Theory of everything - relation to general relativity and quantum mechanics

Helmut Schmidt

ABSTRACT

The presented theory of everything (TOE) is based on the simplest possible law for energy $E = 2^r i^t$ and the torque for an observer and two objects. A common constant can be derived from h, G and c: $hGc^5 s^8/m^{10}\sqrt{\left(pi^4 - pi^2 - \frac{1}{pi} - \frac{1}{pi^3}\right)} = 1.00000$

For the system of the sun, earth and moon, a formula for c results only from the radius of the earth and one day: $r = \sqrt{pi/2\ \ c\ m\ Day)} = 6378626\ m$

Numerous calculations on planetary systems, the hydrogen atom and elementary particles are given, for example, the exact calculation of the proton mass in relation to the electron mass: $m_{proton} = (2pi)^4 + (2pi)^3 + (2pi)^2 - (2pi)^1 - 1 - 2 - 2/pi - 2/pi^6 + 4/pi^8 + 4/pi^{10} + 4/pi^{12} + 8/pi^{13} - 1/pi^{14}\ \ m_e\ = \ 1836.15267343\ m_e$

With the TOE, the energies of objects are directly determined. Quantum mechanics (QM), quantum field theory (QFT) and general relativity (GR) use the Euler-Lagrange formula. Vacuum is seen as an essential part of the universe, filled with virtual particles. This can be represented by the equation $All = TOE + Vacuum = TOE + QFT + ART$.

I. INTRODUCTION

Our idea of nature is conditioned by evolution: a 3-dimensional space. Since the theory of relativity was proposed, however, nature has been understood as a 4-dimensional space-time. This is ultimately a consequence of Newton's theory of gravitation. Since Newton, every object has been associated with a mass in kg and a center of gravity. Almost all of mathematical physics is built on this notion, with calculations based on gravity. The gravitational constant has units $m^3/kg/s^2$. This alone shows that gravitation only leads to finally observable measurements in m over several steps.

II. FORMULATION OF THE TOE

The simplest model for calculations in physics is a single dimension (time), a single type of particle with a universal speed and a single law of nature, and this relates to the energy $E = 2^r i^t \quad r \in \mathbb{R}, t \in \mathbb{N}$ (1) **as the most compact information.** All particles move with a constant speed pi c in the form of a spiral around the geodesic line as described with general relativity theory (GRT). The endlessness of the universe is beyond any possible realization and results in a kind of a fractal.

For calculations in physics, all the particles in a system must be assigned a single number. This is part of the universe. The natural numbers result in cohesion and thus replace gravity. A system of multiple objects built from particles does not require a vacuum; it is a whole. Each particle corresponds to a natural number. The structure of the system is given by dual, alternating states, matching a series of 1, 1, -1, 1, -1, -1. This results in an integer. The maximum number in this system is the total energy. An object is a divider of this system.

In contrast, **our idea of the world** is one with 3 isotropic dimensions x, y and z. A comparison of x, y and z is physically very problematic. Each ruler is rotated for comparison and subject to the Coriolis force. The TOE, on the other hand, uses polar coordinates. If one calls **r the large radius, xy the small radius and z the deviation**, then there are only ratios such as $r/z = n/m \quad xy/z = l/m \quad n > l > |m| > 0 \quad n, l, m \in \mathbb{N}$. r, xy and z cannot be the same; as in a Turing machine, each variable has a defined storage space. n, l and m refer to the ratios of the round-trip times. 2pi is the appropriate conversion factor from radius r to the circumference and orbital period UZ.

The polynomial $E_{(Object,Surface)} = (r(t) + (2pi)xy(t) + (2pi)^2 z(t))$ (2)
is the summary of the 3 dimensions of an object. Starting from the center, there is a clear order according to the sizes r > xy > z. This makes Heisenberg's inequality obsolete. Polynomials can be mathematically treated as vectors. Schrödinger's wave theory is based on $\Psi = Ae^{-i/\hbar(Et+rdr/dt)} = Ae^{-i(wt+r/\lambda)}$ (3). Through the mathematical transformation with $e^{(r\ln(2pi))} := 2pi^r$ and the assumed digital time with values of only 1 and -1, Ψ can be converted to

$$r_{Orbit} = A(2pi)^{-iwt}(2pi)^{r/\lambda} = \pm \mathrm{R}_{Center}(w)\,(2pi)^{r(0)+n/l\lambda} \quad (4)$$

In this way, the apoapsis and periapsis of celestial bodies can be calculated. That is, the **TOE contains quantum theory**.

Pi is simply a tool for distinguishing between inside and outside. It is simply a question of the number system. Nature works in binary. For our understanding of space, the base is 2pi for one complete revolution. Here, 2pi is the circumference of an idealized electron. The barrier between one object and another object is a circle. Either the object is inside or outside, matter or antimatter, in the time before or in the time after. Exactly on the circle, the energy is zero. Regardless of how epicycles are built from circles, the barrier remains. Whether physics consists of 3 or 11 spatial dimensions does not matter; the length of the polynomials is manmade, from our idea of space.

Photons consist of an electron and an antielectron. In nature, these are two immediately adjacent particles. They cannot be separated and observed except for emission or absorption or with a 3rd object for pairing. The pair formation shows the consequence of the decay and leads to an electron moving toward the center and an antielectron moving in the opposite direction.

A photon has exactly the properties of an electron paired with an antielectron.

