Gravity
The Merger of Quantum- & Classical-Physics

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Abstract
In this 3rd paper of a triptych in quantum theory, a mathematical description ab initio of gravitational field theory is presented. In this description, quantum physics and classical general relativity (GR) are merged seamlessly – instead of deviations from general relativity, the treatment results in identical (photon and massive Higgs boson coupled energy) trajectory curvatures in gravitational fields, however with 3 deviating conclusions regarding (naked) *singularities*, spacetime-*curvature* and *graviton* i.e. deviating as predicted by the Einstein tensor metrics of GR.
This is illustrated by the dimensionless point 'source' of the Standard's Model gravity source as a starting point i.e. *without* any description of the actual gravity source; ironically, apparent singularities (K.Schwarzschild, J.Droste) vanish by a proper definition of a source of gravitation.
The basic principle in the field description of gravitation - the potential treatment – is developed here in the complex Hilbert space. The gravity field then is identified by the *causal* relation between two vector-fields and emerges as *scalar* field, evolving pre-determined in space from the moment of mass creation.
Instead of manifold diffeomorphisms and Lorentz transformation, the presented field theory is based upon vector- derivatives in the potential treatment of the scalar field couplings to the graviton from Planck scale upwards; operators in the description are Integral Domain Transformation (IDT) invariant and Abelian. In case natural domain functions are time dependent (spacetime) e.g. g(r, t), the transformation may be complex to account for phase differences i.e. the spacetime functions become algebraic after transformation and may serve to create further understanding i.e. in yielding *densities* of a property of the inverse variable: pure time functions yield → 1/t densities (amplitudes) in the frequency domain, and space functions r → 1/r density of mass in the curvature domain, whereas 1/r may as well is regarded a function value i.e. of decay.
The back-transformation to recover the function is to be unambiguous, hence is Abelian.
Next steps include a -classical- mathematical approach i.e. *gravitational field theory* in which spacetime curvature eventually emerges as *geodesic-trajectory* curvature by energy objects in the field of a gravitation source.
In the field, the trajectories of objects are being determined *only* by the principle of least action (LaGrange, Feynman): a *geodesic* is followed solely through compensation of accelerations (i.e. the 'actions' present in compensation) and revealed by mathematical consistent spacetime *separation* of in principal physically *different* properties represented by identical variables in separated natural and frequency/curvature density domains.
Due to symmetry breaking, the graviton is argued to be a *massive* Higg's-type scalar gauge *boson* with ubiquitous presence since the creation of quantum and clustered mass in the universe: the influence of a settled gravity field on mass (in) entering this field (e.g. by created mass) therefore is

an instantaneous ‘action at distance’, i.e. in contrast with e.g. the SM vector-boson description as required in EM fields.
Gravity field time derivatives i.e. the amplitudes of gravitation waves, settle with max. c m/s in *truly empty* space (ref. §4.1) and instantaneously cause the pre-determined interaction with the bosons, manifesting the fundamental gravity force.
Gravity waves, as well occurring in mergers/transitions of mass, are defined by changes in time of the gravity field dM/dt (at max. c m/s) in space and only become observable when substantial mass/energy is involved due to the weakness and spatial decay of gravity fields.
The mathematics (e.g. IDT’s, complex vector space and required operators) in the paper are maintained in the Abelian group for validity at the Planck scale.
Results thus constitute the description of gravity on all scales.

1. Introduction

Consistent descriptions connecting the results of Einstein’s tensor treatment of gravity in general relativity with quantum physics have not surfaced despite major efforts in e.g. string theory, brane theory, manifold descriptions, holographic scenario’s, entropic force proposals as well as attempts in mathematical non-Abelian mathematics and more.
The classical approach in strong gravity fields i.e. massive objects e.g. black holes, is to describe trajectories on surfaces by Killing -vectors (Wilhelm Killing, Germany) and vector fields as tensor metrics on a manifold. This approach e.g. uses Lie algebras and matrix mechanics which both pose substantial restrictions in the use of these mathematics when this description is to remain valid in the quantum realm. Furthermore, the use of Killing vectors for descriptions of e.g. scalar fields is not found to required, even when the fields originate from vector fields.
The derivation by both K. Schwarzschild and J. Droste (1916) [21] of the field of gravitation and particle motion, is a most ingenious as well as elaborate, however cumbersome trajectory (in the meaning of difficult to handle or to take into different domain for near- and far-field description) to exact solutions of the Einstein tensor analysis, and seems directed to planetary motions and its corrections. It e.g. is including non-Abelian matrix mechanics and non-symmetrical (far-)field approximations and as well yields singularities where they are unlikely to exist e.g. introduced by multiple substitutions of variables in the mathematics of the field descriptions (§4.2, §5). This points at variable validity violation (vvv), e.g. as J.Droste [21] phrased it: “*this* <variable> *r is not the same as occurs in (4)*”, however only took note of it.
In classical physics the result is considered exact, however from quantum mechanical (QM) perspective, the Planck scale behaviour (near zero, curvature, singularities) and the non-Abelian mathematics (even only partially), do not acquire full validity on this scale; and when with non-commutative operators in descriptions, a different approach is required.
This prompted to re-explore the basic scalar potential theory approach when taken into the Hilbert complex vector space and Green’s function based system-model as a starting point.
A quantum mechanical description of gravity then is proposed as a *causal relation* in the natural and integral transformed *domains* by the curvature as frequency-intensity parameter i.e. the integral transformed (k, r) domain (IDT). In this domain mathematically exact result functions in quantum system causality descriptions can be derived instead of statistical probability functions, e.g. as

outlined and illustrated in [17, 20]. Therefore, all natural domain mathematical (r, t) descriptions resulting in expectation values in a statistical, or non-Abelian group treatment are *not* suitable for exact results in QM.

