 - 2 \cdot 16 = 137$

At page 1 the Formula (α-SF1) was already listed and it is repeated again, because by its use and further by use of basis 1,0001 at the following Fine Tuning Terms one get remarkable results:

$$\alpha_{SF1}^{-1} = 0{,}5 \cdot 210 + 0{,}5 \cdot \sqrt{4100} = 137{,}015621187 \qquad (\alpha\text{-SF1})$$

Next Formula (α-SF1a) with a result, which is very close to the reference value, uses besides the basic term $\alpha_{SF1}$ a fine tuning term with basis 1,0001 and is written to:

$$\alpha_{SF1a}^{-1} = 1{,}0001^{Exp_SF1a} \cdot \alpha_{SF1}^{-1} = 137{,}035\,999\,095 \qquad (\alpha\text{-SF1a})$$

with the exponent Exp_SF1a of the Fine Tuning Term with basis 1,0001:

$$Exp_SF1a = 1 + [0{,}666 + 1 / (666 - 2 \cdot \Phi)] / 1{,}37 = 1{,}487\,232\,725$$

Connection of the figures: $2 \cdot 666 + 314 - 1618 = 4 \cdot 144 - 4 \cdot 137$ [$314 \approx 100 \cdot \pi$; $1618 \approx 1000 \cdot \Phi$];
$1618 - 2 \cdot 666 + 2 \cdot 73 = 3 \cdot 144$;

Remarkable: with Exponent "0,999994 · Exp_SF1a" the result is: 137,035 998 973;
with Exponent "1,000006 · Exp_SF1a" the result is: 137,035 999 217;
by the change ±0,0006% of the exponent Exp_SF1a the results are outside the $\alpha^{-1}$ tolerance range of CODATA 2022 and far outside the one of CODATA 2018

Formula (α-SF1b), of which the result corresponds to the reference value, uses besides the basic term $\alpha_{SF1}$ a fine tuning term with exponent Exp_SF1b and is written to:

$$\alpha_{SF1b}^{-1} = 1{,}0001^{Exp_SF1b} \cdot \alpha_{SF1}^{-1} = 137{,}035\,999\,096\,0000 \qquad (\alpha\text{-SF1b})$$

$$Exp_SF1b = 1 + \{0{,}666 + 1 / [666 - (1{,}711 / \sqrt{\Phi})^4]\} / 1{,}37 = 1{,}487\,232\,787$$

Connection of the figures: $1272 + 4 \cdot 144 - 1711 = 137$ [$314 \approx 100 \cdot \pi$; $1272 \approx 1000 \cdot \sqrt{\Phi}$];
$1711 - 2 \cdot 666 - 314 + 144/2 = 137$; $\ln(1711)/\Phi = 4{,}6011600$ [$\approx 2 \cdot 2{,}3$]; $233 - 23 = 73 + 137$;
$\ln(1711)/\Phi - \Phi/(\pi \cdot 444) = 4{,}6000\,0001$; $\ln(1711)/\Phi - 1/(3{,}7 \cdot 233) = 4{,}6000\,0005$;
$1711 - 1272 - 314 = 5 \cdot 5 \cdot 5 = 6 \cdot 6 \cdot 6 - 91$ [see figure 91 at Formula (α-TSF) on page 2]

Remarkable: the result of Formula (α-SF1b) possesses four zero digits at the end of in the whole 13 digits behind the decimal point!

## 4) Formulas for the electron mass $m_e$ dependent on the reference (Hans de Vries) value $\alpha_{HdV}$:

The classical Electron Radius[1.5, 1.6] $r_e$ is defined to:

$$r_e = \alpha \cdot h / (2\,\pi \cdot m_e \cdot c_L) \qquad (re)$$

In upper Formula the Physical Constant h is Planck's Constant[1.7], $m_e$ is the Electron Mass[1.8, 1.9] and $c_L$ is the Light Velocity[1.10]. Their values are listed on the last page.