$spin1 = spin½ + spin½ \quad E_{ges} = E_{Electron+}E_{Antielectron}$

$N_{Electron} = -N_{Antielectron} = 1\ \ E_{Electron} > 0\ \ E_{Antielectron} < 0$. Bosons consist of an even number of particles and fermions of an odd number. The speed $pi\ c$ (see below) allows interaction between 2 entangled photons solely via the angular momentum. This applies to all entangled objects.

For calculations in physics, an observer and two objects 1 and 2 are essential, with the respective numbers of particles N_B, N_1 and N_2. Basically, physical laws result from the respective conditions, the torques and a corresponding formula for the time or frequencies.

$N_B/r_B = N_1/r_1 = N_2/r_2$ (5) $N_B/w_B = N_1/w_1 = N_2/w_2$ (6)

The same laws apply to celestial bodies as to an atom. Elementary particles are also composed of one or more particles. A ground state is only reached when the minimum energy of a system with integer ratios n, l, and m is balanced, with no higher frequencies that could still be radiated. Every celestial body and ultimately every object has a **conversion factor of 2pi per revolution** $2\,pi\,r \propto w$ for each of the 3 spatial dimensions. **Every object has the same information in the radius** $r_{Object} = \mathrm{r}_1(t) + 2pi\,\mathrm{x}_1(t) + 4pi^2\,\mathrm{z}_1(t)$ **as in the frequency w, if w is a complex number.**

There is a focal point for 3 objects. The lever law of classical physics applies as follows:

$$M_{1,2,pot} = \mathrm{N}_1(r_1 + 2pixy_1 + 4pi^2 z_1) + N_2\,(r_2 + 2pixy_2 + 4pi^2 z_2) + \mathrm{N}_B(r_B + 2pixy_B + 4pi^2 z_B) = 0 \quad (7)$$

$$L_{1,2,kin} = \mathrm{N}_1\,w_1 + N_2\,w_2 + \mathrm{N}_B\,w_B = 0 \quad (8)$$

Torque M and angular momentum L are appropriate for these formulas with N particles. According to Gauss' integral theorem, what is inside an object does not matter, whether it is a solid body or a complex system of a center and satellites. According to classical mechanics, the center of gravity corresponds to M = 0 and L = 0. According to quantum mechanics, the energy can only be calculated when the 3 objects interact with the same smallest center of gravity = Q. Q stands for a single quantum N = 1.

$N_1/\,\mathrm{N}_B(r_1/r_B + xy_1/xy_B + z_1/z_B) + N_2/N_B\,(r_2/r_B + xy_2/xy_B + z_2/z_B) = -1 \pm pi \pm pi^2 \pm pi^3$ (9) with (1)

$$(r_1^2/r_B^2 + xy_1^2/xy_B^2 + z_1^2/z_B^2) + (r_2^2/r_B^2 + xy_2^2/xy_B^2 + z_2^2/z_B^2) = -1 \pm pi \pm pi^2 \pm pi^3$$

$$E_{1,2} = (\mathrm{r}_1\,v_{1,r} + xy_1\,v_{1,xy} + z_1 v_{1,z})c + (\mathrm{r}_2\,v_{2,r} + xy_2\,v_{1,xy} + z_2 v_{1,z})c = \sqrt{(-1 \pm pi \pm pi^2 \pm pi^3)}c^2 \quad (10)$$

$$Q^2 = -1 \pm pi \pm pi^2 \pm pi^3 \quad (11)$$

$$E_{(1,2)} = E_1 + E_2 + E_W = Qc^2$$

The pi^a summands in Q are the connections to other members of a larger system. This

means that 2 chains can be combined into a larger system using the 2 end links.
Usually the energy is calculated with the mass:

$E^2 = x^2\,\mathrm{p}_x^2\,c^2 + y^2\,\mathrm{p}_y^2\,c^2 + z^2\,\mathrm{p}_z^2\,c^2 - m^2\,c^4$. **Including the observer's measurement is correct and simpler. The measurement dominates the recoil.** The mass m naturally has no unit, it is simply a ratio. The masses result from the interaction or the torque of the three bodies. Simply by assuming a particle number > 2, the mass is superfluous. With $\mathrm{N}_1\,w_1 + N_2\,w_2 + \mathrm{N}_B\,w_B = 0$ applying to each system,

$$\mathrm{N}_1\,w_1/(N_B w_B) + N_2\,w_2/(N_B w_B) = -1$$

$N_1^2 - N_2^2 = N_B^2 \quad w_1^2/w_B^2 + w_2^2/w_B^2 = -1 \quad w_1^2 + w_2^2 = -w_B^2$ (12)

What is the importance of the frequency of an object in quantum mechanics and TOE?

Three polar coordinates are summarized in the TOE: $r_{Object} = (r(t) + (2pi)xy(t) + (2pi)^2 z(t))$

xy corresponds to the transverse plane of rotation and applies to all objects in a system. The longitudinal direction of propagation is given by the ratio r/z. The properties of a photon can only be determined in relation to a third body. w is not the frequency f that is usually assigned to an elementary particle. f is the frequency of recoil after emission or absorption and depends on the detector, observer and the mass of the earth.

The interaction $E_W = pi^2 c = hf$ can be included in the square root $Q/c^2 = \sqrt{(-1 \pm pi \pm pi^2 \pm pi^3)}$ in the pi^2 term. Only when 2 objects no longer emit energy, regardless of if they are particles, electromagnetic waves or gravitational waves, is a basic state reached in the entire system:

$Q/c^2 = \sqrt{(\pm 1 \pm pi \pm pi^3)}$ (13)

A. Gravitational constant

With the product G h, the mass is eliminated and can only be calculated as a single unit. In 3 dimensions, the volume is limited to a particle $V_e = pi^2 c^3$. N particles have a volume of $V_r = Nr^3$. No single particle will occupy the same position after a complete revolution of the complete system $\sqrt{(1 \pm pi \pm pi^3)}$, and thus, the relation $V_N = Npi^2 c^3$ (14) results.