Mass, causing curvature by gravitation thus is modelled by the curvature *k*(r) i.e. density (of occurrence of trajectory curvature) at location r i.e. in the (*k,* r) domain. The circle frequency κ = 2π.*k*(r) with *k*(r) = 1/r.
In contrast with treatment in the natural (r, t) domain with expectation values, due to addressing individual quanta mathematically and in experimental reality (physical) collapses by observations/measurements, the descriptions in the transformed frequency domain do not violate uncertainty relations in quantum properties and retain full validity in the space domain.
In the treatment on quantum scale, stringent conditions apply in the mathematical structure at the current local energy level: the theory is formally restricted to Abelian groups (Nils Henrik Abel, 1802-1829, Norway; Mathematician) e.g. algebras, operators, vector + scalar -spaces and -fields, requiring operator commutativity*,* a fundamental condition without exception. Where a classical approach top-down is used for a mathematical description in the quantum realm, the mathematics therefore must be *validated* for compliance.
Mass is considered a property of a quantum or classical object in the same *sense* as e.g. electrical charge. On quantum scale, creation of mass is on a much higher energy level and is caused by symmetry breaking [22, 23], resulting in status quo states at lower energy level. Generation of mass is manifest by a Higgs' (-type) boson coupling to other elementary particles e.g. quarks, resulting in mass of elementary quanta i.e. the principal source of a gravitation field distributing in space. This field as function of location settles instantly in space at max. c m/s.
Matter then is the result of concentrations of elementary particles of energy as result of coupling and forming elementary quanta with mass, accounting for mass density and dimension at quantum scale. The creation has taken place at much higher average energy levels than in the universe currently, this level had to be achieved in experiments (LHC) with proton experiments being carried out to find the Higgs' particle. The found 125GeV is established as the value to acquire mass of the proton, consisting of three quarks; less massive fundamental particles may require less energy, i.e. more Higgs'-type particles may exist.
The creation of mass on quantum level in the model then is taken as a system source that interacts (couples) via a Higgs' mechanism-function as cause, resulting in a massive elementary particle. The mass generating effect for elementary particles resulted instantly in gravity potentials around them and depending on local conditions, chemical elements and matter could be created at suitable energy levels. The foundation of the quantum gravity field then is identified in two *vector-fields*, and from these fields, in pairs of vectors for any location in space, a gravity source description with pre-determined field strength by inner vector (i.e. scalar) -product is derived.

Gravitation thus is considered to evolve in space in a *causal system-theoretical description* i.e. then constitutes *the description of gravity effects in space* starting from quantum sources.

Then, the classical results of the Einstein GR based solutions of the Schwarzschild radius are

compared with the in §4.4 derived curvature density *k*(r) results; singularities are upscaled, in general avoiding algebraic associations with variables addressing individual quanta i.e. quanta in curved space or on manifolds directly or by IDT into the *k*(r) density domain.
In [20] is argued that *individual* quantum behaviour remains hidden from observation or measurement and this includes for example degrees of freedom or internal energy of quanta. Side-effects and other indirect information of experiments can be gathered to reveal quantum behaviour, e.g. propagation of quanta in materials [20], and LHC high energy experiments.
Finally, this treatment of gravity does not provide support i.e. rejects the hypothesis of the occurrence of *(naked) singularities* in large enough massive objects, nor in the abstract point-source of mass (§4.3) with a field of gravitation around it; the generic results are as well independent of (properly defined) coordinate systems.

2. The Higgs' (-type) boson

The Higgs' boson has been predicted since 1961 by Higgs [22], Brout and Englert [23]; as a free detectable particle it has an extreme short time to live at current energy level. Experiments with the LHC in 2012 revealed the existence of particle (energy app. 125 GeV) and the achievement is being regarded a formidable breakthrough.
The Higgs' field is considered to have a permanent ubiquitous invisible presence in nature, however this starting point does not identify a cause (source) for the field. A source should be right at the basis of a spatial field distribution and 'no-source' is postulated not being in line with the fundamental causal evolvement of (events in) nature. The obvious source is the 'big bang' (BB) in which the distribution of energy and consequently of mass quantum particles likely was far from being truly uniform. Mass can be regarded as an energy state of e.g. concentrations Higgs' coupled elementary particles leading to e.g. protons at the energy level to form nuclei and to other Higgs' type particles in less massive quantum elementary particles, the basis for different types of matter. Where concentrations and energy levels were high and favourable enough, currently visible matter has been created, estimated around 5% of total mass in the universe.
Assuming that 100% of quantum mass has been created during the 'big bang', then 95% would have to be around still in quanta surviving in the lower energy states, at creation less concentrated and without favourable conditions to start forming elements, and *not ever aggregating any more* at current energy level and scale in 'empty' space: a candidate for 'dark energy/matter' perhaps.
The assumption is that on quantum level, once a boson couples to form standard model elementary particles with mass, by *all* the generated mass entities/particles instantly gravity fields were created, and matter and gas clusters could be formed with elementary particles at locations where concentration and energy levels were favourable.
The gravity field generated from the Higgs' field(s) filled space at max. c m/s, i.e. each coupled Higgs' boson is a source of mass generation by interaction, and the therewith created gravity field distributes instantly in space. The total energy of the massive particle is contained in the field and mass of the particle, the field decaying with distance, and the total energy is limited to the Higgs' energy or less when other less massive elementary particles are created.
Its maximum field value is assumed to be located in the centre in free space directly at the surface of the Higgs' coupled (dimensional) particle, and decays losing density by expansion on a spatial

spherical surface.
As the Higgs' mechanism interacts with elementary particles acquiring mass, which particles make up elementary SM particles, *quantum gravity sources* therefore consist of discrete quantum masses i.e. mass as property in matter is quantized. This applies to the total particle energy value of mass and field. The field strength represents the potential energy as function of the dimension r in space i.e. by dimension is not quantized.
The potential field on quantum level reacts identical as argued (see §4, massive black hole M), by storage of the energy of an external particle m_1 entering and moving in the field with a velocity component in the direction of the source m_0, meaning that energy is given to the particle and vice versa. There are 3 options, 1.) the particle escapes by taking a trajectory escaping the source, returning the taken field energy of the conservative field, or 2.) interacts, meaning that all of it's own energy + the energy taken from the field are coupled to form a massive particle, illustrating *energy exchange* i.e. the interaction of the potential field and mass on quantum level.
The 3rd option of orbiting by gravity is rejected due to the weak quantum gravity fields and extreme curvature value required at the Planck scale, and a much stronger force is required to allow orbits at this scale, i.e. obviously the electromagnetic force between protons and electrons.