Formula ($r_e$) is rearranged in the way, that the product "electron mass $m_e$ times classical electron radius $r_e$" stands alone on the left side of the formula:

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

By use of the reference value of the Fine Structure Constant $\alpha_{HdV}$ the term $T_{HdV}$ is written to:

$$T_{HdV} = r_{eHdV} \cdot m_{eHdV} = \alpha_{HdV} \cdot h / (2\,\pi \cdot c_L) = 2{,}56696996771 \cdot 10^{-45}\ \text{kg m} \qquad (T\text{-HdV})$$

Next Formula ($P\mu_0$) correponds to the product "Reciprocal [$= 1/\mu_0 = e^2/(4\,\pi \cdot r_e \cdot m_e)$] of the Magnetic Field Constant[1.11] $\mu_0$ times the term $4\,\pi$":

$$P_{\mu 0HdV} = e^2 / (r_{eHdV} \cdot m_{eHdV}) = e^2 / T_{HdV} = (1{,}602176634 \cdot 10^{-19}\ C)^2 / (2{,}56696996771 \cdot 10^{-45}\ \text{kg m}) =$$
$$= 9999999{,}995424\ C^2\ kg^{-1}\ m^{-1} \qquad (P\mu_0)$$

In upper Formula the Physical Constant e is the Elementary Charge[1.12].

In the following the value of the quantity $P_{\mu 0HdV}$ is used without SI-Units :

$$T_{P\mu 0HdV} = P_{\mu 0HdV} \cdot C^{-2}\ kg^1\ m^1 = 9999999{,}995424 \quad [\approx 10^7] \qquad (T\text{-}P\mu_0)$$

Please keep in mind, that upper result is close to the 10-power $10^7$.

[ A short annotation: the quantity $T_{P\mu HdV}$ dependent on Physical Constants is not the only one, which

leads close to a full number without considering the SI Units. Please see the following mathematical relations with and without Fine Tuning Terms, which - if existing - often use the figure 1,0001 (= 137 · 0,0073) as basis:

$G^{-1} \cdot c_L^{-1} = 49{,}977390\ m^{-4}\ kg\ s^3$ [≈ 50] G: Gravity Constant[1.13]
$(G^{-1} \cdot c_L^{-1} m^4 kg^{-1} s^{-3}) \cdot 1{,}0001^{3,7 \cdot 11/9} = 49{,}999\,995$; $(c_L^{-1}\ m\ s^{-1}) \cdot 50^{-1} \cdot 1{,}0001^{3,7 \cdot 11/9} = 6{,}674299 \cdot 10^{-11}$
$(G^{-1} \cdot c_L^{-1} m^4 kg^{-1} s^{-3}) \cdot 1{,}0001^{1,44 \cdot \pi} = 50{,}000\,003$; $(c_L^{-1}\ m\ s^{-1}) \cdot 50^{-1} \cdot 1{,}0001^{1,44 \cdot \pi} = 6{,}674300 \cdot 10^{-11}$

$\sqrt{e} \cdot G^{-1} = 5{,}997213\ C^{0,5}\ m^{-3}\ kg\ s^2$ [≈ 6]
$(\sqrt{e} \cdot G^{-1}\ C^{-0,5}\ m^3\ kg^{-1}\ s^{-2}) \cdot 1{,}0001^5 = 6{,}000212$

$10^7 \approx [e^2/(r_e \cdot m_e)]\ C^{-2}\ kg^1\ m^1$
$c_L / 10^7 = 29{,}9792458\ m\ s^{-1}$ [≈ 30]; $(c_L / 10^7\ m^{-1}\ s) \cdot 1{,}0001^7 = 30{,}00024$

$h^2 \cdot e^{-3} \cdot c_L \cdot 10^7\ C^3\ kg^{-2}\ m^{-5}\ s^3 = 320038{,}024$
$10001^{-1} \cdot h^2 \cdot e^{-3} \cdot c_L \cdot 10^7\ C^3\ kg^{-2}\ m^{-5}\ s^3 = 32{,}000602$ [≈ 32]