$Q/c^2 = \sqrt{(\pm 1 \pm pi \pm pi^3)}$

$Ghc^3pi^2Quantum = Ghc^5pi^2\sqrt{(\pm 1 \pm pi \pm pi^3)} \approx \pm 1$. All quanta have a charge as an electron or antielectron. Gravity is the difference from the smallest possible distance between two quanta. Two quanta result in a graviton. Cohesion corresponds to the interaction of a photon. The ratio of the 2 quanta results from the direct sequence in the series $1/pi^3 + 1/pi + 0 * 1 + 0 * pi + pi^2 + pi^4$. The polynomial $0 * 1 + 0 * pi$ is again part of the interaction between the 2 quanta.

$Graviton = \sqrt{(1 + pi(pi + pi^3) - (1 + 1/pi + 1/pi^3))} =$

$\sqrt{(pi^4 + pi^2 + 1/pi + 1/pi^3)}$ This results in

$hGc^5s^8/m^{10}\sqrt{(pi^4 - pi^2 - 1/pi - 1/pi^3)} = 0.999991$ (15)

h, G and c form a unit and are **defined by this formula**. The units of meters and seconds are mandatory in this formula. Three objects can be used as standard units of measure if at least two measures are specified: the orbital period, diameter and/or particle count. The value of G is known only to the fifth digit. In this respect, the result can be assumed to be 1. h and c are already exactly defined. The only parameter that is still determined by a measurement is G. The only force holding the world together is the natural numbers, and they appear as centrifugal and centripetal forces. Two objects with 3 dimensions need 3^2 parameters plus the total number of particles and 10 equations. Formula (1) corresponds to ART with 16 equations, of which only 10 are independent. **That is, the TOE contains GR and QM.**

B. H0 and the gravitational constant

The equation for the graviton $hGc^5s^8/m^{10}\sqrt{(pi^4 - pi^2 - 1/pi - 1/pi^3)} = 0.999991$ can also be differently formulated by dividing the volume by the number of particles $V_N = Npi^2c^3$:

$$G_{Universe}/V_N = hGc^5s^8/m^{10}\sqrt{(pi^4 - pi^2 - 1/pi - 1/pi^3)}/pi^2/c^3$$
$$= hGc^2s^5/m^7\sqrt{(1 - 1/pi^2 \ldots .)}$$

If you multiply $G_{Universe}/V_N$ by twice the speed of light c, then you obtain the orthogonal component, the speed of light c, which is the expansion of the universe H0.

$hGc^3 2\sqrt{(1 - 2/pi^2)}s^5/m^8 = 2.13 \cdot 10^{-18}/s$ (17) Measurements: $H0 = 2.1910^{-18}/s$

All interactions are thus due to the expansion of the universe.

C. Calculations for the sun - earth - moon

For the 3 spatial dimensions, 2^3 = 8 is the basis for the rotation or frequency ratios. This is also reflected in the periodicity of 8 in the periodic table. The largest possible stable ratio of radii of celestial bodies is that of the earth and the moon. This results in the following ratios of the diameters of the earth/(earth + moon):

$$R_{moon}/(R_{earth} + R_{moon}) = 2^3/(2pi) = 4/pi.$$

Calculated: $R_{moon} = 6356.75\ km(4/pi - 1) = 1736.9\ km$ related to the pole diameters. Relative error = 1.00011.

This unique relationship between the sun, earth and the first moon in the planetary system explains why the moon fits pretty much exactly into the sun during a solar eclipse. The distances between all bodies can also be the result of the expansion of the entire universe $H0 = 2.1910^{-18}/s$. $\frac{d}{dt}distance(Moon) = 38.2\ mm/384400\ km/1\ year = 3.1510^{-18}/s$. $(1 - 1/pi)3.1510^{-18}/s \approx H0$

D. Calculation of the speed of light c from the earth radius and 1 day

The sun, earth and moon combined are a system with special rotation time ratios. This also means that the speed of light c should be in the greatest possible ratio. pi^2 in $Q = \sqrt{(\pm 1 \pm pi \pm pi^2 \pm pi^3)c^2}$ corresponds to the rotation in the transverse plane. For a photon, this is $E_W = pi^2 c^2 = hf$. Factors pi and pi^3 are related to the longitudinal propagation direction and spin. c' = pi c m is the speed with which an electron revolves around its geodesic line. For the relative speed of electrons in a photon compared to electrons on the surface of a macroscopic object, the orbital period results in: O$p = r/\omega = 2/(pi\ c\ m)r^2$. If the radius of the earth's surface of 6378.626 km and the orbital period of one day is substituted into this formula, then the result is the speed of light c.

$$r = \sqrt{(pi/2\ c\ m\ day)} = 6378626m \quad r^2/day/m\ 2/pi = c \qquad (18)$$

The radius at the equator is 6,378,137 m (GSM 80), with a difference of **489** m.

