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Applications of Absolutivity Theory: Black Holes, Hawking Radiation, 4D Harmonics Wave Theory, and the Mass-Gravity Property

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ABSTRACT

Absolutivity theory introduces an objective reality of time within a true four-dimensional spacetime model built on universal simultaneity and an expanding three-dimensional space continuum. The theory unifies asymptotic modified Newtonian gravity with quantum theory within an orthogonal four-dimensional framework that opposes intrinsic spacetime curvature and eliminates gravitational singularities. This paper presents three physical applications of Absolutivity theory: black holes and Hawking radiation, four-dimensional harmonics wave theory, and the mass-gravity property. For black holes and Hawking radiation, Absolutivity predicts a hidden vacuum area located between the massive core and the Schwarzschild radius. Within this region, both photons and mass particles can orbit according to Lagrange's principle of stationary action. Photons experience curvature in a gravitational field without requiring an attractive force, as they possess no mass-gravity property. The theory supports the existence of Hawking radiation from a classical continuum perspective but does not predict complete evaporation of the black hole core. In four-dimensional harmonics wave theory, the true spacetime topology allows energy to ingress from three independent spatial directions toward a single spacetime point. This yields a theoretical energy concentration higher by a factor of the square root of three compared to the one-dimensional Mizohata-Takeuchi conjecture. The treatment emphasizes that dimensional density of energy must be properly accounted for in harmonic analysis. Regarding the mass-gravity property, the gravitational potential field of a particle is shown to be velocity-dependent. As a particle approaches the speed of light, its gravity field becomes confined within the particle structure and cannot radiate outward. Consequently, measurements of gravitational potential fields cannot provide an accurate estimate of the total mass present in the universe. These applications demonstrate that Absolutivity offers a deterministic, causality-embedded, non-curved spacetime framework capable of addressing both quantum and astrophysical phenomena.

Keywords: Absolutivity theory; Black hole physics; Hawking radiation; 4D spacetime; Quantum gravity

1. INTRODUCTION

Absolutivity is a theory of objective reality with validity in the entire continuum of spacetime, an anchor component in a true $4D$ spacetime topology, inclusive of quantum theory and foundationally departing from observer-oriented Relativity. Spacetime therefore here is considered a $4D$ coordinated framework in a vacuum state with a conceptually independent fabric of potential fields and (all types of) matter. As a matter of principle, it introduces causality-based objective reality (as opposed to subjective, observed, measured reality) in mathematical relations in time functions and therefore does not support longstanding assertions in Quantum Mechanics (QM) in its current form or state: a basis of statistical results and Schrödinger cats, collapsing wavefunctions, no access to crucial causality information between states, denial of natural causality, reversed causality, non-existence of dynamic descriptions, as well as the inability due to incompliance to integrate with gravity and worse despite the valuable contributions of e.g. P.A.M. Dirac and many others without significant progress to develop the theory any further. Although historically foundational, QM in its current (2025) state has lost its foundational status. The real challenge therefore here is alignment of theoretical results in a (any) continuum description of objective reality with quantum theory experimental and predicted results see e.g. Absolutivity applied inter alia to Hawking radiation with supporting, as well as extended, results.

Absolutivity theory instead builds on Poisson's foundational potential field theories [13] with quantum photon and mass-gravity density distributions, corresponding mathematical Green's functions and Lagrange's principles of stationary action, directly embedding photon energy Eph distinct in treatment separated from quantum mass-gravity particles with energy density property (Sec.4), i.e. particles that experience force F_G by acceleration a_G in Newton's model. The theory operates with universal elementary density flows in spacetime in well-known mathematics and with four mathematically true orthogonal dimensions; no tensors or matrix mechanics are required in the basic description, fundamentally avoiding loss of information by e.g. 'coarse/fine graining' in quantization, risk of tensor 'red cards' (see below, Heisenberg), as well as untraceable scalar dependencies of variables in scalar time treatments in real axes.

Causality is rigidly embedded in this true $4D$ framework, inseparable from the independent time dimension. The natural principle of cause and effect here is anchored at any scale, modeled within the evolving 'present' of curved time information surfaces [8] and in the reality, of the Universe irreversible: therefore the QM-based artefact of retro-causality and related theories are rejected in a reality description. Yet Absolutivity enables scientific research 'to go back in time' in particular in causality information in data in memory structures of information in the time-surfaces as described in [6, 8] to come to grips e.g. with quantum theory. It cannot be excluded that analytics of this information in 'reversed' order of time actually form the basis of what now erroneously is called retro-causality, i.e. currently and certainly historically mathematically not rigidly embedded in dimensional time. Causality usually appeared afterwards in discussions, i.e. not truly mathematically embedded as in [8] a 4th time dimension of experimentally proven irreversibility.

