A stochastic interpretation trial on the Hans de Vries formular for the finestructure − constant $\alpha \approx \frac{1}{137.036}$.

The Hans de Vries formular :

$$\alpha = \Gamma^2 . e^{-\frac{\pi^2}{2}}$$

where $\Gamma = 1 + \frac{\alpha}{(2\pi)^0}(1 + \frac{\alpha}{(2\pi)^1}(1 + \frac{\alpha}{(2\pi)^2}(1 + ...$

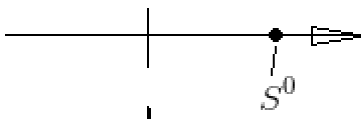
Someone can proof that the HdV formular is identical to

$$\alpha = \left[\sum_{n=0}^{\infty} \frac{\alpha^n}{(2\pi)^{\binom{n}{2}}} \right]^2 . e^{-\frac{\pi^2}{2}}$$

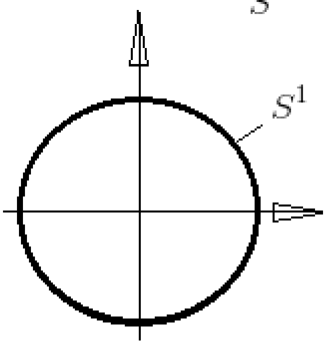
then

$$\sqrt{\alpha} = (1 + \frac{\alpha}{(2\pi)^0} + \frac{\alpha}{(2\pi)^0} . \frac{\alpha}{(2\pi)^1} + \frac{\alpha}{(2\pi)^0} . \frac{\alpha}{(2\pi)^1} . \frac{\alpha}{(2\pi)^2} + \cdots).e^{-\frac{\pi^2}{4}}$$

$\boxed{\frac{\alpha}{(2\pi)^0}}$ $\mathbb{R}$



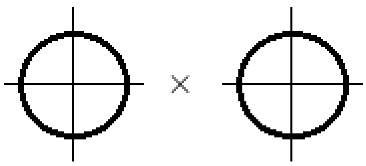
Volume$(S^0) = (2\pi)^0$



$\boxed{\frac{\alpha}{(2\pi)^1}}$ $\mathbb{C}$

Volume$(S^1) = (2\pi)^1$

$\boxed{\frac{\alpha}{(2\pi)^2}}$ $\mathbb{C} \times \mathbb{C} = \mathbb{H}$



Volume$(S^1 \times S^1) = (2\pi)^2$ $S^1 \times S^1$

Let us write

$$B = \left\{ \frac{\alpha}{(2\pi)^i} \mid i = 0, 1, 2, 3, ... \right\} \text{ } Shapeprobabilities$$

$We\ now\ want\ to\ define\ the\ formular\ by\ the\ stochastic\ first\ moment$
$which\ is\ the\ expectation\ value\ E(X).$
$For\ that\ we\ take\ the\ squareroot\ of\ the\ HdV\ formular.$

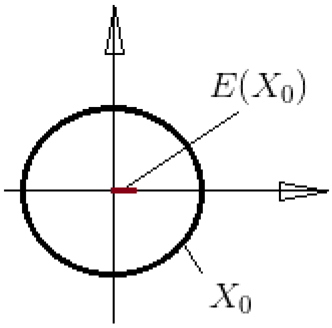
$$\boxed{\sqrt{\alpha} = \Gamma . e^{-\frac{\pi^2}{4}}}$$

$First. The\ factor\ \boxed{e^{-\frac{\pi^2}{4}}}\ can\ be\ seen\ as\ the\ \sqrt{expectation\ value}\ of$
$the\ wrapped\ normal\ distribution\ f_{WN}(\theta, 0, \pi)$

$details\ see$

$https://en.wikipedia.org/wiki/Wrapped\_normal\_distribution$

$chapter\ moments.$



$We\ write\ E(X_0) = e^{-\frac{\pi^2}{2}} \quad X_0 = \left\{ x \mid x = e^{i\theta} \quad , 0 \leqslant \theta < 2\pi \right\}$

Second the factor $\boxed{\Gamma}$

$$\Gamma \;=\; (1 + \frac{\alpha}{(2\pi)^0} + \frac{\alpha}{(2\pi)^0}\cdot\frac{\alpha}{(2\pi)^1} + \frac{\alpha}{(2\pi)^0}\cdot\frac{\alpha}{(2\pi)^1}\cdot\frac{\alpha}{(2\pi)^2} \;+\; \cdots\;)$$

To understand this factor we have to think about α *as a probability that acts on different shapes (Toris as random variables).*
In our case we have a hierachy of toris $\mathbb{T}^n$ *where*
$\mathbb{T}^n = S^1 \times S^1 \times ... \times \; S^1 \quad n \; times \; for \; n > 0$

Additional we define :

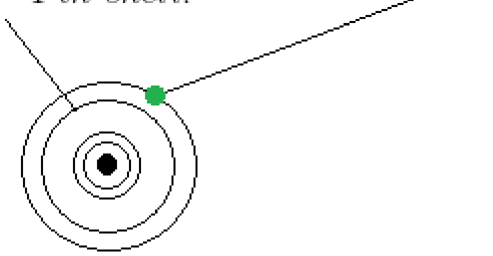
$\mathbb{T}^{\{\}}$ *is a point.*
$\mathbb{T}^0 \; = [0, 1]$ *is a line*

Then we can write a hierachy

$H = \mathbb{T}^{\{\}}, \mathbb{T}^0, \mathbb{T}^1, \mathbb{T}^2, ...$

One factor $\frac{\alpha}{(2\pi)^n}$ *can be thougth as that the probability* α *acts on* $\mathbb{T}^n$.
The denominator is the normingfactor (torus − volume).

It is similar but not the same as thinking about the electron on the n th shell.
Before an electron reaches the $n-th$ *shell it must climb up to the* $n-1$ *th shell.*



$$\Gamma \;=\; (1 + \frac{\alpha}{(2\pi)^0} + \frac{\alpha}{(2\pi)^0}\cdot\frac{\alpha}{(2\pi)^1} + \boxed{\frac{\alpha}{(2\pi)^0}\cdot\frac{\alpha}{(2\pi)^1}\cdot\frac{\alpha}{(2\pi)^2}} + \; \cdots\;)$$

Then for example this summand of the Γ *sum can be seen as that* α *acts on the shell's (toris)* $\mathbb{T}^{\{\}}$ *and* $\mathbb{T}^0$ *and* $\mathbb{T}^1$ *and* $\mathbb{T}^2$.
This is like building a human tower.

Then Γ *is the sum of all this possibilities.*

The HdV formular uses an infinit series (sum) but it is possible to cut the series on $N \geqslant 3$ and get values for the finestructure − constant which are within the range of the CODATA value for α.
CODATA :

$$\alpha \quad = 0,0072973525693(11)$$
$$\alpha^{-1} = 137,035999084(21)$$

For example we say that the finestructure − constant is defined by $N = 3$.
Then we get the finit formular

$$\sqrt{\alpha} = (1 + \frac{\alpha}{(2\pi)^0} + \frac{\alpha}{(2\pi)^0} . \frac{\alpha}{(2\pi)^1} + \frac{\alpha}{(2\pi)^0} . \frac{\alpha}{(2\pi)^1} . \frac{\alpha}{(2\pi)^2}) . e^{-\frac{\pi^2}{4}}$$

Solving this euqation by iteration we get

$$\alpha \approx 0,00729735256865318$$

$$\alpha^{-1} \approx 137,035999095842$$

So finally in words :
We have calculated a value for the finestructure − constant by an expectationvalue and therefore only based on stochastic methods.