E. Transfer of the equations to elementary particles

The masses of elementary particles are energies expressed by polynomials. Each summand represents one of the 3 dimensions. Composite particles are sums of two polynomials. Every polynomial of an elementary particle starts with the 3 coefficients for r, xy and z:

$$E = E_{kin} + \mathrm{a}_r(2pi)^d + a_{xy}\,(2pi)^{d-1} + a_z(2pi)^{d-2} \quad (19)$$

For stable particles, the coefficient a_r is 1 for matter or -1 for antimatter. a_{xy} describes the angular momentum with quantum number l. a_z is 1 or -1 and describes m + spin. The energies of all elementary particles are related to that of the electron.

$$E_e = 1 \pm (2pi)^{-1} \pm (2pi)^{-2} \quad (20)$$

F. Calculation of the mass of a proton

The calculation of the proton mass starts with 2 polynomials (19):

$E_{p,1} = (2pi)^4 + (2pi)^3 + (2pi)^2 - E_W$ and the antiparticle $E_{p,2} = -((2pi)^1 + (2pi)^0) - E_W$.

E_W corresponds to the interaction or binding energy with a first estimate

$$E_p = (2pi)^4 + (2pi)^3 + (2pi)^2 - (2pi)^1 - (2pi)^0 - 2E_W = 1838.79090228 - 2E_W$$

G. Calculation of the interactions

E_W depends on the environment of the proton. That is, decimal places should result from inversion of the polynomials $\ldots + (2pi)^r + \ldots$ with reflection on the unit circle (r, phi) -> (1/r, phi).

The unit circle depends on the dimensions d and changes from matter to antimatter in the first step:

Matter	:	i^t	:	antimatter
... + $(2pi)^r$+ ...	:	e^{i2pi}	:	.... $-pi^{-r}$..

With 2 transformations, we obtain:

Matter	:	i^t	:	antimatter	:	i^t	:	matter
... +$(2pi)^r$+ ...	:	e^{i2pi}	:	...$-pi^{-r}$...	:	e^{i2pi}	:	... +$2pi^{(-2r)}$+ ...

From the assumption of $E_W = 1 - 1/pi$ follows $m_p = 1838.79090228 - 2 - 2/pi + 2E_{core} = 1836.15428251 m_e$.

H. Calculation of the interactions in the atomic nucleus:

A proton consists of 3 quarks, which leads to further interactions:

Dimensions: d = 3 $E_{core} = (1/pi^d)^2 = 1/pi^6$

This leads to $m_p = 1836.15428251 - 2 - 2/pi + 2/pi^6 + 2E_{intercore} =$ $1836.15324235 m_e$.

Further factors for the interaction within the proton are added according to the same scheme:

$$E_{intercore} = (1 - 2/pi^2 - 2/pi^4 - 2/pi^6(1 + 1/pi^2(2pi - 1/4)))$$

The last factor $1/pi^2(2pi - 1/4)$ deviates from the rule. It describes the particle that is closest to the overall center of gravity of the atom. $1/4 = (1/2\, Spin\ of\ e)^2$. This is at least a reasonable assumption. This leads to the following:

Mass of the proton $m_p = (2pi)^4 + (2pi)^3 + (2pi)^2 - (2pi)^1 - 1 - 2 - 2/pi - 2/pi^6(1 - 2/pi^2 - 2/pi^4 - 2/pi^6(1 + 1/pi^2(2pi - 1/4)))$

$= (2pi)^4 + (2pi)^3 + (2pi)^2 - (2pi)^1 - 1 - 2 - 2/pi - 2/pi^6 + 4/pi^8 + 4/pi^{10} + 4/pi^{12} + 8/pi^{13} - 1/pi^{14}$

Theory: 1836.15267343 m_e **M**easured: 1836.15267343(11) m_e (21)

Each term $\boldsymbol{n\,pi^r}$ $\boldsymbol{n, r} \in \mathbb{Z}$ of the polynomial is unique, since pi is a transcendental number. **In this respect, the calculation of the proton mass by chance is extremely unlikely.**

The smallest energy fraction with the smallest orbit should be an electron neutrino.

$E_{Neutrino} = \mathrm{E}_{Electron}\, 2/pi^6\, 2pi^6 2/pi^2 1/4 = (2pi - 1)pi^{14}/2 = 1.1510^{-6} eV$ (22)

I. Neutron

The gap in $-2/pi - 2/pi^6 + \ldots$ is a placeholder for further interactions between further protons or neutrons to build up the periodic table.

$m_{neutron} = (2pi)^4 + (2pi)^3 + (2pi)^2 - E_W$

$m_{neutron} = E_W + (2pi)^1 + (2pi)^0$ $1/pi^2 : 1/pi^4$ $E_W = 1/2/pi^2(1 + 1/pi^2)$

$m_{neutron} \approx (2pi)^4 + (2pi)^3 + (2pi)^2 - (2pi)^1 - (2pi)^0 - 1/pi^2 - 1/pi^4 = 1838.68$

Speculation for now:

$m_{neutron}$=$(2pi)^4 + (2pi)^3 + (2pi)^2 - (2pi)^1 - 1 - 1/pi^2 - 1/pi^4 + 2/pi^6(2 + 1/pi^2 - 1/pi^4 - 1/pi^6(1 + 1/pi^2(2pi - 1/4)))$

$$m_{neutron} = (2pi)^4 + (2pi)^3 + (2pi)^2 - (2pi)^1 - 1 - pi^{-2} - pi^{-4} + 4pi^{-6} + 2pi^{-8} - 2pi^{-10} - 2pi^{-12} - 4pi^{-13} + pi^{-14}$$

Theory: ***1838.6836617 m$_e$*** Measured: *1838.68366173(89) m$_e$* (23)

In contrast to the proton, there is an instability at $4pi^{-6}$. The farther this potential break point is from the beginning of the polynomial, the lower the probability of decay. This makes the neutron unstable. The ratio $(2pi^{-6})/1$ should be proportional to the decay rate of a neutron into a proton, an electron and an electron antineutrino. The 3 interactions, i.e., the electromagnetic force, weak force and strong force, result from the 3 dimensions (r, xy, z).