Atomic Mass of Helium[6] with Unit u dependent on $c_L$: Approximations are marked by a double cross #

$m_{uHe} = 4{,}002602$ u (Tolerance: $\pm 2 \cdot 10^{-6}$ u)

$mu_{He1\#} = (120 \cdot 10^7 / c_L) \cdot [1 - 1/(144 \cdot 666)]^4$ u m $s^{-1} = 4{,}0026022$ u (muHe1)
Deviation: $m_{uHe\#1} - m_{uHe} = 1{,}96 \cdot 10^{-7}$ u

$m_{uHe2\#} = (120 \cdot 10^7 / c_L) \cdot [1 - 1/(144 \cdot 666)]^{4{,}002602}$ u m $s^{-1} = 4{,}00260209$ u (muHe2)
Deviation: $m_{uHe\#2} - m_{uHe} = 8{,}74 \cdot 10^{-8}$ u

Remarkable: Result of Formula (muHe2) with the exponent term "$m_{uHe}\ u^{-1}$" is more accurate than result of Formula (muHe1)!
Can this extremely accurate circumstance be random? By no means! Please look at the many accurate Formulas of the reports [2] and [4], which work with the figures 144 and 666 or at the Addendum on pages 10 and 11.

Figure 120 derived by serie primes: $2 \cdot (11 + 13 + 17 + 19) = 120$; $23 + 29 + 31 + 37 = 120$;
$2 + 3 + 5 + 7 = 17 = 137 - 120$; $2 \cdot 3 \cdot 5 \cdot 7 = 210 = 137 + 73$ ]

Now the ratio "$r_e / m_e$" with the unit m/kg is introduced and for comparison the values of CODATA2018 and CODATA2022 are calculated.

$R2018r_e/m_e = r_{e2018} / m_{e2018} = 2{,}817\,940\,3262 \cdot 10^{-15}$ m / $9{,}109\,383\,7015 \cdot 10^{-31}$ kg =
$= 3{,}093\,447\,831\,97 \cdot 10^{15}$ m/kg

$R2022r_e/m_e = r_{e2022} / m_{e2022} = 2{,}817\,940\,3205 \cdot 10^{-15}$ m / $9{,}109\,383\,7139 \cdot 10^{-31}$ kg =
$= 3{,}093\,447\,821\,50 \cdot 10^{15}$ m/kg

The quantity $Rr_{e\#}/m_{e\#}$ is introduced with the goal to perform an approximation for the ratio "$r_e / m_e$":

$Rr_{e\#}/m_{e\#} = [4884 \cdot 1{,}0001^{2+0{,}00032} / (4\pi)^2] \cdot T_{P\mu 0HdV}^2$ m/kg =
$= [4884 \cdot 1{,}0001^{2+0{,}00032} / (4\pi)^2] \cdot 9999999{,}995424^2$ m/kg =
$= 3{,}093\,447\,823\,59 \cdot 10^{15}$ m/kg (R1a)
with the exponent "$2{,}00032 = 2 + 0{,}2^5$" and $4884 = 4 \cdot 11 \cdot 111$

Connection of the figures: $10001 - 2 \cdot 4884 = 233 = 23 + 73 + 137$ [$73 \cdot 137 = 10001$; see 233 on page 5]; see also use of figure 4884 at Formula (h) on page 11.