The foregoing fundamentally means that the gravity mechanism is valid at *extremely different* scales: the potential field (temporarily) loses energy and gains the same amount later-on by particles or massive objects, when *not* aggregating at quantum level or merging with e.g. a black hole.
An established interpretation in quantum physics is that the particles are a manifestation of excitations of a (Higgs') field in the structure of/with other particle fields, and a more classical view is that the Higgs' particle interacts with other standard model particles to provide mass in building blocks of matter, while in this paper the cause is boson coupling *status quo* as the source, and the effect c.q. result is mass + gravity field i.e. a fundamental causality relation in a system-theoretical description is proposed.
This system theoretical approach contrasts with the unitarity of the Schrödinger wave-function of Hamiltonian evolution of quantum states, as it *transfers* the evolution to *cause* and *effect* mathematical (r, t) relations on quantum level in(to) the integral *transformed inverse domain* leading to *exact functions* instead of probability relations: the basic reason to explore and use *alternative mathematics* in quantum physics e.g. as in gravity presented here. The approach increases the distance to - and minimizes anomalies created by – inevitable interpretations.
In the 2nd paper [20] of the triptych, information on quantum level is considered 'ordered' energy (that may become fully dis-ordered e.g. in a black hole), and is argued that 'information' only can be *contained/preserved* in some form of memory i.e. atoms, molecules, DNA, (human) brain, books, computer chips etc. , e.g. taking the sting out of the *information paradox* in black holes. Whichever interpretation is the right one, in this *system model* of quantum *causal* relations, is not an issue [20], as in the invisible reality of quanta, the energy and transitions of individual quantum particles cannot be observed (quanta remain 'invisables' with regard to their original state) i.e. the description of the phenomena is hypothetical and based on thought experiments and assumptions, abstracted in the mathematics, and is to be *verified* by experimental observations.
Quantum behaviour thus is described in a systems-theoretical way [11, 13, 14] by a source and a

result function in a causality description which identifies this relation only by cause- and effect-functions (system input-output relations).
This paper thus fundamentally considers Higgs'-type bosons as the causal quantum of mass, and assumes spatial dimensions at the Planck scale i.e. in the standard model SM. The Higgs' type boson coupling creates mass and field, manifest in a natural domain. A transform of the mathematical description into the transformed domain [11, 12], yields quanta based energy particle (analogue) distribution functions in the frequency (*k*, r) domain, valid in space as in classical physics. Then results finally link with the results of Einstein's tensor-analysis of gravity.
First, attention is being payed to the standard model.

3. The Standard Model & Dimensions

Mass of fundamental particles of the standard model (SM) e.g. an electron or a neutron, is accepted as a property, without a definition in space apart from location.
Standard model particles are usually considered as entities without dimension, which - as in this paper is assumed - is a drawback of the model occasionally.
Therefore as a starting point of the description, elementary particles are not regarded dimensionless and are considered in reality to '*take up some amount of space*', i.e. in a 3 dimensional 3D description. A second reason for 3D is that gravity does not give rise to very dynamic events at quantum level requiring a mandatory 'spacetime' fundamental description of the nature of gravity. At current energy level quantum gravity dynamics are low, however in (very large scale) galaxy centres of extremely large black holes and mergers of large massive objects, this requirement changes. However, the vectors in definition of the source of the gravity field may be complex, therefore e.g. *phase*-differences of the field relative to a source when required may be accounted for, e.g. with local time as *parameter* (when not yet defined and implemented as a true dimension).
Three dimensions in order to expand, or rather shrink, i.e. *define* dimensions in the quantum realm are in this paper fundamental to be described mathematically in emergent gravitational fields from QM-perspective.
As a consequence, the property 'mass' is to be described in terms of mass-density i.e. specific mass property with a *volume, surface or line-curve* in a dimensional description.
For quantum particles in the standard model in 3D-space, the description of mass m is substituted with a product of *specific-mass* m_s (kg/m^3) mass density and its dimensional volume V (m^3), i.e. m = m_s.V (kg) as treated in §4.
This at first sight does not seem to have substantial impact in the SM or in classical physics where a massive object is characterized with mass M, however has the effect of fundamentally changing the perspective in physics as *dimensions* may be embedded on *all scales* of the description i.e. infinitesimal close to zero.

4. Field Description

An electromagnetic description requires 2 fields in a vector environment of E and H i.e. both with attracting and repelling components *and* both have direction and magnitude and as well include potential E-field theory (showing the brilliance of J.C. Maxwell). This is mandatory in EM fields as energy transport and transformation is required anywhere in space to be described (i.e. RH system

with Poynting vector in classical EM theory and by a *vector gauge boson* in the SM).
A description of gravity in a unified field theory (UFT) therefore fails in case the field of gravity is e.g. a scalar field: it does not (need to) transport energy to be converted at large distance from a source, only conserves and returns energy and with 1 component of mass is attractive only.
Gravitons as *carrier* of a gravity force in analogy with photons of the electro-magnetic force, thus never have been found.
A deviating hypothesis for the influence of gravity in space is postulated by identification two basic *fields* in a complex vectorspace with a resulting field manifest with *scalar* (complex) fieldstrength values of the potential conservative field, illustrated by a non-rotating, non-charged black hole.
By introduction of mass density in the dimensional description in §3 - to explore very small or even quantum black holes - mass density would have to be extreme i.e. beyond limits of required energy of creation to be supported and is therefore rejected: from eq. (4.4) and eq. (5.1) follows $m_{DS} = 3.c^4 / (16\pi.G.a_S.r_S^3)$, with a_S = acceleration at Schwarzschild radius r_S (order of magnitude $r_S \sim 10^{-35}$ m), m_{DS} specific mass of the quantum, c (m/s) vacuum speed of light. The obvious conclusion is that black holes only exist at *astrophysics scale* i.e. planets, (black and white) stars and galaxies.

The black hole (star) then is a massive object not 'radiating' other energy than its established field of gravitation (except Hawking radiation; which is not considered to influence a semi-static model and is neglected in this paper), and has restricted energy transport capabilities. In a description of transporting force-fields, a carrier vector boson is required as the transported energy may be used in *transformation* of energy far away from the source e.g. for recovery of information i.e. ordered energy, or in strong fields, e.g. lightning strikes. The black hole has a gravity field attracting mass in space and therefore is not truly black with respect to mass and gravity, meaning that an energy exchange i.e. temporary energy transport exists between the massive hole and mass particle.
Obviously this cannot be of em-nature radiated from the hole, and with the gravity field attractive for all types of energy, the energy is contained as well in the gravity field outside the massive object core as a direct function of its mass M.
This field therefore is capable of restricted exchange of energy with particles having mass or energy (equivalence relation), leaving a particle in the field with only 3 options: it can escape the source M, is attracted with motion towards the hole in the entire trajectory and collides with M, or the particle can orbit a massive black object.
In case it escapes, as soon as distance to the hole increases, it *returns* the field energy it gained in reducing distance and when captured, all of its energy including the gain from the field is delivered to the hole i.e. the field energy is returned and by increase of captured mass in the core, also the total energy (and horizon) of the hole increases.
For photons in the field of a massive object, with constant v = c (m/s), this means a change of wavelength in mass equivalent energy $h.\nu$ i.e. UV-shift in approaching M and red-shift when distance to M increases; for an observer of an image of the 'lensing' effect, the shifts are not observed as energy is exactly returned.
In case of a black hole the temporary lost energy cannot be compensated by em-radiation.
The conclusion therefore is that the energy temporary must be delivered by motional changes, the momentum or by rotation; the hole experiences a tiny force by acceleration of the field of m in the

direction of m, which is more obvious to an observer when m is in the order of magnitude of M: the field is able to re-actively exchange energy i.e. the conservative potential field.