The energy difference between a proton and a neutron essentially corresponds to the energy of two electrons. $E_n - E_p = (-1 - pi^{-2} - pi^{-4}) - (-1 - 2 - 2pi^{-1}) = (2 + 2pi^{-1}) - pi^{-2} - pi^{-4} = 2(1 + pi^{-1}) + E_W$ (24)

J. Muon

The calculation is analogous to that for a proton.

$m_{muon} = (2pi)^3 + E_W$ $m_{muon} = -E_W + (2pi)^2$ $E_W \approx 1 - 1/pi$ $m_{muon} = (2pi)^3 - (2pi)^2 - 2E_W = (2pi)^3 - (2pi)^2 - 2 - 2/pi = 205.93 m_e$

The muon is an unstable particle. The comparison with the calculation of the proton mass is only an estimate. Due to the instability, $E_W \approx 1 - 1/pi^2$ is more likely.

$$m_{muon} = (2pi)^3 - (2pi)^2 - 2E_W^2 = (2pi)^3 - (2pi)^2 - 2 - 2/pi^2 = 206.77 m_e \quad (25)$$

Theory: 206.77 m$_e$ Measured: 206.7682830(46) m$_e$

K. Tauon

A tauon is composed of many particles, as seen from the numerous decay channels. The first particle with the factor $(2pi)^4$is a proton. The tauon should therefore possess the factor $2(2pi)^4$.

First estimate for the mass of a tauon:

$$m_{Tauon} = 2(2pi)^4 = 3117.0m_e$$

Without the factors $(2pi)^3$and $(2pi)^2$, the tauon, like the proton, cannot exist.

$$m_{Tauon} = 2(2pi)^4 + (2pi)^3 + (2pi)^2 = 3404.61m_e$$

Speculation: $2(2pi)^4 + (2pi)^3 + 3(2pi)^2 - (2pi)^1 = 3477.29$ with 2 x 3 particles

$$m_{Tauon} = 2(2pi)^4 + (2pi)^3 + 3(2pi)^2 + E_W$$

$m_{Tauon} = -E_W + 2pi$ Interaction: $E_W = 1/pi^3(1 - 1/pi^2)$

$$m_{Tauon} = 2(2pi)^4 + (2pi)^3 + 3(2pi)^2 - 2pi - 1/pi^3(2 - 2/pi^2) = 3477.235m_e \quad (26)$$

Theory: 3477.23 m_e Measured: 3477.23 m_e

L. Atomic theory

The energies in the TOE depend on the center, i.e., on E_{proton}. All energies have the unit c^2. $c^2$is a ratio between two objects from $E_1 = (2pi)^n i^{t/n}$ and $E_2 = (2pi)^l i^{t/l}$. That is, the parameters e,e_0, m, h, and c are already present in the energies as polynomials. This seems unusual for the traditional calculations with the Bohr atomic model. Only the E_{proton} polynomial is required to calculate the energy levels of the hydrogen atom.

$$E_{proton} = (2pi)^4 + (2pi)^3 + (2pi)^2 - (2pi)^1 - 1 - 2 - 2/pi - 2/pi^6 + 4/pi^8 + 4/pi^{10} + 4/pi^{12} + 8/pi^{13} - 1/pi^{14}$$

$E_e = E_{kin} + 1 \pm 1/(2pi)chR_\infty = 0.00002662568m_e$ is the ionization energy E_R.

$$E_H = E_p + 1 + E_W = E_p + E_e + chE_H$$
$$= (2pi)^4 + (2pi)^3 + (2pi)^2 - (2pi)^1 - 2 - 2pi^{-1} - 2pi^{-6} + 4pi^{-8} + 4pi^{-10} + 4pi^{-12} + 8pi^{-13} - 1/pi^{-14} + E_W$$

The calculation of H in this way is initially limited by the inaccuracy:

Measured: $m_H = (1836{,}15267343(11) + 1 + 0.00002662568)me = 1837.15270006(11)m_e$

Unlike the neutron calculation, the interaction of the electron is in the final part after the $-2pi^{-6}$ gap. If even exponents occur in the form $pi^{(-2n)}$, a polynomial result:

$$0.00002662568 = 2pi^{-10} + 4pi^{-12} + 7pi^{-14} + \ldots (residual\ value\ 1.7 * 10^7)$$

$$E_H = (2pi)^4 + (2pi)^3 + (2pi)^2 - (2pi)^1 - 2 - 2pi^{-1} - 2pi^{-6} + 4pi^{-8} + 6pi^{-10} + 8pi^{-12} + 8pi^{-13} + 6pi^{-14} + \ldots$$

$E_H = 1837.15269989$ is therefore in the range of possible errors.