One needs two Formulas solving two unknown quantities, namely the classical electron radius $r_{e\#}$ and electron mass $m_{e\#}$. The first Formula is the one for the classical electron radius $r_e$:

$r_{e\#} = \alpha_{HdV} \cdot h / (2\pi \cdot m_{e\#} \cdot c_L)$ [or rearranged: $m_{e\#} \cdot r_{e\#} = \alpha_{HdV} \cdot h / (2\pi \cdot c_L)$] (re1)

and the second Formula (re2) can be written by use of the Term $Rr_{e\#}/m_{e\#}$ as follow:

$r_{e\#} = m_{e\#} \cdot Rr_{e\#}/m_{e\#}$ (re2)

The unknown electron mass $m_{e\#}$ can now be calculated by Equalization of Formulas (re1) and (re2) :

$m_{e\#} \cdot m_{e\#} \cdot Rr_{e\#/m_{e\#}} = \alpha_{HdV} \cdot h / (2\pi \cdot c_L)$ or rearranged

$m_{e\#} = \sqrt{[\alpha_{HdV} \cdot h / (2\pi \cdot c_L \cdot Rr_{e\#/m_{e\#}})]} = 9{,}109\,383\,7135 \cdot 10^{-31}$ kg (me1a)

$r_{e\#} = m_{e\#} \cdot Rr_{e\#/m_{e\#}} = 2{,}817\,940\,3223 \cdot 10^{-15}$ m (re1a)

The electron mass of Formula (me1a) is close to the one of CODATA2022 and the classical electron radius of Formula (re1a) is between the one of CODATA2022 and the one of CODATA2018.

Reminder: the "Hans de Vries" Fine Structure Constant possesses the value: $\alpha_{HdV} = 1 / 137{,}035\,999\,096$

There is another ratio $Rr_{e\#/m_{e\#}}$ with the unknown quantities $r_{e\#}$ and $m_{e\#}$, which is approximated by the following formula (R1b) using the figures 144 and 666:

$$Rr_{e\#/m_{e\#}} = [4884 \cdot 1{,}0001^{0{,}000216} / (1 - 1/144/666)^{2 \cdot 1{,}44 \cdot 6{,}66} / (4\pi)^2] \cdot T_{P\mu 0HdV}{}^2 \text{ m/kg} =$$
$$= [4884 \cdot 1{,}0001^{0{,}000216} / (1 - 1/144/666)^{2 \cdot 1{,}44 \cdot 6{,}66} / (4\pi)^2] \cdot 9999999{,}995424^2 \text{ m/kg} =$$
$$= 3{,}093\,447\,825\,58 \cdot 10^{15} \text{ m/kg} \quad \text{(R1b)}$$

with the exponent "$0{,}000216 = 6 \cdot 6 \cdot 6 \cdot 10^{-6}$" of basis 1,0001;

Connection of the figures: $4884 = 4 \cdot 11 \cdot 111$; $999 + 222 = 1221 = 11 \cdot 111$;

$\ln(4884) / \ln(4\pi) = 3{,}355\,842\,9341 = 3{,}35588 - 1/(0{,}999222 \cdot 30^3)$; $33 + 55 = 88$;

$144 \cdot 666 - 2 \cdot 216^2 = 2592 = 2 \cdot 36^2$ [see figure 36 at Formula (α-TSF) on page 2];

$4884 - 2592 - 216 = 2076 = 144 + 314 + 1618$; $3 \cdot 335588 - 999222 = 7542 = 3 \cdot 4884 / 2 + 216$

The unknown electron mass $m_{e\#}$ is calculated again by Equalization of Formulas (re1) and (re2):

$m_{e\#} \cdot m_{e\#} \cdot Rr_{e\#/m_{e\#}} = \alpha_{HdV} \cdot h / (2\pi \cdot c_L)$ formula is solved for $m_{e\#}$ and this leads to

$m_{e\#} = \sqrt{[\alpha_{HdV} \cdot h / (2\pi \cdot c_L \cdot Rr_{e\#/m_{e\#}})]} = 9{,}109\,383\,7105 \cdot 10^{-31}$ kg (me1b)

$r_{e\#} = m_{e\#} \cdot Rr_{e\#/m_{e\#}} = 2{,}817\,940\,3232 \cdot 10^{-15}$ m (re1b)

The electron mass of Formula (me1b) is between the one of CODATA2022 and the one of CODATA2018, but closer to the value of CODATA2022.

