**An Interpretationtrial of the Fine Structure Constant Formula Found by Hans de Vries**

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Abstract
The formula found by Hans de Vries for the fine structure constant is very elegant and accurate but there exists no explanation for it. In this paper, I try to give an interpretation. It is also shown why we have a electromagnetic field and why we have the value for the fine structure constant.

*The Hans de Vries formular :*

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

*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*

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

*The challenge now is to interprete this formular.*
*The factor* $e^{-\frac{\pi^2}{4}}$ *looks like the expectationvalue of the wrapped normaldistribution which is*

$$< z >= e^{i\mu - \frac{\sigma^2}{2}} = e^{-\frac{\pi^2}{4}} \quad for\ \mu = 0\ and\ \sigma = \frac{\pi}{\sqrt{2}}$$

*see https : //en.wikipedia.org/wiki/Wrapped_normal_distribution*

*And the factor*

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

*looks like the series of conditional probabilities.*

*more concrete (details see https : //en.wikipedia.org/wiki/Conditional_probability)*

$$\sqrt{\alpha} = \sum_{n=1}^{\infty} P(A_1 \cap ... \cap A_n) = (1 + 1 \cdot \frac{\alpha}{(2\pi)^0} + 1 \cdot \frac{\alpha}{(2\pi)^0} \cdot \frac{\alpha}{(2\pi)^1} + 1 \cdot \frac{\alpha}{(2\pi)^0} \cdot \frac{\alpha}{(2\pi)^1} \cdot \frac{\alpha}{(2\pi)^2} + \cdots ).e^{-\frac{\pi^2}{4}}$$

*with*

$$P(A_1 \cap ... \cap A_n) = P(A_1).P(A_2|A_1).P(A_3|A_1 \cap A_2)...P(A_n|A_1 \cap ... \cap A_{n-1}) = \frac{\alpha^{n-1}}{(2\pi)^{\binom{n-1}{2}}} \cdot e^{-\frac{\pi^2}{4}}$$

$$e^{-\frac{\pi^2}{4}} \qquad \frac{\alpha}{(2\pi)^0} \qquad \frac{\alpha}{(2\pi)^1} \qquad \frac{\alpha}{(2\pi)^{n-2}}$$

*the denominator of* $\frac{\alpha}{(2\pi)^i}$ *looks like the* $i-$*dimensional 'volume' of a torus therefore*

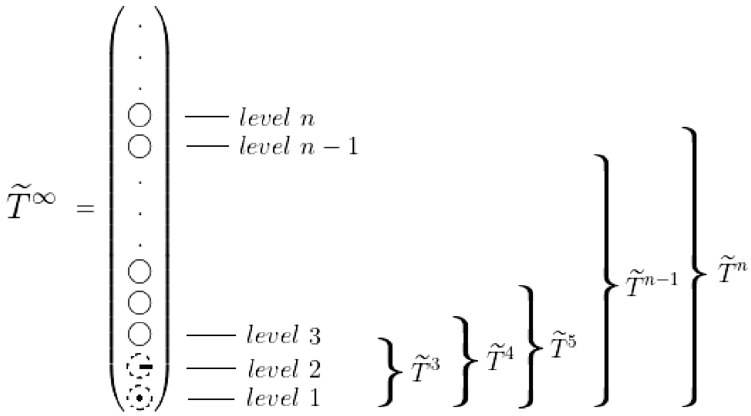
*the factors* $\frac{1}{(2\pi)^i}$ *can be seen as normalizationfactors.*

*Now if we understand what is* $A_1, A_2, A_3, ...$ *then we understand the HdV formular.*
*And furthermore we understand why we have an electrical charge.*

*Normally a* $n-$*dimensional torus is defined as* $T^n := S^1 \times ... \times S^1 = (S^1)^n$
*But in our formular we have two denominators which have the dimension of a point and a line.*
*Therefore we define the torus as*

$$\tilde{T}^n := \{0\} \times [0,1] \times S^1 \times \ ...\ \times\ S^1 = \{0\} \times [0,1] \times (S^1)^{n-2}$$