4.1 Acceleration and Force

The vectorfield of acceleration usually is considered to be the cause of 'action at a distance' by gravity; geo-metrically the fieldstrength values at a location r derived on quantum scale in the qm-perspective are *pre-determined* in an acceleration field, i.e. locally the fieldstrength is determined in space and the field values are the manifestations of the established field where local mass is present, thereby mediating the gravity force F_G experienced by mass at the particular location.
However, the acceleration vectorfield however is not considered in §4.2 to be the source field of gravity.
The force of gravity is not '*carried*' but is truly '*mediated'* instantly on a local mass property in a gravitation field of M in space i.e. the boson-coupling in *local mass* m with the local fieldstrength fundamentally results in the *local* gravity force F_G on mass, and is manifest as force directly when the fields of M and m are established in space, which is assumed for both m and M (by aggregation) to be distributed directly after mass creation at quantum level.
The graviton as quantum of gravity then constitutes a *mediating boson type.*
Particles have different masses and may require different coupling energy, therefore it cannot be excluded that several types of Higgs' bosons exist, and if so, all *with* mass.
Higgs' boson: E = h.ν =125 GeV, equivalent mass 125GeV/c^2; the energy value is relatively high as it provides the energy to create mass of elementary particles e.g. of quark-composite protons in the LHC experiments.
As the gravity field cannot act as fundamental source of *energy*, the *energy* only in restricted way can be transported and transformed by the field (although astronomy reports have been made interpreting energy transport by gravity fields by assumed loss of energy in interactions of heavy objects); comment author: (free, independent) transport may be a wrong description; conserved potential field energy in strong gravity fields converting into kinetic energy of motion resulting in mergers of sources may be a consistent explanation; gained energy in escaping from the field is temporary and is returned. The field is conservative i.e. gravity 'consists of' mass *and* field to exchange energy and the trajectory closed integral in the end equals zero: $\int_C F. dS = 0$.
The property to exchange re-actively and locally internal energy of the potential field is of major importance in (quantum) physics, for example also in local temporal energy exchange with photons enabling propagation in materials [20].
In case space is not empty e.g. contains other gravity (boson) sources, the changing energies of moving (quantum) energy particles in the gavity fields are re-distributed between the potential fields in a local 'give and take' scenario. This requires time, resulting in delays and tends to *slow down* the propagation (speed) of gravity waves in non-empty space which e.g. may be observed (on galactic scale) by the influence on the expansion of the universe, especially in high density, mass creating early stages of the BB.
The gravity force F_G thus is a fundamental force manifest by a potential fieldstrength of acceleration magnitudes of a quantum gravity source, and is the one (and only) force with the most significant visible impact in the universe, and unlike other fundamental force-vectorfields, the quantum boson

is a *mediating scalar boson*, i.e. F_G is not being ‘carried’ by a vector boson.
The gravity potential field thus acts as an acceleration *scalar*field, and this in principal is because matter consists of two inseparable components of energy: mass and field.

The cause (coupling of Higgs' boson presence in SM elementary particles and matter) of the potential field is a reality description, as gravity then clearly is emergent from concentrations of standard model elementary particles coupled to Higgs' type bosons, as well is consistent with a gravity forces’ full causality description *by geo-metrics only*, at all quantum short and classical long range distances i.e. in a gravity field *instantly* resulting in a force on local matter/mass (possibly with phase differences i.e. at astronomic distances) to the source, modeled by *complex* field values), thereby providing as well the link with the classical Einstein tensor-analysis results as well as the conclusion of a *massive* graviton.

4.2 Gravitational Potential

A potential at a certain location in space may be used to exchange energy in case the field of potentials has a rate of change in space. The affected energy is related to the property of the field i.e. electrical, gravitational.
A mathematically proper description of a potential field is explored from potential-theory and taken into a *vectorspace* description starting with a *point source;* a further step is illustrated by the introduction of dimensional mass of certain volume and density as realistic source.
For an energy description on quantum level, our interest is thus in the decaying rate of the potential field as a function of vector $\underline{r}$, having magnitude and direction i.e. the *vector*field partial derivatives in space of a quantum mass source.
The gravitational *potential* Φ of a differentiable scalarfield function of a symmetrical 3D entity with mass M is given by potential theory:

$$\Phi(r) = G.M / r \qquad 4.1$$

The description is in magnitudes without sign; directions become clear in the vector field description. To observe the change of the potential vectorfield in a direction in space, ∇ i.e. the Nabla operator represents the partial differentials in vectorspace:
$\nabla = (\delta/\delta x)\underline{i} + (\delta/\delta y)\underline{j} + (\delta/\delta z)\underline{k}$,
resulting in the corresponding vectorfield $\nabla.\Phi(r)$ [19], i.e. acceleration field $\underline{a_G}(r)$

$$\underline{a}_G(r) = \underline{\nabla}.\Phi(r) = \underline{\nabla}. (G.M/r) = G.M\, \underline{r} / r^3 \qquad 4.2a$$

in vectorspace rewritten as

$$\underline{a}_G(r) = G.M. (\underline{r} / r).(1 / r^2), \text{ for all } \mathbf{r > 0} \qquad 4.2b$$

With $\underline{\nabla}$ the Nabla operator, $\underline{r}$ the position vector, $\underline{r}$ / r unity vector, Φ(r) = G.M/r, G the gravitational constant, M the (point-)source of the potential field.