By direct treatment in quantum energy (mass-gravity and photon particles), the theory in principle as well departs from the Schrödinger-Hamiltonian wavefunction: phase shifts in wavefunction modeling identify wave potential energy annihilation as in fluids and gases, e.g. water waves and sound waves. Energy of quanta cannot be annihilated, only transformed, e.g. in LHC experiments. The wavefunction as foundational quantum model therefore here is regarded obsolete; however, it remains supported for information carried by quanta alone [5, 6], i.e. modulated, transported and recovered (de-modulated) in quantum theory, i.e. fundamentally replacing as well the wave-model of light waves and interference by mathematical modulation theory [5, 6] applicable to dynamic spatial flows and distributions of concentrations of quanta, i.e. photons. Consequently, modulation theory identifies that information alone may be annihilated on quantum level, e.g. in a black hole, in principle without energy annihilation.

The re-exploration of gravity's potential field from the very basics 'ab initio' and subsequently adapting [7] Newtonian Gravity with a relatively modest modification in the symmetrical core description (i.e. realistic gravity source) of a massive object M eliminates asymptotic singularities. In Poisson's potential field description, applying the Nabla operator, i.e. to establish spatial changes of the potential field, yields Newton's famous 'inverse square law', i.e. by definition therefore a genuine field description alone, derived from a dimensionless source: the theoretical point mass of chosen density ρ, applicable to a dimensional core and potential field starting from the core radius r_c. Mass is created in a causal process: after creation of mass the gravity field emerges at c (m/s) in space, i.e. mass as excitation of a field thus is considered a reversed causality, e.g. as in gunslinger Lucky Luke's 'faster than his shadow'.

In Newton's model, mass M remains unspecified in space other than being a concentration of particles with mass-gravity property. However, dimensionally, $M(r)$ should build a Poisson potential field from scratch, i.e. from zero mass $M(0)$, which definitely identifies an anomaly for the singularity because at $M(0) = 0$, i.e. without mass, by definition field $F_M(0) = 0$, $a_G = 0$ and $F_G = 0$.

In line with introduced density ρ in Poisson's theories, we therefore defined mass density M_d and dimensional volume V_D with $M = M_d \times V_D$, i.e. for the spherical object (average, uniform) mass density $M_d = M/(4/3)\pi r^3$. This modest core, i.e. source modification, allows $M(r)$ to emerge functionally linear, building the field of the core with uniform density from $M(0)$ to the Poisson field maximized value $M(r_c)$ at the core surface radius r_c (i.e. what actually was measured outside the cores in Newtonian gravity experiments).

Both photon and mass-gravity particles mandatory must fit the quantum realm in a continuum description of any type of particles, i.e. whatever their source of action in regular mathematical treatment in concentrations and flows in one - to four-dimensional line, surface, or volume elements. In the continuum of modified Newtonian gravitation [7], this yields exactly identical results as in General Relativity (GR) (compared to e.g. [10] K. Schwarzschild's and J. Droste's results from Einstein's equations) without tensor treatment and stress-energy tensor restrictions, i.e. Heisenberg's 'Red Card'.

Causality-preserving mathematics (symmetry) may be in spacetime or in the inverse domain, i.e. frequency domain, e.g. in causality (systems theory, Laplace and Fourier transforms [4]) or distributions (modulation, information, density), as both remain valid in space, i.e. are applicable to properties of matter and energy in space functions: concentration, density, curvature, etc. per location, i.e. $1/r$. The frequency domain is required in a quantum theory, as in general individual quantum particles are in spacetime 'invisibles', i.e. when observed or measured they are transforming energy, as opposed to observables of (relatively much) higher energy. Intensities of their frequencies of occurrence per location, i.e. concentrations in an infinitesimal (volume/surface/line) element describing densities, can be mathematically described exactly and observed without exact information of the location and momentum: the 'red card' for tensors and equations in tensors, e.g. a stress-energy tensor treating both properties of the individual quanta simultaneously in descriptions, violating the Heisenberg relation. This relation is a fundamental measurement uncertainty relation, actually valid for any measurement taking energy from the object under measurement. This energy cannot be neglected in quantum theory (but usually in classical physics is neglected, without significant consequences) and must be accounted for in treatment or avoided. The alternative mathematical treatment is given by description in the (frequency) inverse domain approach [5, 6].

The foundation of a true orthogonal coordinate system in $4D$ spacetime [8] is consequential in generic reality descriptions: it should avoid all hyperplanes not containing the origin, while a functional description in spacetime datapoints is focused on the dimensional covariant structure. Moreover, any subspaces, e.g. local coordinate dynamic subspaces typically suitable for local descriptions, inherently must have an identical dimensional spacetime structure, where in this particular $4D$ framework in principle a reality-based conceptual vacuum state description with a dynamic spherical time boundary therefore remains valid, and (strong) gravity does not cause intrinsic distortion of but is super positioned, i.e. co-exists in $4D$ spacetime. Moreover, of the 4 spacetime dimensions, time is the only curved with extremely small curvature in true time, and locally treated 'flat' virtual component, i.e. mandatorily represented by complex numbers in an otherwise real, flat $3D$ space of real numbers. This framework thus renders all dimensions of spacetime orthogonal, i.e. immune to each other.