Fine Structure Constant $\alpha_{10\hat{}7}$ derived by the 10-power $10^7$:

The Fine Structure Constant $\alpha_{10\hat{}7}$, which corresponds to the value "$10^7$ C² kg$^{-1}$ m$^{-1}$" derived by the term $[e^2 / (r_e \cdot m_e) = 10^7 \text{ C}^2 \text{ kg}^{-1} \text{ m}^{-1}]$, is calculated to:

$\alpha_{10\hat{}7} = [e^2 / (10^7 \text{ C}^2 \text{ kg}^{-1} \text{ m}^{-1})] / [h / (2\pi \cdot c_L)] = 0{,}007\,297\,352\,565$

The reciprocal value is:

$\alpha_{10\hat{}7}{}^{-1} = 137{,}035\,999\,159$

Conclusion:

It was shown, that starting with the square root of the term "$10 \cdot 137$" a simple formula is given, by which more complex formulas are performed with the goal to get accurate results for the Fine Structure Constant. This was successfully done using the - in this context - significant Primes 23, 37, 73 and 91. Further very accurate approximations for the "Hans de Vries" Fine Structure Constant are performed. The used Fine Tuning Terms often apply the figure 1,0001 as basis.

A proposal for natural scientists, who are looking for Fine Tuning Terms nearby the figure 1 in the frame of their research works: you can try to introduce Fine Tuning Terms with basis 1,0001 and maybe you can await a reasonable figure or term, respectively for the exponent. This approach is understandable, because figure 10001 contains the figure 137.

One can extend the search of an appropriate exponent:

with basis $[1 \pm 1/(N\pi \cdot 137)]$ with $N = 1; 2; 3; 4; \ldots$ or even with basis $[1 \pm 10^{\pm N}/(144 \cdot 666)]$.

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.


[1] Wikipedia.de-Entry "Physikalische Konstante"; Status November 2026 and Status May 2024

[1.1] Fine Structure Constant α according to CODATA 2022; Status November 2026:
26. CODATA Recommended Values (2022). (https://physics.nist.gov/cgi-bin/cuu/Value?alph) NIST, abgerufen am 11. Juni 2024 (englisch, Wert für die Feinstrukturkonstante)

[1.2] Reciprocal of Fine Structure Constant $\alpha^{-1}$ according to CODATA 2022; Status November 2026:
27. CODATA Recommended Values (2022). (https://physics.nist.gov/cgi-bin/cuu/Value?alphinv) NIST, abgerufen am 11. Juni 2024 (englisch, Kehrwert der Feinstrukturkonstante)

[1.3] Fine Structure Constant α according to CODATA 2018; Status May 2024:
25. CODATA Recommended Values. (https://physics.nist.gov/cgi-bin/cuu/Value?alph) NIST, abgerufen am 20. April 2020 (englisch, Wert für die Feinstrukturkonstante)

[1.4] Reciprocal of Fine Structure Constant $\alpha^{-1}$ according to CODATA 2018; Status May 2024:
26. CODATA Recommended Values. (https://physics.nist.gov/cgi-bin/cuu/Value?alphinv) NIST, abgerufen am 20. April 2020 (englisch, Kehrwert der Feinstrukturkonstante)

[1.5] Electron Radius $r_e$ according to CODATA 2022; Status November 2026:
49. CODATA Recommended Values (2022). (https://physics.nist.gov/cgi-bin/cuu/Value?re) NIST, abgerufen am 11. Juni 2024 (englisch, Wert für den klassischen Elektronenradius).

[1.6] Electron Radius $r_e$ according to CODATA 2018; Status May 2024:
45. CODATA Recommended Values. (https://physics.nist.gov/cgi-bin/cuu/Value?re) NIST, abgerufen am 3. Juni 2019 (englisch, Wert für den klassischen Elektronenradius).