Nothing new under the sun, however (4.2a,b) are started in the vector-space and the derivation is to be formally completed in the vector-space, basically by respecting the cause and effect relations: source is M with settled field providing acceleration values, resulting in the acceleration vector field leading to the force on m in direction of the origin of $\underline{r}$ i.e. in the source.
The result is a *vector inner product.*
Equations (4.2) identify the *gradient* of the *vector field,* which physically is the change rate of potential Φ in the direction of vectors $\underline{r}$. The force $\underline{F}_G$ exerted by the field on a testmass m then is m.G.M. $\underline{r}/r^3 = m.\underline{a}_G(r)$. The description is finalized in the vector space by facilitating the acceleration $\underline{a}_G$ (r) vectors as mediator of the gravity force experienced at r in the opposite direction of unit vector $\underline{r}/r$, by means of the dot (inner) vector product $(1/r^2)\, \underline{r}/r \,\boldsymbol{.}\, \underline{a}_G(r)$. This results in the *scalar field* values.
Just for the record: a cross product (yielding a vector field) 1.) is not commutative i.e. not suitable for acquiring validity at quantum-scale, 2.) would require a *non-existing* second component in gravity, e.g. curl for $\delta M(r)/\delta t = \nabla X$, i.e. X as 2nd component and 3.) yields the zero vector.
The dimensional interpretation of (4.2) is that $(1 / r^2)$ physically relates to a spatial spherical expanding surface reducing the gravitational field density, which accounts for the field decay, and $\underline{r} / r = \underline{r} / |r|$ as unit vector determines direction of $\underline{a}_G(r)$ i.e. in the opposite direction of $\underline{r}$.
In the end - perhaps surprisingly - by formally continuing and finalizing the mathematics in vector space, the result is a scalar field derived from 2 vectorfields, in contrast with an often assumed vector acceleration- or force- field.
Before moving on with the derivation, it is worth noting that equation (4.2), taken into *vectorspace*, in principle has similarity with the *original* summation description of gravity of Newton [27, 28], at the time (and later on) being considered not to be solvable under generic conditions and mass distributions; the validity of the equation is for $r > 0$, and the equation is *exact* (!) under fully symmetrical conditions.
The value of the field as function of r is thus being provided by each *pair* of vectors of the two vectorfields in making up the inner product of $\nabla\Phi(r)$ and $\underline{r}/ r$, then yielding a *scalarfield of fieldstrength* $\underline{a} \,.\, (\underline{r} / r) = a \cos \pi = - a$, i.e. acceleration values in opposite direction of $\underline{r}$:

$$\nabla\Phi(r) = - \underline{a}_G(r) , \qquad 4.3$$

$G.M. (\underline{r} / r).(1 / r^2) = (G.M/r^2).(\underline{r} / r)$, i.e. with unity vector $|\underline{r} / r| = 1$, the field magnitude value $a_G(r)$ is

$$a_G(r) = G.M/ r^2 \qquad 4.4$$

Three conclusions can be drawn from equation (4.4):
1.) Instead of a direct force, the acceleration field magnitude values $a_G(r)$ act as mediator of the force F_G i.e. a deterministic scalar field of acceleration values expanding in space directly after

creation of mass on quantum level. This scalar field is the result of two vectorfields, for each spatial location delivering one pair of vectors $\nabla\Phi(r)$ and unit vector $\underline{r}$ /r , in the commutative vector inner product i.e. by the *commutative* property of this product, eq. (4.4) fully *acquires validity* in the descriptions at quantum Planck scale and therewith is mathematically consistent *at all scales*.

As argued, the temporary energy exchange i.e. both the interaction (M→m) of (external) mass m in the potential field of gravity of M and vice versa (m →M) relate to motion -changes of mass e.g. acceleration by ‘give and take‘ (or ‘take and give’, depending which side you’re on) energy exchange with the potential field, which can be accomplished by *local bosons* interacting with the field i.e. the action of acceleration value resulting in force on quantum scale is immediate.
The gravity field then emerges in space as a scalarfield of acceleration fieldstrength values $G.M/ r^2$, and therefore the force F_G is a direct effect of cq. caused by coupled scalar bosons interacting with the field - the only scalar boson found to date (2023) is the Higgs' boson, and its quantum is thus postulated to be a *scalar gauge Higgs' -type boson*.
The field has the property of expanding in space directly at creation of the source, i.e. the acceleration values of the field emerge and are manifest as the *magnitudes* of the vectorfield i.e. $|\underline{a}(r)|$ and therefore the conclusion arrived at is: the quantum boson of the gravity scalar field is a *mediating Higgs'(-type) scalar gauge boson, spin 0* ,
(deviating from the classical prediction of spin 2, result of the stress tensor).
The gauge is a function of r and any measurement of the value (or force on mass at this position) in space yields *the pre-determined* value, whichever mass ($M,_m$) is applicable as source.
This Higgs'-type boson then constitutes a massive graviton as mediating scalar gauge boson; gravity fields propagate through space at c m/s, decaying according to eq. 4.4 and may be detected when the sources (e.g. in mergers causing significant field changes) are large enough.

The second conclusion is:
2.) Equation (4.4) $a_G(r) = G.M/r^2$ is the field description of a point source with mass M i.e. without dimension, ánd at first sight yields two *singularities* at r = 0.
This is exactly where the dimensionless point source of gravity is defined; i.e. an example of *variable validity violation* (vvv), as the mathematics state r > 0, i.e. *a priori* excluding the location of the point source, in fact excluding a most interesting part: the source of gravity.

The Schwarzschild radius of a point source is given by eq. (4.9):
3.) Conclusion three therefore is that a dimensionless point source of gravity (if existing, undefined at r = 0) is not a *naked* singularity.

This illustrates the importance of introduction of dimensions on the Planck scale by substitution of M by specific mass density M_S in a (e.g. spherical) volume. By a tighter definition (§4.3) of the source dimension, singularities *disappear* i.e. meaning that they in fact in physical reality do not exist as validity is **r > 0** in the straightforward mathematics of the point source.
Abandoning the point source by introducing e.g. a spherical volume $V = 4/3\ \pi.r^3$ (r_{max}= R) and specific mass density $M_{S,}$ the substitutions applied in (4.4) yield for the fieldstrength

$a_G(r) = 4.\pi.r^3 \cdot G.M_S / 3r^2 = 4.\pi.r.G.M_S/3$ for $0 \leq r \leq R$ 4.5

Valid inside the source with radius R and yields an expected acceleration $\mathbf{a_G(r) = 0}$ by gravity of M at $\mathbf{r = 0}$ in the centre of M, increasing *linear* towards the surface at R of the core (see §4.3, *point source)*, decaying for r > R by $G.M/r^2$, and thus in principle include the radius of curvature where photons cannot escape i.e. the Schwarzschild radius.