Continuing this research, Absolutivity emerged in unification of modified Newtonian quantum gravity [7] within this true $4D$ spacetime topology model, i.e. in a continuum of complex vector spacetime, definitively departing from a 4th dimensional real-time axis, time cones, scalar time dependencies, and spacetime distortions, as proposed in several well-known theories in physics (e.g. String theory, Lorentz Transformations, and General & Special Relativity).

This paper introduces treatment of e.g. black hole Hawking radiation in Absolutivity. Electromagnetic radiation of a black hole seemed at the introduction, a contradiction in terms. Hawking proposed quantum mechanical principles at the boundary, i.e. black hole horizon, where electromagnetic radiation in principle cannot escape the gravity field of a massive large object, and he as well concluded evaporation of black holes. To date, this phenomenon never gained support from results in a classical continuum description in physics. A solution arises in Absolutivity using Lagrange's principles of stationary action [1,2] where curvature $k(r) = 1/r$ associated with sphere and circle geometry remains separated from physical distances r in spacetime. Curvature k thus serves as a frequency parameter in the spatial frequency domain, i.e. inverse transformed domain, giving rise to an explanation of Hawking radiation from a classical viewpoint. I named it Newtonian in his honor: a resolution is presented built from Poisson's potential field theory and asymptotic modified Newtonian gravity, leading to surprising conclusions in Sec.2.

Harmonics are described in functions of $f(x,t)$ where, e.g., a line transformation typically the X-ray transform is operated on lines in Euclidean space, i.e. $X[f(x,t)] = F(x,t)$.

The X-ray transform in practice is specifically useful in two-dimensional scans of tissue density in space line locations in computer tomography (CT, MRI), composed into coupe-like scans, revealing deviations from expected density in human tissue (inverse domain, mass concentrations).

Function $f(x,t)$ is one-dimensional in space, evolving two-dimensionally in the spacetime model [8]. Here, the model of spacetime provides a $4D$ framework for $f(x,y,z,t)$ and operates within $3D$ Cartesian space by structured virtual, curved imaginary time information surfaces [8]. This background in $4D$ is highly useful in mathematical reality descriptions of energy evolutions in a general sense and in particular in harmonics of electromagnetic nature. The Absolutivity approach explores contributions in the three independent two-dimensionally structured harmonics of $f(x,y,z,t)$ along the space axes, and synchronized in the 4th t-dimension, and compares results with the unidirectional (1D) Mizohata-Takeuchi conjecture. It thus uses the alternative approach in the 4D framework for exact temporal coincidence of the spacetime functions, Sec.3.

Asymptotic treatment in gravitation [7] enables descriptions of mass cores in the continuum at quantum scale, i.e. stretching validity in Newtonian gravitation to any scale. For the maximum density of matter to arrive at reality descriptions of black hole size and a surprising 'hidden' vacuum state area in the relation with Schwarzschild radius versus massive core radii (Sec.4), in this paper as well mass density is required. Poisson's theory fundamentally introduces density ρ; here property M_{d} (and dimensional volume VD) instead of M, therefore in a generic sense relieves this constraint and as well the asymptotic singularity of M as a single fixed property of object mass to scalability in the continuum, including the origin 0.

The basics of (quantum) concentrations, i.e. frequency-domain distributions in space volumes and flows through surfaces, together with potential energies theory in a vector space as treated in [7, 8] thus effectively enables fundamental mathematics of physics as well in an entire continuum of quantum reality in a quantum theory. It also identifies that a quantum theory with (in Nature) fundamental basic properties, i.e. embedded causality, without statistics and probability results, collapsing wavefunctions, etc., readily can describe quantum behavior as part of Absolutivity in the continuum at this smallest scale.

2- BLACK HOLES AND HAWKING RADIATION

This treatment is built from adapted Newtonian gravity taken into the vector space, using Lagrange's principles of stationary action [1] applied to particles in a gravitational field of a mass source [1, 2, 7].

Absolutivity predicts both radiation and particles escaping from a black hole. It argues as well that electromagnetic radiation is not affected by gravitational attraction in a (Newtonian) force model and predicts the existence of a vacuum state hidden behind a black hole horizon, governed by curvature intensity in the gravitational energy field determined by the geometry, size, and mass density of the black hole. Despite the potential energy in the gravitational field, photons carry energy of a different nature: electromagnetic field energy. Unlike mass particles, photons cannot exchange energy with the gravity field. Directional (curvature) changes of photons do not require a force in interaction with the field to overcome inertia a property that photons do not possess i.e.; photons are immune to gravitational forces. This includes photons crossing the Schwarzschild boundary.

2.1 Photons, Curvature, And Vacuum-State Area

Experimental astrophysical evidence has shown that pure potential electromagnetic energy is also influenced by gravitation, e.g. in the 'lens' property of light: photons have a curved trajectory 'bent light' in the vicinity of a source of gravity. Einstein concluded by interpreting equivalent photon mass $\mathrm{m_{ph}}(E) = E/c^2$ and gravity as an attractive force in a gravity field, resulting in spacetime distortion because of mass, visualized in the worldwide presented artist impression or 'rubber sheet and marbles' model of curved space geodesics in the vicinity of massive objects considered a longstanding foundational model.