In the equation for the graviton $hGc^5s^8/m^{10}\sqrt{\left(pi^4 - pi^2 - \frac{1}{pi} - \frac{1}{pi^3}\right)} = 1.00000$, there are groups of even or odd exponents. The interaction $E_W = pi^2c = hf$ in the root $Q/c^2 = \sqrt{(-1 \pm pi \pm pi^2 \pm pi^3)}$ means that the respective mismatched terms become 0 by radiating energy. This can again be found in the formula of E_H with the polynomial $delta(E_H - E_p) + E_{observer} = 1 + 0 * (2 - 2pi^{-1} - 2pi^{-6} + 4pi^{-8}) + 2pi^{-10} + 4pi^{-12} + 7pi^{-14} + \ldots + E_{observer} = 0$ (27)

Emission or absorption involves a system of 3 objects with energies $E_e, E_p,$ and $E_{observer}$. Between $-2pi^{-6}$ and $+4pi^{-8}$, there is thus the possibility of absorption of a photon = electron + antielectron.

(27) can be calculated using classical physics. The impulse is divided into 3 objects. The energy depends on the mass of the detector and ultimately on the mass of the earth. The detector dominates the recoil and thus the energy $E_{observer} = hf$. In the entire system of the electron, proton and observer, revolutions are exchanged while conserving energy and angular momentum.

Thus far, the ground state at time t = 0 has been considered. Each factor $1/pi^n$ also has a time component $1/pi^n(1 + i^{t/n})$. According to the ratios $N_e/w_e = N_p/w_p = N_{obs.}/w_{obs.}$, the total angular momentum is constant. The energy differences result in the energy of the photon with principal quantum number n. $N_e^2 - N_p^2 = N_{observer}^2$ $w_1^2/w_B^2 + w_2^2/w_B^2 = -1$ $w_e^2 + w_p^2 = -w_{observer}^2$ (see 12 above)

$pi^{-6}(1 + i^{(t/-6)/n2} - i^{(t/-6)/n1}) = hf/m_e$ $(1 + 1/n_2^2 - 1/n_1^2)E_H = E_{Erde} + hf$ $(1/n_2^2 - 1/n_1^2)R_\infty = hf$ (28)

The term $i^{(t/-6)(1/n2-1/n1)} \propto f$ is a beat and has to be converted by a trigonomic formula into a real part in the r direction and an orthogonal part in the time direction. The frequency f, which is normally assigned to a photon or electron, is only the frequency between an excited atom and a receiver, as every transmitter needs a ground. The gap between $-2pi^{-6}$and $+4pi^{-8}$ dominates the kinetic energy with n_1/n_2pi^{-7}. The quantum property only arises when 3 objects have a common center of gravity.

For the time being, this example is only intended to show how polynomials enable a second way of calculating the energies in an overall system, atom or molecule.

Ultimately, grouping molecules into a single and unique polynomial should be possible. The fine structure constant should result from a polynomial. h is ultimately a property from the Coriolis force. The orientation of an atom or molecule relative to a larger object such as the earth determines the energy levels.

M. Calculations of the orbits in the solar system

The solar system with center r_{sun} is orbited by smaller objects with radius r_{orbit}. In this respect, the number of particles N in $E = (2pi)^{(N/d)} i^{(t/N)}$can be replaced by the dividers n, l and m and is related to r_{center} and the number of revolutions t = UZ. E can again be represented as a polynomial with at least 6 terms: $E_{(n,l,m,s)} = r_{Zentrum}^2 (2pi)^{nlms} i^{t/(nlms)}$. n, l, m and s are only placeholders for the time being and must be determined more precisely.

Resonances in the solar system should result from rotation and revolution time ratios (period 2^3 = 8). In the inertial system, from the center of gravity, the orbital times are divided between the rotation around the center and the orbital period of the orbit, giving the factor 1/2.

For the time being, the following are speculative:

Orbital period for the lunar orbit: $1/2(8^2 - 8^1 - 1) = 27.5\ days$ *Measured: 27.322 days* (30)

Orbital time for the Venus orbit: $1/2(8^3 - 8^2 + 1) = 224.5$ *224.701 days* (31)

Orbital time for the earth orbit: $1/2(8^3 + 3(8^2 + 8 + 1)) = 365.5$ *365.25 days* (32)

Orbital time for the Mercury orbit relative to the sun's rotation *of 25.38 days*

$days 1/2(8 - 1 - 1/21/8) = 88.03$ 87.969 days (33)

If the times are set relative to the sun's rotation $xy_{sun} i^{4t}$, then there is a complete revolution t for every whole number.

$$E = \underset{Center}{\overset{2}{\mathrm{r}}} (\mathrm{r}_{sat}\, i^{t/n} + xy_{sat}\, i^{t/n-1} + \underset{sat}{\mathrm{z}}\, i^{t/n-2} + r_{sun}\, i^{4t} + \underset{sun}{\mathrm{x}}\, i^{4t-1} + z_{sun}\, i^{4t-2})$$

For Mercury with n = 1, this results in the following equation:

$$E_{(n,l,m,s)} = \mathrm{r}_{Center}^2 (32pi^5 i^t + 16pi^4 i^{t-1} + 8pi^3 i^{t-2} + 4pi^2 i^{4t} + 2pii^{(4t-1)} + i^{(4t-2)}) \quad (34)$$

The radial component $r_{sat}\ 32pi^5 i^t$ mainly corresponds to the potential energy. $xy_{sat}\ 16pi^4 i^{t-l}$ is orthogonal to r_{sat} and mostly corresponds to the kinetic energy. In the

TOE, whether the sun orbits Mercury or Mercury orbits the sun does not matter. This is a question of the observer. $\vec{r}\overrightarrow{yx} \propto t$ directly yields Kepler's 2nd law. $8pi^3 i^t$ corresponds to the ecliptic and is therefore orthogonal to the distance from the sun and can be set to $z_{sat} = 8pi^3$ in the energy formula. However, it requires other relations between the real part and other i^t terms. (35)

$$E_{(n,l,m,s)} = \overset{2}{\underset{Center}{\mathrm{r}}}(32pi^5 1/4(3+i^t) - 16pi^4 1/2(1+i^{t-1}) + 8pi^3 + 4pi^2 1/4(3+i^{4t}) - 2pi1/2(1+i^{(4t-1)}) + 1)$$