4.3 System sources, singularities and normalization

One of the sources below can be used, as a point-source is a mathematical abstraction causing anomalies.

Point source

Elaborating on conclusion 2.) in §4.2 :

At r = 0, the mathematics would be required to provide all values of the fieldstrength between 0 and infinite, i.e. is *undefined* at the location of the source, therefore is excluded a priori by validity of variable r: $\mathbf{r > 0}$. This can be solved in two ways, 1.) by including room for the fieldchange e.g. $0 \leq r \leq r_1$, evolving e.g. with f(r) = C.r C = constant, treated in §5 and eq. (4.5), by including a sphere around r = 0 with a mass density in the volume $4\pi r^3/3$, i.e. includes r = 0 in the variable validity: $\mathbf{r \geq 0}$., or 2.) by definition of the field value at r = 0 e.g. by a generalised Dirac function, the Dirac source.

Dirac Source

The Dirac source in system-theory is convenient as it describes the normalized field generation in terms of an ideal pulse (creation) of mass in the natural domain by the Dirac function: $\delta_m (r, t) = 1$ at r , valid at $t_1 = 0$ (i.e. in the 'big bang'). In the transformed (*k*, r) frequency domain i.e. the curvature domain, the amplitude at all the frequencies i.e. of curvature yields '1' i.e. an equally *ideal* uniform distribution in the transformed domain. By considering a *non-ideal source* of e.g. a spherical volume around r = 0 instead of a Dirac function at r = 0, 1.) room is created for the function and 2.) it is possible to arrive at the non-ideal frequency distribution in terms of curvature in space (i.e. underlying the proposal in this paper).

Singularity

In case of the point source field, the singularities are vvv's and don't have a physical meaning, ánd as well can be removed by either one of the two proposed possibilities in §4.3, illustrated in the classical description in §5.

This as well can be shown for e.g. the *Kretschmann invariant* [25], a description with 2nd derivatives of the Einstein tensor metric, where r^6 drops out from the denominator when substitution for M is applied as illustrated in §5 - the singularities disappear.

The foregoing as well shows that by definition of a reality source (*Point source* option 1.), the distribution in the transformed domain of the non-ideal *i.e. a physical source*, is 'shaped' i.e. shown as *deviation* from a ideal value '1' in the variable *amplitude* (intensity) in occurrence of *curvature* in space trajectories i.e. as direct result of *mass* distribution in space on quantum and classical level.

4.4.1 Geodesic curvature

Using the results of (§4.2) for (point source) quantum objects M and m in each other's field, the accelerations are
in the field of m: $a_1(r) = G.m/r^2$ with force $F_1 = M.\ G.m/r^2$ and in the field of M: $a_2(r) = G.M/r^2$ with $F_2 = m.\ G.M/r^2$. The total force F_G between objects then is

$$F_G = 2G.M.m/r^2 \qquad 4.6$$

Based on the conclusion of validity of §4.2 eq. 4.4 , upscaling (4.6) by M >> m to e.g. a black hole M, and by considering the *principles of action and compensation*, we explore the motion of m.
For the motion in a field of M, without influences of other sources, the trajectory is to comply with the 'principle of least action', Lagrange [30], Feynman [6].
The actions are two *accelerations*: of gravity and of curved motion, leading to gravity force F_G and in curved motion required centripetal force F_C i.e. F_G acts as the required $F_{C.}$
With $F_G = F_C$ in the entire trajectory taken by the particle in the field, gravity force F_G delivers $F_{C,}$ resulting in zero *acceleration* of the particle in the trajectory: a curved geodesic.
I.e. gravity *acceleration* a_G experienced by m is *compensated* in curved motion of m by the centripetal *acceleration* a_C on m, thereby yielding the 'least (stationary) action' in the movement of a particle in the field, where F_C is perpendicular to the tangent vector $\underline{T}$ of the curved trajectory.
Note that in compensation, the actions of accelerations and forces are physically *present*.
With $F_C = m.v^2 / r = k .m.v^2 = F_G$ we find

$$2G.M.m/r^2 = m.v^2 / r \qquad 4.7\mathbf{a}$$

This equation elegantly reveals where the twain almost secretively meet: mathematically at first sight $m.v^2/ r$ violates the uncertainty relation in quantum perspective by simultaneous exact use of p = m.v and r. The RH part of equation (4.7a) however is in the transformed domain i.e. (*k*, r) space domain with *k* = 1/r and a quantum particle may be *anywhere (x, y, z)* i.e. undefined spatially on the surface of a sphere with radius r.
This is indicating that in eq. (4.7a), variable r *physically* acquires a different *meaning* left (field decay) and right (*k*(r) curvature 1/r). The resulting eqs. (4.7) and (4.8) therefore are valid in the quantum realm. Mathematically it takes the form as in eq. (4.8) with *k*(r) curvature expression as function of distance to M.

K.Schwarzschild [26, eq.(14)] was the first to publish the exact solution and J.Droste put a footnote in his article arriving at his eq. (7), agreeing that it was equal to (14).
In his original paper of J.Droste [21], his notion of different meaning of r is captured strikingly in his phrase "this r is not the same as occurs in (4)", after his substitution $\xi = a/r$, arriving at eq. (7) in the original 1916 paper, allowing both field decay and curvature in his (and Schwarzschild's) results

to be *combined* mathematically with different *validity of variables r* in 1 equation.

Continuing with 4.7a, keeping the natural (r, t) and the curvature k(r) domain *separated* i.e. '*not the same **r** as in (4)',* variables r left and r right remain distinctive:

$$2G.M.m/\mathbf{r}^2 = m.v^2 / \mathbf{r} = k.\ m.\ v^2 \ , \qquad 4.7$$

i.e. in a field of gravity source M, at distance r, the *trajectory* of particles is *deformed with curvature k(r)* from straight:

$$k(r) = 2.G.M / r^2.v^2 \qquad r > 0,\ v > 0,\ M > 0 \qquad 4.8$$

This equation describes curvature k(r) of any energy particle (massless or massive) at distance r on quantum Planck scale as well as on astronomic scale, moving in the gravitation field of a symmetrical massive object M. Objects at the same distance in space but different speeds, are following *different* geodesic curvatures towards the source of gravitation i.e. 'space' is not affected by gravitation fields (which everyone can experience by throwing an object with different speeds at the same location).
Eq.(4.8) shows no dependencies on space coordinates that may justify spacetime deformation. Variable r of distance to the source remains separated from the variable indicating the curvature of the trajectory, as two different physical causes underly the two equations with variable 'r'.