The $4D$ virtual topology of spacetime [8] however foundationally opposes this viewpoint; its mathematical foundation does not identify curvature or deformation of space, with full independence of space from curved time surfaces as a true time dimension. This fundamentally challenges Einstein's interpretation of spacetime curvature, i.e., distortion by gravitation.

Absolutivity provides an approach to Hawking radiation from the potential field-related, objective standpoint in the continuum, starting from the equations derived in [7].

At distance r in a field of gravity, the trajectory curvature at the event horizon of a symmetrical black hole is governed only by the object's speed v (m/s), as object mass m cancels out in the equation (Sec.2.2 eq.2.2.1) [7], [eq.4.8]. This is consistent with the experimental observation that massless 'pure' electromagnetic energy objects, i.e. photons, have curved trajectories in gravitational fields. In the equation [7], [eq.4.8] obviously for photons, c (m/s) determines a Schwarzschild boundary r_s for light, as shown in [7] by substituting c for v at the Schwarzschild radius r_s with curvature $k(r) = 1/r_s$.

For a mass particle, equation [7] [eq.4.8a] is valid, where kinetic energy E_{mk} also plays a role in observed curvature, while mass m again cancels out. That is, at the same distance from the black hole mass, particles with high speed have lower curvature than identical particles with low speed, obviously arising from velocity (see Sec.2.2).

However, pure energy particles, i.e. photons, do not have a mass-gravity property interacting with an external gravity field. Thus, unlike mass particles, photons are not prone to gravitational attraction and cannot exchange their electromagnetic-based energy with gravity potential field energy. Therefore, the causal explanation of their behavior cannot be identical to that of mass particles. In the Newtonian force model, the absence of a mass-energy property thus rules out an attractive force for photons. This identifies that the behavior of photons should be explained by the intensity of curvature $k(r)$ alone, and the presence of field curvature defines the causality relation in stationary action, i.e., balanced in equilibrium (where object mass is also cancelled [7]).

Photon energy $E_p = h\nu$, with $\lambda\nu = c, \Rightarrow E_p = hc/\lambda$, and this electromagnetic potential energy cannot change without a causal electromagnetic source. The geometry-related curvature $k(r) = 1/r$ is separated from the spatial distance r used to locate quanta. From [7] [eq. 4.9], the curvature at the Schwarzschild radius is derived (and is identical in GR), which is the minimum curvature at c (m/s); the maximum wavelength of radiation that can be captured therefore is $2\pi rS$. Higher curvatures arise from higher core densities and larger size (volume) of a black hole. Exploring an orbit at potential V_{G} in the gravitational field: $V_{\mathrm{G}} = \varphi(r) = MG/r = k(r)MG$ i.e. a photon trajectory curvature in a Lagrange stationary action (at V_{G}= constant) in the gravity field of a spherical core M, i.e. the product $E_p V_{\mathrm{G}} = C$ in an orbit, and $k(r)(hc/\lambda)MG = C$, which is constant for orbits at any radius r_λ for a photon of wavelength λ. Given any black hole, this yields a constant value in its gravitational field valid for $r > r_c$ for the generic ratio between curvature in the field and photon energy, i.e.

$$\frac{k(r)}{\lambda} = \frac{C}{hcMG} = \text{constant} \quad , \quad k(r) < \frac{1}{r_c} \tag{2.1.1}$$

Note that the role of an observer by definition in Absolutivity is taken out. In GR, optical effects of red shifts and blue shifts (and 'Doppler acoustics' in the case of mechanical waves, e.g. gas waves) as phenomena in an observer-oriented framework shape reality into a perceived reality of an observer, i.e. a subjective reality. Here, in the Absolutivity framework of objective reality [8], the quanta, i.e. the wavelengths in a wavefunction model of photons, are not affected, while each observer's perception from a different perspective, e.g. location r, velocity dr/dt, acceleration $(d^2r)/(dt^2)$, etc., in relativity requires renewed calculation (see e.g. [8] [Sec.3 on one-dimensional state descriptions]).

The generalized result in the above equation is quite remarkable: it establishes that for photons in a gravity potential energy field, the ratio between photon wavelength and curvature in the field is constant for a fixed λ, i.e. for a specific (ray of) identical λ photon(s), given a black hole with mass M. This means that without a subjectively changing wavelength λ photonic (monochrome) curvature in gravitation is determined by the functional momentary local (r,t) value in the entire trajectory anywhere in a gravity field alone. Trajectory curvature dynamics are mediated between local potential field strength r and photon energy λ. Orbiting photons of arbitrary wavelength λ_n have their own corresponding Schwarzschild radius r_λ and corresponding curvature $k(\lambda)$. Here, a much higher curvature is balanced with their energy, i.e. a complete area of a myriad of spheres that may contain orbiting photon particles. From a quantum theory perspective, this seems a contradiction, indicating that here the exact position of a photon is known by its wavelength correct for the radius (distance): the Heisenberg relation is not violated, being rescued by the sphere surface.

