

## Quantum Hologram of Dynamic Universe

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### ABSTRACT

Quantum physics and quantum cosmology were originated and remain today self-informational metric systems based on long-term multiple experiments with subsequent statistical averaging of results and spectral description of motion of material bodies and waves in subatomic and cosmic space.

For the first time in scientific and engineering practice, it is logically and mathematically substantiated, experimentally, metrically and arithmetically confirmed that for the absolute assessment of the hidden parameters of the motion of matter, it is sufficient to evaluate the vibrational, rotational and translational speed, as well as the amplitudes and phases of spatial displacement of a sphere with a diameter of "e" inside a sphere with a diameter of "pi", but if and only if the length of mantissa of decimally normalized fractions is at least 64 bits – to frequency  $10^{64}$  Hz, well above the Planck barrier.

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### Introduction

The bit and frequency limits of the information entropy of quantum metrics were found as a result of general spatial imagination, elementary mathematical logic of calculations and the development of parametric expressions for the vibrational, rotational and translational velocity of material particles, for the amplitude, phase, frequency and length of material waves in a crystal, liquid, gas and free space.

### Absolute Speed Limit

Speed of light is a speed at which light waves propagate through different materials. The metric value of the speed of light in vacuum is experimentally evaluated with practically possible for today precision and conditionally established by the scientific community as "exactly" 299792458 meters per second – the limiting velocity in the universe, being an upper bound to the propagation speed of signals and to the speeds of all material particles. The speed of light is fundamental metric unit, linking the "energy" and "action" of the hypothetically "massless" photons ( $E = h \cdot f = m \cdot c^2$  by Planck-Einstein) with magnetic constant ( $4 \cdot \pi / 10^7$ ) and characteristic impedance of vacuum ( $4 \cdot \pi \cdot c / 10^7$ ) by Maxwell.

The absolute value for the speed of light unit can be iteratively extracted from the parametric equation  $C = (R + 4 \cdot \pi \cdot C / 10^{18})^{64} \cdot 10^7$ , where  $R = \text{Integer}\{10^8 \cdot (C / 10^7)^{(1/64)}\} / 10^8 = 105456978$  is partial Planck constant reduced by the uncertainty ratio  $h / (2 \cdot \pi)$  of Heisenberg:

$C = 299792457.86759133843368398914990500927337258665405914040533114633.$

This calculated value, completely independent of the original assumption, was a latent mathematical constant that recursively links a finite non-periodic (rational) number C with an infinite non-periodic (transcendental) number "pi". This result is unprecedented in number theory, but very well known in cosmology and physics, and is called the "horizon of events".

Thus, the speed of light not only coordinates the physical categories "mass", "energy", "action", "space" as "meter" and "time" as "second", but also gives geometric meaning to the Planck units - the perimeters of the rings, drawn by rotations and oscillations of radius R, and this dynamically connects vector and tensor mathematics.

### Absolute Temperature Limit

Absolute temperature scale is any thermometric scale on which a reading of zero coincides with the theoretical absolute zero of temperature (equilibrium state of minimum energy). The standard unit of temperature is "kelvin", on which the only point established by arbitrary definition is the temperature at which the liquid, solid, and vapor forms of water can be maintained simultaneously. The Kelvin scale is the Celsius temperature scale shifted by 273.15 degrees (Britannica.com).

The absolute speed unit of Maxwell C is bind to absolute temperature unit of Kelvin  $K = \text{Sum}\{e + AS + BS\}$ , where four decimal powers (0, 1, 2, 3), decimally normalized qubit  $[1.111111111 > \dots]$  of Schrödinger and integer of Avogadro 602214183 all are arithmetically related as  $AS = 10^0 / 10^2 \cdot [10^1 / (10^1 - 10^0)]^3 = 1/100 / (1.1111111111111111 \dots)^3 = 0.00729$  and  $BS = \text{Lim}\{\text{Sum}[B / 10^{(3 \cdot N + 8)}]\} = 0.00602817:$

$K = 2.7315999984590452353602874713526624977572470936999595749669676277\dots$

The number  $AS = 0.00729 = 729/10^5 = 3^6/2^5/5^5$  can be expressed also in natural transfinite form as  $1/100/\text{Lim}\{\text{Sum}\{[A+(A-100)*N]/10^{(3*N+2)}\}\}$ , where  $A = 137$  is the Sommerfeld-Eddington-Born "magic number", the only "mystery" of which is that it periodically shows the hyperbolic points for central and mirror symmetry of the inverse natural set:

$1/A = \text{Sum}\{729927/10^{(8*N)}\} = 0.007299270072992700729927007299270072992700729927\dots$  SPIDER WEB OF Subatomic Space

The given above information is enough to determine absolutely all the fundamental constants of the standard physical model and to draw the two-dimensional holographic patterns for the spider web of spheric quantum topology of inner subatomic and, by analogy, of outer cosmic space.

The "trident quaternion" of Kelvin-Maxwell (three "teeth" RE, RA, RK and "handle" RC) describes the ideal gas state of matter. The ultimate accuracy of the calculations is limited by the bit length of C.

$RC = (R+4*\pi*C/10^{10})/10^8 = 1.0545697837673031329538102408884016631286796020784447181983290413.$

$RE = (R+1/(K-BS-AS))/10^8 = 1.0545697836787944117144232159552377016146086744581113103176783451.$

$RA = (R+1/(K-BS))/10^8 = 1.0545697836689548576871274272015782537366846029312691244712730207$

$RK = (R+1/K)/10^8 =$

$1.054569783660858107205014183250653875804250064673444334999896642.$

All other fundamental quantum constants of the standard physical model, including entropy and gravity, can be easily obtained from the parameters of the above expressions without measuring and without using the equations of special or general relativity [1]-[5]. But the expressions for the kinetic energy of quanta should be redefined as  $h*f*[1+(v/c)^2] = m*v^2/2*[1+(v/c)^2]$  thus harmonizing quantum and classic physics with discrete numerical and continuous symbolic functional analysis.

### Conclusion

Quantum physics is a natural rationalized metric and calculus of the eigen parameters of the motion of matter. Quantum physics is the human languages, music and painting that create wonderful songs and colorful selfies of a dynamic universe.

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