In (4.7), at first sight the mass of the test particle m drops out (instantly giving rise to interpretations), and as result in (4.8), the curvature k(r) of the geodesic trajectory at distance r of a black hole with property M is governed *only* by the *speed* v and *location* r of the particle in the gravity field of M; (4.8) as well is consistent with the dimension of G.
Outside the field e.g. $r \rightarrow \infty$, $k = 0$, at large distance and/or very weak fields, in practice no curvature is present because of M.
Eq. (4.8) as well illustrates ad hoc the principle of multi-path summations of R. Feynman [29] by the resulting least-action trajectories of mass quantum particles in the field of M: the curvature at r depends on the speed v of the particles, and a *myriad of trajectories* thus exist for quanta which are '*least action'* i.e. eq. (4.8) includes the set of trajectories escaping the source e.g. particles in the 'lensing' property of strong gravitation.

In case of **massive** (i.e. Higgs boson coupled) particles/objects, (4.8) is rewritten with $E_{mk} = ½\ mv^2$, and

$$k(r) = G.M.m / ½\ m.v^2.r^2 = G.M.m/ E_{mk}.r^2 \qquad 4.8a$$

In case of a **photon** in the field of a large enough M e.g. the black hole, the minimum value of curvature is reached at v = c, and curvature (4.8) yields by substitutions $r = r_S$, $1/r_S = \kappa_S$ and v = c :

$\kappa_S = 1/r_S = c^2 / 2G.M$ 4.9

i.e. the Schwarzschild curvature/radius.
Then in case of r_S i.e. a massive dimensional source instead of a point source, validity of r is $r > r_S$.
For treatment of singularities see §4.2, §4.3 and §5.

The obvious conclusion is that eq. (4.9) is identical to eq. (5.1). The latter is derived from the classical Einstein tensor equations in GR of a symmetrical spherical core and shows definitely where classical relativity physics and quantum physics connect i.e. where '*the twain meet*' ánd merge with identical results.

4.4.2 Summary & conclusions

A. Einstein concluded that the presence of concentrated mass e.g. of massive objects (black holes, stars, planets etc.) caused '*spacetime*'-curvature i.e. deforming space and thereby trajectories.
In the treatment in §4.4.1, mass of the object under study of curvature at first sight *disappears* in (4.7), and therefore support for a possible conclusion of *space-curvature* seems obvious *without a mass property* showing up in this equation. Because of the assumed space deformation therefore the thought of gravity not being a fundamental force may have settled.
However, derived from fundamental potential theory - ab initio - mathematics of fields (in principle equal in the same sense as for the electrical field resulting in the electro-magnetic field equations) ánd with validity on the Planck scale and upwards, eq. (4.8) illustrates that curvature *k*(r) is governed by *object* property *speed* v ($0 < v < c$) and *location* r in a gravity field of M i.e. the geodesic trajectory is curved, however ***space*** *properties* i.e. described by dimensions and coordinate systems, are not deformed i.e. do *not act as cause* of curvature e.g. by being stretched, compressed i.e. or otherwise locally deformed.
Spacetime curvature therefore is rejected in favour of trajectory curvature.
In case a causality relation in deformation of space by gravitation would exist, at least one of the dimension coordinates is to be somehow related to curvature cq. mass. Moreover, true space-curvature would have to be valid for all objects, regardless of their properties, whereas 4.8 shows dependency of speed v of objects in a gravitation field i.e. *many different* curvatures up to c (m/s).
Furthermore, the argument that the testmass m disappears (4.7) and concluding that curvature /deformation does not depend on the mass of the object i.e. gravity, is *false*, as m dropped out in (4.7) because of *compensation* of acceleration in the *stationary action principle* causing zero acceleration in the geodesics, whereby physical 'actions' and properties remain present (i.e. do not disappear or 'vanish' in contrast with singularities). This shifts the gravity related property of the testmass m to *energy* mediated by mass m of the particle i.e. by eq. (4.8a).
Factually the result is fully *independent of dimensions*, which leads to the conclusion:
'***space***' *is not deformed due to presence of matter*.
The often used model of a rubber sheet with massive objects visualizing gravity by deformations of space, therefore in fact turns out to be a truly *bad* example.
Matter may be considered a kind of *aggregation state* of energy ($E = m.c^2$) e.g. 'condensed as mass'

at still high energy levels during the ‘big bang’ forming massive elementary particles, as status quo result of (spontaneous) symmetry breaking in an environment of continually lower energy density levels in an expanding universe.
When space is not deformed, ánd with a mathematically proper definition of 4D spacetime with time as 4th, truly *orthogonal* component (instead of parameter axis) in an *identical* relation with (as) the other 3 dimensions, *time* in that case is not affected in *any way* by matter, and is *not related to any true property* of a particle or energy.

The overall conclusion is that deformation is for geodesic trajectories by *cause and effect relations* between field and (elementary) particle; trajectories are straight without gravity, and inside a gravity field depend on particle properties – i.e. in the same sense as in an electric potential field and particles with electrical charge, mass can be mathematically treated identically be it with one attractive component only.
Consequently energy in a gravity field, e.g. photons of different wavelengths, by identical speed of c m/s, are affected showing identical deformed trajectories at a distance r_1 from a massive object M, causing the lensing property of light. Therefore light and e.g. radio signals of objects, can reveal these objects in projection, when behind stars and e.g. black holes.

In §2 – The Higgs(-type) boson - is argued that 100% of elementary mass is being created as quantum mass in the BB and therefore all (un-clustered) gravity as well. As visible, more or less clustered mass (galaxies, stars, planets, gas, dust, debris etc.) currently is estimated to be 5% of expected mass, then 95% should be still present in ‘empty’ space as quantum mass, in principle *invisible* but accounting for 95% in (distributed) gravity: then this state of distributed, un-aggregated, invisible elementary mass may possibly be part of ‘dark’ energy.
Current reports on discrepancies between expansion speeds of background radiation in the universe related to the early BB, vs. currently measured higher speed of expansion lately discovered in results delivered by the space telescopes, seem to be in line with gravity creation in the first phases of the BB due to the higher *gravitation densities* causing lower expansion speeds than in the current phase – more research is required on the subject.