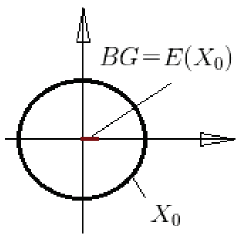
*The infinit torus* $\widetilde{T}^{\infty}$ *then can be seen as infinit ladder.*




*With this geometrical picture we can explain our probability sum.*
$P(absorbing\,or\,emitting\,a\,photon) = P(\pm\gamma) = \sqrt{\alpha}$ *is given by the different levels of the* $\widetilde{T}^{\infty}$.
*A photon is emitted when we climb down from one level to the prior level.*
*or is absorbed when we climb up on the torusladder one step from one level to the next*
*Our events* $A_1, A_2, \ldots$ *are then*
$A_1$... *absorbing a photon by climbing up to level 1 from vacuum or emitting a photon by climbing down from level 1 to vacuum.*
$A_2$... *absorbing a photon by climbing up to level 2 from level 1 or emitting a photon by climbing down from level 2 to level 1.*
*and so on.*

*We call the factor* $\underline{e^{-\frac{\pi^2}{4}}}$ *the Basic−Generator of the electromagnetic field (short BG).*

*Explanation and visualisation of the Basic Generator BG.*



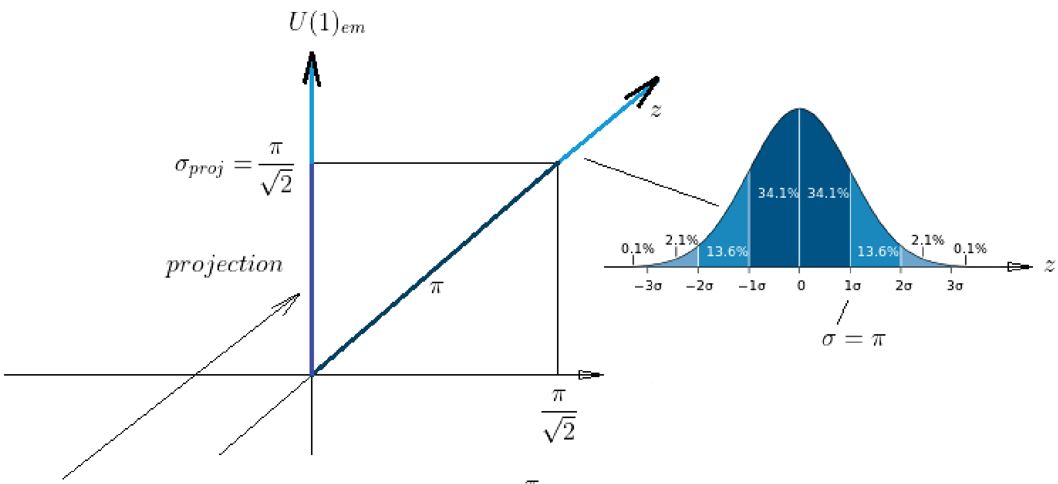

$BG = E(X_0) =$ *expectationvalue of the wrapped normaldistribution which is*

$$< z >= e^{i\mu - \frac{\sigma^2}{2}} = e^{-\frac{\pi^2}{4}} \quad for\ \mu = 0\ and\ \sigma = \frac{\pi}{\sqrt{2}}$$

*see https://en.wikipedia.org/wiki/Wrapped_normal_distribution*

*We write* $E(X_0) = e^{-\frac{\pi^2}{4}} \quad X_0 = \{x \mid x = e^{i\theta} \ ,0 \leqslant \theta < 2\pi\}$

*The factor* $\frac{\pi}{\sqrt{2}}$ *comes from a projection of a distribution*
*with standard deviation* $\sigma = \pi$.




*the projective normaldistribution with* $\sigma = \frac{\pi}{\sqrt{2}}$
*then will be wrapped.*

*Last but not least the value for the Finestructure Constant by the Hans de Vries formular.*

*I have cutted the sum on* $n = 100$ *and calculated the result by iteration.*

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

$$\alpha \approx 0,0072973525686 \approx \frac{1}{137,035\ 999\ 096}$$

*Value for* $\alpha$ *by Wikipedia*

$\alpha = 0,0072973525693(11)$

*The calculated value by the HdV formular fits very good to the empirical measurements.*