From this, we obtain the following for **Mercury:**

Periapsis:

$$r_{Orbit} = 696342\ km\sqrt{(1 + 0 * pi + 4pi^2 + 8pi^3 - 0 * 16pi^4 + 32pi^5)} = 69916199\ km$$

(36)

Measured: $0.4667AU149.610^6 km = 69.8110^6 km$ Relative error = 1.0015

Apoapsis:

$$r_{Orbit} = 696342\ km\sqrt{(1 - 2/2pi + 2pi^2 + 8pi^3 - 16/2pi^4 + 32/2pi^5)} = 46114001\ km$$

37)

Measured: $0.3075AU149.610^6 km = 46.00210^6 km$ Relative error = 1.0024

N. Orbits for the entire solar system

The energies or radii of the orbits are approximately calculated for the entire solar system.

$E_{total} = \mathrm{R}^2_{sun}\, pi^3/2$ (Planet + Apo/Periapsis moon + sun)

$E_{(n,l,m,s)} = \mathrm{R}^2_{Sun}\, pi^3/2\ ((4pi^2 3^n 2^l) + (4pi^2 3^m 2^{s/2}) + (1 + 2pi + 4pi^2))$ (38)

E_{total} is a multiple of pi^3/2 (cf. 11) and is divided into 3 objects. All energies are multiples of 4pi^2. Beginning at the surface of the sun, the quantum properties of the solar system come into play. The definition of the surface results from the coincidence of the body when it rotates. Thus, there is no exact limit for the surface. The energies $E_{(n,l,m,s)}$ can thus be inserted in a single line of a program. Everything else is only necessary for our contemplation of the world. There are 4 loops for the 4 parameters n, l, m and s. n, l and m depend on the parameters r, xy, and z. s describes the large moons. The following table therefore also contains values of ½ or ¼; n, l and m are not directly comparable with the quantum numbers in QM. The inner planets predominantly depend on $4pi^2 3^n 2^l$, and the outer planets predominantly depend on $4pi^2 3^m 2^{s/2}$. Each run requires a unit of time. The first result the runs lead to is the apoapsis and periapsis radii. These are the limit values of two different quantum combinations (n,l,m,s). Kepler's laws are used for graphics, with 2 orthogonal circles for apoapsis and periapsis, i.e., an ellipse with frequencies and sine and cosine functions. Another circle gives the deviation. The advantage of the solar system over atoms or elementary particles is that the orbits can be directly observed.

All calculations of the radii in the solar system cannot be exact. The only exact laws are those of Kepler and Galileo, without pi. The orbits are derived from rational numbers during the formation of the solar system. The fractal nature of the solar system also means coincidence. Pi is the geometric mean in chaos.

$$r_{orbit} = 696342\ km\sqrt{(pi^3/2((4pi^2 3^n 2^l) + (4pi^2 3^m 2^{s/2}) + (1 + 2pi + 4pi^2)))} \qquad (39)$$

Example

Mercury:

n = 1: l = 0: m = 1: s = 0

$$Apoapsis = 696342\sqrt{(pi^3/2(((2pi)^2 3^1 2^0) + ((2pi)^2 3^1 2^{(0/4)}) + (1 + 2pi + (2pi)^2)))}$$

Apoapsis = 46175339

n = 1: l = 2: m = 2: s = 0

$$Periapsis = 696342\sqrt{(pi^3/2(((2pi)^2 3^1 2^2) + ((2pi)^2 3^1 2^{(0/4)}) + (1 + 2pi + (2pi)^2)))}$$

Periapsis = 69304544

The results in Table I only show possible orbits.

TABLE I. Radii of orbits of planetary systems obtained with the formula

$$r_{orbit} = 696342\ km\sqrt{(pi^3/2((4pi^2 3^n 2^l) + (4pi^2 3^m 2^{s/2}) + (1 + 2pi + 4pi^2)))} \qquad (39)$$

				Quantum numbers	n	l	m	s
Sun		R = 696342.0						
Orbital P	= 25.38		Measured: 25.38	RE: 0.000				
Rotational P = 25.4			Measured: 25.38	RE: 0.000				