[1.7] Plancks Constant h according to CODATA 2022: Status November 2026:
18. CODATA Recommended Values. (https://physics.nist.gov/cgi-bin/cuu/Value?h) NIST, abgerufen am 3. Juni 2019 (englisch, Wert für die Planck-Konstante in der Einheit Js)

[1.8] Electron Mass $m_e$ according to CODATA 2022; Status November 2026:
44. CODATA Recommended Values (2022). (https://physics.nist.gov/cgi-bin/cuu/Value?me) NIST, abgerufen am 11. Juni 2024 (englisch, Wert für die Elektronenmasse in Kilogramm).

[1.9] Electron Mass $m_e$ according to CODATA 2018; Status May 2024:
41. CODATA Recommended Values. (https://physics.nist.gov/cgi-bin/cuu/Value?me) NIST, abgerufen am 3. Juni 2019 (englisch, Wert für die Elektronenmasse in Kilogramm).

[1.10] Light Velocity c according to CODATA 2022: Status November 2026:
13. CODATA Recommended Values. (https://physics.nist.gov/cgi-bin/cuu/Value?c) NIST, abgerufen am 3. Juni 2019 (englisch, Wert für die Lichtgeschwindigkeit).

[1.11] Magnetic Field Constant $\mu_0$ according to CODATA 2022; Status November 2026:
15. CODATA Recommended Values (2022). (https://physics.nist.gov/cgi-bin/cuu/Value?mu0) NIST, abgerufen am 11. Juni 2024 (englisch, Wert für die magnetische Feldkonstante).

[1.12] Electron Charge e according to CODATA 2022: Status November 2026:
14. CODATA Recommended Values. (https://physics.nist.gov/cgi-bin/cuu/Value?e) NIST, abgerufen am 3. Juni 2019 (englisch, Wert für die Elementarladung).

[1.13] Gravitation Constant G according to CODATA 2022: Status November 2026:
31. CODATA Recommended Values. (https://physics.nist.gov/cgi-bin/cuu/Value?bg) NIST, abgerufen am 11. Juni 2019 (englisch, Wert für die Gravitationskonstante).

[2] Exact Approximations of Physical Constants using the Figures Φ, π, 144 and 666; Andreas Ball; Published at viXra: viXra submission 2406.0018v3; 2025-12-03

[3] www.chip-architect.com/news/2004_10_04_The_Electro_Magnetic_coupling_constant.html; An exact formula for the Electro Magnetic coupling constant. ( fine structure constant ) by Hans de Vries

[4] From the Electron to the Flower of Life - Proofs of God; Andreas Ball; Published at viXra: viXra submission 2410.0077v5; 2026-07-03

[5] From: Derivation of Ancient Approximations of the Circle Figure π to: a Complete Solution of Leonardo da Vinci's Vitruvian Man; Andreas Ball

Published at viXra: viXra submission 2406.0059v1; 2024-06-13

[6] Wikipedia.de Entry “Helium“; Status November 2026
3. Michael E. Wieser, Tyler B. Coplen: Atomic weights of the elements (IUPAC Technical Report) In: Pure and Applied Chemistry Vol. 83, No. 2, 2011, S. 359–396.
4. IUPAC, Standard Atomic Weights Revised 2013 (http://www.ciaaw.org/pubs/TSAW2013_xls.xls).

[7] Very Accurate Formulas for the Light Velocity dependent on the Figures 144 and 666 and on Wolfgang Pauli's Figure 137; Andreas Ball;
Published at viXra: viXra submission 2604.0114; 2026-04-29

[8] Exact Formulas of the Age of the Universe and of the Gravitational Constant dependent on Physical Constants; Andreas Ball;
Published at viXra: viXra submission 2502.0074v4; 2026-05-13

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Addendum:

The following chapter 8 is part of the author's report [4] describing the connections of the figures 144 and 666 with figures the 23 and 137. This chapter is listed again, because it's essential in the author's opinion.