In principle, by boundary conditions of incoming photons crossing r_s, i.e. entering the black hole, eq. (2.1.1) can result in a hyperbolic functional between curvature $k(r)$ and photon wavelength λ with asymptotic branches. In fact, it then is a catenary, i.e. hyperbolic (cosh) trajectory where in contrast with mass particles curvature does not require additional energy. This identifies that light is 'bent', i.e. photon trajectories are governed by the potentials in the gravitational field of a mass core without requiring extra energy. Therefore, without an attracting force the field geometry is the real cause of the curved trajectories. In a thought experiment with a flat source of gravity, photons thus experience zero curvature and remain at their original potential, while mass particles always experience curvature depending on speed (eq. 2.2.1).

Also, a resulting mass orbit in strong gravitation must be consistent with the conservative nature of the gravity field of the core: $\oint F_G \, dl_{\text{orbit}} = 0$, and no energy is required. The conclusion is that 'bent light' is a Lagrange stationary action of electromagnetic energy in gravity potential energy fields. In strong electromagnetic fields (of identical electromagnetic nature), additional electromagnetic forces allow for much stronger curvatures as well as (temporal) energy exchange, e.g. in atomic grid structures such as the transport of photons in optical fibers and other matter.

By the principle of stationary action, a photon in a gravitational field is without any force, 'naturally' following a trajectory of energy potential field differences balanced with stronger curvature up to a maximum $k_p(r)$ when entering the gravity field without any energy requirement.

In trajectories with $k_p(r) < k(\lambda)$, curvature is balanced in accordance with eq. (2.2.1). When reaching $k_p(r) = k(\lambda)$, photons remain trapped in orbit. For $k_p(r) > k(\lambda c)$, photons collide with the core. Photons cannot exchange energy $E_p = (hc/\lambda)$ with gravity potential energy unless being destroyed, transforming their energy by colliding with the core. Stationary action in orbit means not requiring external (field) energy, therefore following field equipotential geodesics which by the geometry of the black hole field alone causally determines curvature. That is, the field geometry (equipotential energy lines of the source in space) shapes the curved trajectories of photons in stationary action in the entire field, i.e. also outside the Schwarzschild boundary.

In principle, due to the existence of many Schwarzschild radii r_λ from r_c up to r_s (i.e. outside the core but inside the Schwarzschild radius), and in practice depending on the wavelengths of incoming photon energy and the angle crossing the r_s sphere, this points to a vacuum area behind r_s, thus a hidden vacuum state with spherical surfaces r_s, λ_n. That is, a Schwarzschild area capturing photons in orbits, i.e. preventing photons from radiating actually the reason for being a 'black' hole between r_c and r_s, which may contain many photon 'colors', potentially filling the entire region behind the horizon. The Schwarzschild radius therefore is to be considered an upper limit of the radius where photons may be trapped.

The maximum wavelength that may be trapped in orbit is defined by the momentary size of the black hole: $\lambda_{\max} 2\pi r_s$, orbiting at radius r_s, while the minimum obviously is r_c. This is consistent with expected radiation in a thought experiment when, e.g., holes shrink, losing energy: when r_s retracts, the presence of (very) large wavelength radiation escapes the hole. Photons with long wavelengths λ have less corresponding curvature than shorter wavelengths. An incoming photon at a lower field potential therefore balances wavelength λ_n by increasing curvature with increasing field potential until it matches eq. (2.1.1), then may orbit in equilibrium of stationary action at the corresponding wavelength radius r_λ. When incoming at a steeper angle, crossing 'their' radius of equilibrium r_λ, photons collide with the core, refract, or transform energy.

Depending on incoming angle (Sec.2.1.1), long wavelengths thus may orbit near the Schwarzschild radius r_s. Wavelengths with higher energy density up to $k(\lambda) = 1/r_c$ may orbit closer to the core. Shorter wavelengths are trapped; photons colliding with the core may transform and disappear by, e.g., converting momentum, causing increased momentum of the core, or may be refracted in the direction of the horizon and curve back in stationary action, transforming or refracting, and so on. In the case where the photon is outside the horizon, it will stay outside if trajectory curvature is smaller than $1/r_s$, i.e. creating the 'lens' property with $k(r) < 1/r_s$. Equation (2.1.1) reveals as well that a shortest wavelength exists at curvature $1/r_c$. Photons that hit the core and transfer their momentum to the core disappear.

2.1.1 Gravitational Lens, Curvatures, Escaping Photons, and Dark Matter

As the foregoing identifies, i.e., predicts orbits at increased curvature up to r_c, the lensing property of strong gravitation near a black hole therefore involves the massive core radius r_c rather than the Schwarzschild radius r_s, leading to much stronger curvature than may be observed for photons outside the Schwarzschild radius. As the trajectory of photons in gravitation is already in stationary action before entering the horizon at r_s, no forces are present. Therefore, the entire geodesic in the gravity field must be shaped by a hyperbolic curve balancing energy potential in the trajectory with curvature up to $k_\lambda(r)$, i.e., a hyperbolic curve having one tangent point with a circle of radius r_λ (the orbit radius corresponding to the wavelength from eq. (2.1.1)). That is, curvature of photons with sufficient energy $(h\nu = hc/\lambda)$ within the horizon may be up to a maximum curvature of $1/r_c$ without being 'trapped' or colliding with the core, but instead may stay in a stronger curved trajectory within r_s and remain hidden until escaping the hole again at a different location at the same tangent angle. These light-ray trajectories have a remarkable resemblance to mechanical catenary curvatures (which have zero mechanical bending stress values in the entire catenary) of hyperbolic nature, with maximum curvature at the point location closest to the core.