5. The Schwarzschild radius, singularity
The classical description is given by the solution of the Einstein tensor equations related to gravity. The Schwarzschild radius is *the characteristic* for a black hole, and is unique in the sense that such massive object only has an horizon hiding anything (but the gravity field) captured behind it.
The exact solution for the Schwarzschild radius r_s from the Einstein equations is [25, 26]

$$r_s = 2GM/c^2 \tag{5.1}$$

in which G is the gravitational constant, M the mass of the black hole.
The value r_s is the radius where the curvature caused by gravity prevents photons to escape the black hole and are captured. If the massive body constitutes of one type of particle to e.g describe a neutron star, r_s is the maximum radius (i.e. minimum curvature) where neutrons cannot escape. The

mass M is again substituted with $m_{sn}.V$ and speed c = v , the equation then shows

$$r_s = 2G.m_{sn}.V / v^2 \quad \text{for all} \quad r_s > 0 \qquad (5.2)$$

In case the neutron star is an almost perfect symmetrical sphere, substitution of
$V = 4/3.\pi.r^3$ yields

$$r_s = (2G.\ m_{sn}.\ 4/3.\pi.r^3)/v^2 \qquad \text{or}$$

$r_s / r = r^2.(2G.\ m_{sn}.\ 4/3.\pi.)/v^2$ for all $\boldsymbol{r \geq 0}$, i.e.

$$\kappa(r) = r^2 .\ (2G.\ m_{sn}.\ 4/3.\pi.)/ r_s .v^2 \qquad (5.3)$$

with m_{sn} = neutron specific mass (kg/m^3), r the radius of the star and particle speed v (m/s).

At $\mathbf{r = r_S}$ this yields for curvature $\kappa_s = 1/ r_s$

$$\kappa_s = r_s .(2G.\ m_{sn}.\ 4/3.\pi.)/v^2 \qquad (5.4)$$

Eq. (5.4) shows that at v = c m/s, curvature reaches the smallest value i.e. for photons in the outer part of a massive black hole.
Starting from the Einstein results ($r_S > R$), property M is substituted by specific (average) mass M_S and volume V and thus relates to the mass *inside* the physical structure. This volume V introduces by substitution in (5.2) the factor r^3.
The conclusion is that equation (5.3) for massive objects, shows that with $\mathbf{r \rightarrow 0}$ i.e. in the centre, curvature $\boldsymbol{\kappa(r) \rightarrow 0}$, (supporting the validity conclusion 2. of (4.4), §4.3).
For a black hole or planet that does not constitute of one type of particle, an average density m_{Sav} = average specific mass (kg/m^3) may be introduced e.g. in a spherical layered stucture with each layer a different specific density, with the same perhaps surprising effect for a black hole, the conclusion is:

The *intriguing naked singularity* in a black hole in the classical Einstein derived descriptions ***vanishes*** by a change to *mass density* as a property, illustrating the impact of exclusion of *dimensions* e.g. in interpretations and in all related literature.

From the equation (5.3) the conclusion is that in case of limit r → 0, *the curvature* disappears and a (virtual) trajectory is straight, i.e. in a black hole with a higher specific mass than a neutron star and a concentration of mass towards the centre, the *curvature* caused by gravitation at r = 0 equals 0 as well, which gives every reason to conclude that a *naked singularity does not exist* in the centre, in contrast with current interpretations, proposed 'wormholes' and assumed 'warped space' in the centre of black holes.
From both the quantum scale and the classical derivation abstracted *point source* as well as *reality*

sources, the solution of zero curvature and thus zero acceleration due to gravity at r = 0, *no* singularity can be assumed - this *fits* fully in what in fact is to be expected from a symmetrical model of an extreme massive large object, as the attracting forces of gravity in the centre are *fully compensated* by symmetry, however don't disappear: mass in the centre is attracted from all sides equally (resulting in tremendous pressure, decaying towards the surface), therefore the *curvature of the (virtual) geodesic* drops from maximum at the physical surface towards zero curvature in the centre of the object .

6. Postscript

This is my 3rd paper of the triptych, published in papers [17, 20, 24] in quantum mechanics, a quest researching an *entirely different* (from the usual wave function model) *mathematical description* to arrive at a deterministic and complete theory in quantum mechanics. The results fit seamlessly with classical physics. The wave-function model managed to serve since its inception as *essential* however limp support of the successful theory, i.e. despite severe shortcomings such as in fundamental (energy) annihilation by (wave-) phase-shifts, mathematical collapses and probability results, as well as causing a myriad of papers in *interpretations* - several discords are treated in the 2nd paper – and, despite extensive attention over 100 years in the physics community, showing limited *advance* in the development and understanding of the theory.

Exploring the subject (2022), I remember a discussion with a Nobel Laureate with whom I shared my very first thoughts. After an encouraging reply I soon found out that I developed quite different insights: abandoning the usual wave-function Hamiltonian + matrix mathematics and instead turning to the functional *integral* transformed (k, r) frequency domain and Green's functions + transformation based system-theory, while strictly maintaining Abelian group mathematics. This approach in the 1st paper resulted in the model of the double slit-experiment with deterministic and exact results on quantum scale; with by-catch: a *one-slit experiment* with *modulated source* showing *double-slit* experiment results i.e. the proof of energy amplitude-modulation instead of the look-alike however fundamentally different (and impossible at the laboratory energy level) *interference* of photons.

The (r^{-1}) frequency domain description in curvature exceptionally well suits quantum behaviour by exclusion of direct addressing of individual quanta with variables, as well as by providing validity of variable r throughout the entire range in gravity, by the a priori mathematical exception of the location of a point-source at r = 0; two solutions in this 3rd paper are provided to solve the issue of (naked) singularities and to acquire full validity of the variable.

The QM triptych papers give a comprehensive description of quantum mechanics due to the setup along cause and effect relations in nature. For a full understanding, background in the presented deviating mathematics in [17] is required; in [20] several interpretational discords are treated almost without mathematics, and [24] connects classical GR (A. Einstein) and quantum physics in the transformed (*k*, r) i.e. curvature frequency domain with exact, identical results, however with *deviating* from Einstein's classical physics conclusions.

Readers may find out that quantum theory as presented is not at all counter-intuitive as it supports a *deterministic* however *invisible* (undetectable i.e. directly unmeasurable) evolvement of *natural* events from the Planck scale to the galactic scale of our ‘universe’.

A.V, Herrebrugh, April 2022 – May 2024
Netherlands

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