*8) The Evolution of Life and the Fine Structure Constant*

*From the book[18] (pages 71 and 72) with the title 137 the following extract in german is presented:*
*Später stellten die Wissenschaftler fest: Wiche der Zahlenwert der Feinstrukturkonstante um bloße vier Prozent von Sommerfelds Berechnung ab, würden nahezu sämtliche Kohlenstoffatome und Sauerstoffatome auf allen Sternen im Universum vernichtet werden, so dass das Leben auf unserem Planeten nicht mehr existieren könnte oder sich zumindest dramatisch verändern würde.*

*Translation into English (which might be partly incorrect):*
*Later the scientists found out: if the value of the Fine Structure Constant would diverge only by four percent from the Sommerfeld's calculation, nearly all the carbon atoms and oxygen atoms on all the stars would be destroyed, so that the life on our planet could not exist any more or at least would change dramatically.*

*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 pairs of Chromosoms!*
*Please see also some mathematical relations on pages 8 and 9 of the author's report [13].*
*Figure 137 can be derived by the following three relations:*

$666 = 23 \cdot 23 + 137$; *two times the figure 23! One has to imagine the pair: 23 23!*

$3 \cdot 144 - 314 = 23 \cdot 23 - 3 \cdot 137$ $[314 \approx 100 \cdot \pi]$

$666 - 144/2 = 23 + 23 + 4 \cdot 137 = 6 \cdot 99$

*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 the Pair of Chromosons "23 23" stands for the human Evolution.*

The following extract from chapter Conclusion of the author's report [4] describes the connections of the figure 666 with data of earth, moon and sun. The connections can be seen on page 1 of report [2] or on page 27 of report [4]. This extract is listed again, because it is essential in the author's opinion, too.

Extract from the chapter *Conclusion*[4]:

*At the author's report[8] (page 1) some Relations dependent on Data of the Earth, Moon and Sun are presented, which results are close to the Figure 666.*
*Three Relations, which are dependent on the Figure 666 besides the Figures 9 and 11 (see also chapter 3) and lead closely to Data of the Earth, Moon and Sun, are repeated from report [8]. These are:*

$666^{0.1 * 9} = 347.64$ $[\approx 0.1 * Ø_{Moon}]$;

$666^{0.1 * 11} = 1275.9$ $[\approx 0.1 * Ø_{Earth}]$;

$666^{0.1 * (11-9) * 9.11} = 139434.4$ $[\approx 0.1 * Ø_{Sun}]$

*The positive meaning of the Figure 666 is by consideration of these Relations:*

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

*And as everybody knows: Earth, Moon and Sun are the most important celestial bodies for the mankind!*

Formulas with the figures 144 and 666, with the term $4\pi$ and with $\alpha$:

**Light Velocity $c_{LwU}$ without SI units m/s:** $c_{LwU} = 299792458$

$$c_{L1\#} = [144^3 + 666^3] + 3 \cdot (144^2 + 666^2) + 6 \cdot (144^1 + 666^1) + 9 \cdot (144^{0.5} + 666^{0.5}) + 12 \cdot (144^{0.25} + 666^{0.25}) = 299792458{,}792682 \quad (c1)$$

Deviation: $c_{L1\#} - c_{LwU} = 0{,}792660$ that means less than $3 \cdot 10^{-7}$ %

Remarkable: multiplicators ascending by **3** from **3**; multiplicator 0,5 for the next exponent starting from 2

Following Formula (c2) is firstly listed on page 1 of the author's report [7]:

$$c_{L2\#} = c_{L1\#} - 15 \cdot (144^{0{,}125} + 666^{0{,}125}) \cdot 0{,}999^{2{,}22} / 77{,}7 =$$
$$= 299792458{,}792682 - 0{,}792660 = 299792458{,}000022 \qquad \text{(c2)}$$

Remarkable: 999 - 222 = 777. Term $0{,}999^{2{,}22}$ reminds on figure 0,999222, which is used in Formulas (137a), (137b) on page 4 and derived at the section of Formula (R1b) on page 7.