Mercury	R = 2448.57	Measured: 2439.7	RE: 0.004				
Orbital P = 88.7		Measured: 87.969	RE: 0.008				
Rotation P = 59.0		Measured: 58.65	RE: 0.007				
Apoapsis = 46.2		Measured: 46.0	RE: 0.00	1	0	1	0
Periapsis = 69.3		Measured: 69.8	RE: -0.01	1	2	1	0
Inclination 7.14 °		Eccentricity 0.2003					
Venus	R = 6123.80	Measured: 6051.8	RE: 0.012				
Orbital P = 226		Measured: 224.701	RE: 0.007				
Rotation P = 245		Measured: 243.6	RE: 0.008				
Apoapsis = 106.5		Measured: 107.4	RE: - 0.01	2	2	0	0
Periapsis = 110.9		Measured: 108.9	RE: 0.02	2	2	1	1
Earth	R = 6954	Measured: 6378	RE: 0.090				
Orbital P = 368		Measured: 365.25	RE: 0.010				
Rotation P = 1.0		Measured: 1	RE: 0.000				
Apoapsis = 148.4		Measured: 147.1	RE: 0.01	2	3	0	0
Periapsis = 151.6		Measured: 152.1	RE: 0.00	2	3	1	1
Moon	R = 1900	Measured: 1737.4	RE: 0.094				
Orbital P = 27.38		Measured: 27.322	RE: 0.002				
Rotation P = 27.38		Measured: 27.322	RE: 0.002				
Apoapsis	0.3697	Measured: 0.363	RE: 0.02	2	3	0	0
Periapsis	0.416	Measured: 0.406	RE: 0.03	2	3	1	1
Mars	R = 2356	Measured: 3396.2	RE: -0.306				
Orbital P = 712.9		Measured: 686.98	RE: 0.038				
Apoapsis = 208.3		Measured: 206.6	RE: 0.01	2	4	0	0
Periapsis = 243.1		Measured: 249.2	RE: -0.02	2	4	3	2
Phobos	R = 8.15	Measured: 11.2	RE: -0.272				
Apoapsis	0.00691	Measured: 0.00938	RE: -0.26	2	4	0	1/2
Periapsis	0.00691	Measured: 0.00938	RE: -0.26	2	4	1	0
Deimos	R = 4.08	Measured: 6.1	RE: -0.332				

Apoapsis	0.01738	Measured: 0.02345	RE: -0.26	2	4	1	1/2
Periapsis	0.01738	Measured: 0.02345	RE: -0.26	2	4	2	0
Asteroids							
Apoapsis = 293.5		Measured: 299.2	RE: - 0.02	2	5	0	0
Periapsis = 510.4		Measured: 508.6	RE: 0.00	3	5	2	1
Jupiter	R = 71617	Measured: 71492	RE: 0.002				
Orbital P = 4510		Measured: 4332.75	RE: 0.041				
Apoapsis = 739.7		Measured: 740.5	RE: 0.00	3	6	4	1
Periapsis = 810.8		Measured: 816.7	RE: -0.01	3	6	5	2
Satellite Jo							
Apoapsis	0.37512	Measured: 0.42160	RE: -0.11	3	6	4	1/2
Satellite Europa							
Apoapsis	0.6192	Measured: 0.67090	RE: -0.08	3	6	4	2/4
Satellite Ganymede							
Apoapsis	0.97469	Measured: 1.07000	RE: -0.09	3	6	4	3/4
Satellite Callisto							
Apoapsis	1.68404	Measured: 1.88300	RE: -0.11	3	6	4	4/4
Saturn	R = 59505	Measured: 60268	RE: -0.013				
Orbital P = 11659		Measured: 10759.1	RE: 0.084				
Apoapsis = 1394.2		Measured: 1352.5	RE: 0.03	3	7	7	1
Periapsis = 1524.5		Measured: 1514.6	RE: 0.01	3	7	7	2
Uranus	R = 25187	Measured: 25559	RE: -0.015				
Orbital P = 31668		Measured: 30685	RE: 0.032				
Apoapsis = 2659.3		Measured: 2741.3	RE: - 0.03	4	8	7	1
Periapsis = 2984.6		Measured: 3003.7	RE: -0.01	4	8	8	1
Neptune	R = 22354	Measured: 24341	RE: -0.082				
Orbital P = 60927		Measured: 60189	RE: 0.012				
Apoapsis = 4402.3		Measured: 4444.5	RE: - 0.01	5	8	7	1
Periapsis = 4517.6		Measured: 4545.6	RE: -0.01	5	8	8	0

Pluto	R = 3054	Measured: 1188	RE: 1.571				
Orbital P = 110383		Measured: 90559.7	RE: 0.219				
Apoapsis = 4402.3		Measured: 4436.8	RE: - 0.01	5	8	7	1
Periapsis = 7485.6		Measured: 7375.9	RE: 0.01	6	8	7	0

The specified planetary radii are not corrected by moons. The frequencies are shown together. The values are extracted from the radii and therefore do not have to exactly conform to Newton's laws.

III. OUTLOOK

$hGc^5\sqrt{(pi^4 - pi^2 - 1/pi\text{–} 1/pi^3)} = 1.00000$ shows the connection between micro- and macrocosms. We are in the middle of the c^5 potencies. On the left is the quantum of action. G is the opposite of this. Nothing more can be learned. Ultimately, only 3 angular momenta of the spatial coordinates r, xy, and z are required for physics. Some is still speculative. However, the previous considerations should be reasonable enough to continue to pursue the connection with the QFT of ART and to further expand the theory. If these considerations about the TOE are correct, then this would have a significant impact on our ideas about the cosmos.

IV. SUMMARY

The relationship between the units is $hGc^5\sqrt{(pi^4 - pi^2 - 1/pi\text{–} 1/pi^3)} = 1.00000$ and $r = \sqrt{(\frac{pi}{2} c\ Day\ m)} = 6378626\ m.$ h, G and c form a unit. The TOE includes QM, QFT and GR. The basis of all theories is classical physics. The TOE takes the direct route using the simplest assumptions with the energy $E = 2^r i^t$and rational numbers. QM, QFT and GR are committee methods using the Euler–Lagrange formula. Vacuum is considered to be an essential part of the universe, filled with virtual particles. This can be represented as the equation

$$All = TOE + Vacuum = TOE + QFT + ART$$

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Dr. Helmut Schmidt

Ludwig-Maximilians-Universität München

Faculty of Physics

80539 Munich

Germany

Helmut.Schmidt@campus.lmu.de

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