

# QUANTUM PHYSICS AND QUANTUM TECHNOLOGY

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## Unified quantum metric

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The absolute quantum metric of 3D-motion of spheric wave fronts was developed using the rigorous parabolic, hyperbolic, trigonometric and logarithmic relationships of the geometric parameters of the pulsating and rotating spiral. It was discovered that one matrix expression  $[G] = 2 \cdot \pi \cdot [R] \cdot (1 + [A])$ , four rational numbers  $A = 137$  (Sommerfeld's integer),  $B = 602214183$  (Avogadro's integer),  $R = \text{Integer}\{10^{18} \cdot (C/10^7)^{(1/64)}\} / 10^{18} = 1.05456978$  (Dirac's radius),  $C = (R + 4 \cdot \pi \cdot C / 10^{18})^{64} \cdot 10^7 = 299792457.86759104$  (Maxwell's speed) and two transcendental numbers  $\pi$  and  $e$  is sufficient to calculate twelve gauge parameters that completely describe and absolutely coordinate all basic constants of thermodynamics, electrodynamics and gravodynamics. It was also discovered that the radii and eccentricities of the pulsating and rotating spiral are linked by the equation  $R = 1 + 2/100 \cdot (E + A \cdot (1 + \sqrt{2 \cdot \pi \cdot E} / 10))$  where  $\sqrt{2 \cdot \pi \cdot E}$  is the argument of the information entropy of the normal distribution. The expression  $[P] = 2 \cdot \pi \cdot [R]$  generates the Planck's perimeter matrix. The expression  $[G] = [P] \cdot (1 + [A])$  generates the Newton's density matrix. The expression  $[KB] = \text{Cos}(12 \cdot [A] / 10) - \text{Sin}(12 \cdot [A] / 10)$  generates the Boltzmann's polarization matrix. The information entropy matrix of Avogadro is generated instantly by the matrix expression  $[NA] = 100 \cdot \{\sqrt{8 \cdot \pi \cdot E} / (8 \cdot \pi \cdot E + 137^2)} / (1 + 2 \cdot [A] / 1000) - 5 / 10^{18}\}$ . The Maxwell's speed has been obtained from the equations  $C = (R + 4 \cdot \pi \cdot C / 10^{18})^{64} \cdot (10^7)$  and  $C = (R + 4 \cdot \pi / 10^{18})^{64} / (10^{11})$ . The decimal orders of fundamental quantum constants are obtainable from the approximate expression  $E^{137} = (100 \cdot \pi)^{10^{157}}$  and Wien's wavelength displacement formula for the blackbody irradiation. We would like to draw your attention to the fact that for the first time the absolute values of the speed of light, background temperature, fine structure, elementary charge, molar mass, gravitation, Kelvin's, Avogadro's, Boltzmann's and Planck's units were determined analytically without the use of artifacts such as m, s, kg, without the use of Feynman's energy diagrams and without any measurements at all. All quantum constants are, in fact, the harmonic medians of the half-normal and the log-normal distributions of the normalized space-time parameters of spherical waves and all calculated values lie within the uncertainty of the latest NIST data. Thus, the proposed unified metric can be used as the basis of the New SI-2018 measurement system.

Expression	Value
$BC = R + 4 \cdot \pi \cdot C / 10^{18}$	1.0545697837673031
$BE = R + 1 / E / 10^{18}$	1.0545697836787944
$BA = R + 1 / (E + AS) / 10^{18}$	1.0545697836689549
$BS = R + 1 / (E + AS + BS) / 10^{18}$	1.0545697836608581
$A4 = A0 + 4 \cdot [A1 - A0]$	0.0073189621138002
$AL = 1 / (1 + 5 \cdot \pi^2 \cdot [A] / 10)$	0.0073071361324362
$A1 = 1 / A$	0.0072992700729927
$AF = 10^{13} / (\text{Integer}\{10^{13} \cdot \sqrt{2 \cdot \pi \cdot E} + R^2\})$	0.0072973525203056
$A0 = (\pi \cdot E / 10^2)^{1/2}$	0.0072927060593902
$AS = 1 / \text{Sum}\{[A \cdot 10^2] \cdot [e] / 10^{13} \cdot [e + 2]\}$	0.0072900000000000
$AX = 5 / \text{Root}\{2 \cdot \pi \cdot E \cdot (E^3 - 1) - 8\}$	0.0070261763632109
$BS = \text{Sum}\{[10^{13} \cdot e + 1]\}$	0.0060221410732354

Figure 1: Gauge parameters

Constant	Analytical	NIST Measured
Rotational core speed	299792457.8676	299792458
Translational velocity	299792456.9769	(not evaluated)
Vibrational tempo-rate	299792456.0862	(not evaluated)
Avogadro's	6.022141073517	6.02214083(74)
Kelvin	2.731599998459	2.7316
Boltzmann	1.380648450231	1.38064852(79)
Planck	6.626070011116	6.626070040(81)
Fine structure	0.007297352521	0.007297352564
Elementary charge	1.602176618025	1.6021766208(98)
Relative molar mass	11.99927775055	12 (conventional)
Newtonian gravitational	6.674082900778	6.67408(31)
Background temperature	2.725254327563	(not evaluated)

Figure 2: Basic quantum constants

The presented analytics can be interpreted as the logarithmically compressed 2D-image of the 3D-motion of the pulsating sphere and as the matrix bridge between continuous and discrete mathematics. Having as a tool the modified Euler's formula  $E^{(j \cdot \pi)} + 1 = [A] / (10^{157})$ , we can say: "The way to quantum programming and computing is opened".

## Biography

Eugene A Machusky is currently Head of the Department of Technical Information Protection Systems, Scientific Director of Special Design Bureau "Storm" in National Technical University of Ukraine "Kyiv Polytechnic Institute" (KPI), Kyiv, Ukraine. He received Master's in Engineering (1974), PhD (1979), DSc (1989) from NTUU-KPI. He is a Research Visitor at University of North Wales (1983-1984, Bangor, UK), Visiting Professor at Harbin Technological University (2015-2018), China. He is the Author and Editor of Radio Engineering Encyclopedia (Kyiv 1999; Moscow 2002, 2009, 2016) has written articles in Great Ukrainian Encyclopedia (2016, 2017). His field of interest include: Microwave Electronics, Underwater Acoustics, Information Security, Mathematical linguistics

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