**Planck's Constant $h_{wU}$ without SI units:** $h_{wU} = 6{,}62607015 \cdot 10^{-34}$

$$h_{\#} = (144 \cdot 666)^{-6{,}66} \cdot 1{,}001^{0{,}666} \cdot [1 - 1{,}0001 / (2\pi \cdot 137)]^{666 / (137 \cdot 4884)} = 6{,}6260701502 \cdot 10^{-34} \qquad \text{(h)}$$

Remarkable: exponent "666 / (137 · 4884)" contains figure 4884. See use of it on pages 6 and 7! Random?

Figure 4,884 is derived on page 15 in the author's report [7]:

*$ln(Ø_{Sun} \cdot Ø_{Earth} \cdot Ø_{Moon}) / ln(666) = 4{,}88429$ [≈ 4,884; see use of figure 4884 at section Figure 11000]*

**Age of the Universe[8] twice with the term $4\pi$:**

$$Age_{Univ} = (4\pi / \alpha)^{4\pi} \cdot r_e / c_L = 4{,}349567 \cdot 10^{17} \text{ s} = 13{,}783 \cdot 10^9 \text{ a}$$

Result is fascinating! See use of term $4\pi$ on pages 6 and 7 at Formulas (R1a) and (R1b)!

**Product "Norm Pressure times Norm Temperature":** see more in the author's report [2] on page 11

$$P_{PnTn} = p_N \cdot T_N \text{ Pa}^{-1} \text{ K}^{-1} = 101325 \text{ Pa} \cdot 273{,}15 \text{ K Pa}^{-1} \text{ K}^{-1} = 27676923{,}8$$

$$P_{PnTn\#} = 11 \cdot \alpha^{-3} - 33 \cdot \alpha^{-2} - 77 \cdot \alpha^{-1} = 27676931{,}5$$

$P_{PnTn\#} - P_{PnTn} = 7{,}795$; Value shows a small deviation related to the set value $P_{PnTn}$

Conspicious: difference of multiplicators in front of the α-terms is each time 44:

$44 = 11 - (-33) = -33 - (-77)$ furthermore $|11 - 33 - 77| = 99 = 9 \cdot 11$

Used Data of Physical Constants:

| | |
|---|---|
| Electron Charge e[1.12]: | 1,602 176 634 · $10^{-19}$ C |
| Fine Structure Constant α[1.1], CODATA 2022: | 7,297 352 5643(11) · $10^{-3}$ |
| Reciprocal 1/α[1.2], CODATA 2022: | 137,035 999 177(21) |
| Fine Structure Constant α[1.3], CODATA 2018: | 7,297 352 5693(11) · $10^{-3}$ |
| Reciprocal 1/α[1.4], CODATA 2018: | 137,035 999 084(21) |
| Reciprocal of Fine Structure Constant $1/\alpha_{HdV}$ due to the "Hans de Vries"-Formula[3]: | 137,035 999 096 |
| Light Velocity $c_L$[1.10]: | 299 792 458 m/s |
| Gravity Constant G[1.13]: | 6,67430(15) · $10^{-11}$ $m^3$ $kg^{-1}$ $s^{-2}$ |
| Mass of Electron $m_e$[1.8],CODATA 2022: | 9,109 383 7139(28) · $10^{-31}$ kg |
| Mass of Electron $m_e$[1.9],CODATA 2018: | 9,109 383 7015(28) · $10^{-31}$ kg |
| Planck's Constant h[1.7]: | 6,626 070 15 · $10^{-34}$ J s |
| Radius of Electron $r_e$[1.5], CODATA 2022: | 2,817 940 3205(13) · $10^{-15}$ m |
| Radius of Electron $r_e$[1.6], CODATA 2018: | 2,817 940 3262(13) · $10^{-15}$ m |

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