Therefore, despite a Schwarzschild boundary and consistent with electromagnetic radiation not being affected by gravitational attractive force, higher energy photons with wavelengths shorter than λ_c can also cross the Schwarzschild 'boundary' r_s of the hole and may pass it, literally emerging from the 'black' hole by crossing r_s once more, becoming visible (measurable) again.

In this process, photons may experience a curvature much higher than $1/r_s$ i.e., $k_\lambda(r) < 1/r_s$.

This stronger curvature of 'light' in a gravity field therefore is unlikely to be attributed to 'dark' matter [9]. Strong curvature may also be observed in strong gravity fields by definition of photons as carriers of information, but therefore definitely is not 'dark' e.g., radiation from a star or galaxy at the right position for the black hole to 'bend' this light.

Curvature, however, for the vast majority of incoming photons does not fulfill the criteria in Sec.2.1. This is the reason that black holes only radiate long wavelengths and thus remain quite 'black'. Moreover, the photons in high-curvature

trajectories are not considered 'trapped' within a black hole but are bypassing it, crossing r_s.
In general, observed curvature of photons near a black hole in principle thus may be much stronger than the curvature at the horizon. This identifies that photon with orbiting wavelengths having curvature less than $1/r_c$, incoming at their hyperbolic curve above 'their' orbiting r_{λ} will cross the horizon again, escaping the hole, always experiencing higher curvature than $1/r_s$.
This resembles black hole radiation, as these photons were never confined, i.e., 'trapped', in orbit inside r_s, but instead bypass in a hyperbolic trajectory around the core radius r_c.
Between r_s and the massive core, photons thus may escape or orbit within the horizon in much stronger curvature than $1/r_s$ i.e., below the horizon. Therefore, in reality, an identical form of a vacuum state exists a vacuum area of very strong gravitation similar to that outside the horizon, but which remains hidden. That is, the 'horizon' is actually the edge of an invisible, hidden vacuum between the solid core radius rc and the Schwarzschild radius r_s, with a very strong, geometrically curved gravitational field.

2.2 Mass Particles and Properties

The vacuum area identified in Sec.2.1 is where mass particles may also orbit at higher curvature in stationary action, depending on their velocity only (as mass cancels from equation 4.8 in [7], eq. (2.2.1)). Mass particles with too low speed are and stay trapped at the core with radius r_c, converting their momentum and increasing core mass M_c. Curvature from eq. 4.8 in [7]:

$$k(r) = \left(\frac{2\,MG}{r^2 v^2}\right) \tag{2.2.1}$$

In contrast with photonic energy, an orbit of mass particles in a gravity field identifies for the curvature a potential field kinetic factor [7] [eq. 4.8a] derived from (2.2.1):

$$k(r) = \frac{GMm}{E_k r^2} = \left(\frac{MG}{r}\right)\left(\frac{2}{v^2 r}\right) = V_G N_G \tag{2.2.2}$$

In this formula, $N_G = m/E_k r$ represents the Newtonian factor, introducing mass m (inertia) and its kinetic energy as the causal factor of curvature of mass particles in a gravitational potential field $V_G = MG/r$.
The expressions of curvature in Sec.2.1, eq. (2.1.1), and here, eq. (2.2.1), also give a strong indication of validity in the entire continuum of space, as the mass property of the observed object cancels out in the equations. This means that any mass, including zero mass (Sec.2.1, photons), i.e., at astrophysical or quantum scale, is applicable in a Poisson potential field and derived Newtonian gravity when a strict separation is maintained between a mass core and the field description. The force and acceleration are Newton's model for mass mathematically derived from S.D. Poisson's potential field. Curvature for massless photons (i.e., without inertia) is caused directly by this field, which arises from the idea that photons cannot experience a Newtonian force in gravitation and instead experience curvature directly from potential field energy, made possible without requiring energy, i.e., inertia, to adapt directional changes (curvature). This also identifies the strong causality relation in Nature: quantum mass and potential field are not created simultaneously, and the field spreads at c (m/s) in space, i.e., the field develops after a mass property has been created. This very thought therefore challenges the idea of particles being excitations of a field (e.g., in QM), which is considered reversed causality by the velocity of gravity fields. This is not supported in causality-embedded Absolutivity.
The curvature in a stationary action of a high-speed mass particle, e.g., with velocity $v = 0.71\ c$ (m/s), is orbiting at $k(r)$:

$$k(r) = \left(\frac{2MG}{0.5\,r^2c^2}\right) = \left(\frac{4MG}{r^2c^2}\right) > k(r_S) = \left(\frac{2MG}{r^2c^2}\right) \tag{2.2.3}$$

i.e., two times higher curvature at a shorter radius than at the horizon. To identify the reality of this state as we have assumed $r_S > r_c$ for a vacuum area we provide a reality check and consider a black hole with core r_c mass M, and curvature at r_S: $k_{S(r)} = 2MG/c^2 r_S^2$ with orbit curvature at r_c, i.e., $k_c(r)$:

$$k_c(r) = \left(\frac{2MG}{v_c^2\, r_c^2}\right) \tag{2.2.4}$$

Then follows the ratio r_S/r_c

$$\frac{k_{c(r)}}{k_{S(r)}} = \frac{r_S}{r_c} = \frac{c^2}{v_c^2} \tag{2.2.5}$$

A mass particle with $v_c = \frac{1}{2}\sqrt{2}\,c\ =\ 0.71 \ldots\ c$ (m/s) yields:

$$\frac{r_S}{r_c} = \frac{c^2}{0.5\,c^2} = 2 \tag{2.2.6}$$

The Schwarzschild radius r_S therefore stretches to $2r_c$, confirming the reality of a vacuum area.
The foregoing description of orbits also strongly resembles orbits at the quantum scale of electrons in the much stronger energy density of electrical potential fields in atoms, which are equally in stationary action, in an isolated state requiring no external energy for their existence in reality. In contrast while based upon the same principles due to the weak gravitational force, the scale is astronomical and requires corresponding sources of mass.
The predicted vacuum state within the black hole horizon represents a large 'micro' cosmos, in which captured massive and photon particles at radii smaller than r_S may orbit in arbitrary directions. Because of the myriads of particle velocities and wavelengths orbiting at different radii, it represents a fully hidden but otherwise colorful and rough cosmos. In principle, it is a kind of three-dimensional, black-hole-geometry-curved rainbow layer of different energies and mass particles, in case this entire spectrum is captured in time. In the entire vacuum area, photons may thus collide with massive particles, and this creates a 50% chance of deflection toward the core versus toward the horizon at r_S. The latter case essentially means that photons and mass particles may escape a black hole. For photons, this is determined by location in the vacuum state and whether trajectory curvature may reach a value smaller than $1/r_{\lambda}$. The same reasoning is valid for high-

speed mass particles at distance r, where curvature depends on velocity only (2.1.1), and mechanical energy between mass quanta and collisions with high-energy photons may cause quantum mass particles to escape.

2.3 The Newtonian Tightrope

Returning to the compensation mechanism of stationary action, for any object behind the horizon, the vacuum area is a representation of a myriad of spherical surfaces of orbits (in the same basic symmetrical model as in Hawking's model [12]), including quantum orbits. In the case where a photon, orbiting at its own r_λ, collides with a mass particle and refracts in the direction of a larger radius (without further collisions), it will inevitably escape the hole. The chance is extremely low, as the wavelength of the photons may be too long to detect ('see') the particles.
Due to stationary action of mass particles, this is also the area where compensation between curvature and centripetal force [7] acts as the cause of the typical curved orbital geodesic trajectories of mass quanta in an equally fragile equilibrium for particles.
Thinking of it in a pure mechanical sense for photons as well as for mass particles, this much resembles a tightrope walk act without a balancing rod for stabilization. In the compensation equilibrium in and below the horizon, the forces, accelerations, and curvatures remain physically present while at the same time causing a delicate balance anywhere in the vacuum area behind the horizon. A small external force disrupting this equilibrium (unlikely gravitational unless in mass mergers) may be of a different nature, i.e., mechanical (by collisions) or electromagnetic. Electromagnetic: a tiny particle, e.g., an electrically charged quantum with velocity only, requires a minimum amount of additional electromagnetic energy from general sources of electromagnetic potential energy immune to attractive gravity force, as argued in Sec.2.1 outside the horizon, e.g., electromagnetic bursts influencing curvature (e.g., of a magnetic field) to escape the black hole.
Collisions may occur in the vacuum area between mass particles as well as between photons and mass particles. Here, different velocities (curvatures) play a role, but a chance equally exists that a quantum mass particle escapes the horizon, this chance being much higher when closer to the horizon. This is consistent with Sec.2.3 and predictions of mainly low-energy, long-wavelength radiation.
The vacuum state below the horizon also reveals that, in contrast with QM (including quantum field theory) predictions, only particles that are in equilibrium have a chance of escaping. This leads to two conclusions:
First, there is no prediction of the core interacting in the vacuum state other than through the strong gravity field. That is, without catastrophic impact from outside, the core does not 'evaporate' in steady state, which challenges Hawking's conclusion of total evaporation of a black hole. Second, radiation continues from incoming energy that stays in the vacuum layer alone, trapped in stationary action.
The gravitational potential at the horizon is GM/r_S with derivative $-(GM/{r_S}^2)$. This represents the force compensated in the stationary action (orbit) for mass in Newton's model.
The curvature derivative $dk(r)/dr$ shows sensitivity in curvature:

$$\frac{d}{dr}k(r) = \left(\frac{2GM}{v}\right)\frac{d}{dr}\left(\frac{1}{r^2}\right) = -\frac{2GM}{3\,v^2r^3} \tag{2.2.3}$$

i.e., a factor of 1/(3r) less curvature at r_S, and a particle forced by internal (mechanical) or external (electromagnetic) action may move to an area of smaller curvature than $1/r_S$ i.e., may move from the horizon to the outside, escaping the hole. This gives rise to the conclusion that:
Hawking was absolutely right reasoning from his quantum mechanical viewpoint [1974, Black Hole Explosions?]. However, in further research papers, he did not provide a classical Newtonian explanation that clearly had to be in line with quantum theory yielding an identical outcome of escaping radiation. Absolutivity in the Newtonian treatment also predicts surprisingly additional information on a vacuum state within a black hole horizon.
This result also provides evidence for the observation that a quantum theory alone cannot describe the reality of quanta entirely [3], which gives support to Absolutivity theory as a reality-based classical description in physics, summarizing:
Absolutivity theory:

1. is based on objective reality and obviously departs from subjective reality.
2. describes 'invisibles', i.e., quanta, by means of the inverse domain, i.e., in exact predictive spatial quantum energy distributions that are built from independent, individual, and invisible quanta.
3. predicts radiation by perturbation of particles and photons in equilibrium in a 'Schwarzschild' area a reality that (literally) is not observable or measurable, i.e., behind the Schwarzschild radius inside a black hole horizon, and cannot be described by observing, e.g., a wavefunction in quantum theory alone; and
4. does not predict that black hole cores evaporate by radiation.

3- ON 4D HARMONICS WAVE THEORY

3.1 Dimensions

In one-dimensional harmonics in space, two other independent dimensions of space are excluded from contributions of radiation. This led to a treatment proposal in Absolutivity of the 4D spacetime model, i.e., a physical model of photon quanta that directly involves energy at the quantum level when coinciding in a particular spacetime location at the origin 0. This treatment in principle also shows that for a proper mathematical description, energy is to be treated in (orthogonal) dimensions, i.e., as a concentration of energy in volume (3D), surface (2D), or line (1D), just like the mass-gravity property in [7] and Sec.2.2.
Starting from the inverse equation of the expanding universe in [8], an identical equation is used for the ingress of pure energy by v in the opposite direction. That is, we consider the incoming energy to be c (m/s) photonic in three axes, in the same but opposite direction of the expanding universe:

$$v = v_x\,i + v_y\,j + v_z\,k \tag{3.1.1}$$

and

$$|c| = \sqrt{v_x{}^2 + v_y{}^2 + v_z{}^2} \quad (3.1.2)$$

That is, all contributions not on the coordinate axes, i.e., outside the direction of the origin 0 of the local coordinate system, have a lower projected speed and distance to 0 (covariance), i.e., they comply by covariance with the phasing in the time surface: the coincidence at 0 at time t_c. Photonic energy is $E_p = hc/ƛ$ from which it may be concluded that at c (m/s), different wavelengths cannot coincide at exactly one point location in time, because they each stretch by time $t = ƛ/c$. This calls for a mathematical description of energy density per (stretched) location and is a reason to limit wavelengths to high-energy components that, in terms of energy, may contribute to a creation of mass in defining the time frame of coincidence, i.e., in a reality model, the result of the convolution.

Because the ingress of energy along spatial coordinate axes toward the spacetime data point 0 is considered independent, the total contribution of incoming energy at t_c is thus limited by c (m/s), and from the three independent axes follows:

$$|c| = \sqrt{c_x{}^2 + c_y{}^2 + c_z{}^2} = \left|\sqrt{3c^2}\right| = \sqrt{3}\,c \quad (3.1.3)$$

The contributions in independent dimensions appear at the same time coordinate, i.e., typically the time information surface of the 'present' in a thought experiment. That is, the phase shift φ between the time functions is defined as zero by the particular information surface, meaning that all individual amplitude (intensity) components contribute to the steepness of the time pulse and their wavelengths contribute to the duration in time. The incidence of the pulses toward the (local) origin is now spatially located in three axes, and the timing is phased such that the three pulses occur at the same time surface (in any, but now unique, spacetime location), and the fourth orthogonal dimension t remains independent of space, whereas a priori the time vector on this surface could have taken any direction but remains constant in its magnitude |t|.

This specifically shows the difference between Absolutivity and Relativity in a way that relieves the predictive capability of temporal observational information to the reality of temporal non-observable information, i.e., including quantum information, by domain transformation of the 4D spacetime framework into the curvature or frequency (inverse) domains.

We set up a thought experiment composed of three identical two-dimensional pulses in space, created at the same time in true time [1], coinciding at the origin. A practical adaptation can be to revert to convolutions, replacing the ideal considered Dirac pulses containing equally phased and intensity properties of Fourier components.

The amplitudes of the orthogonal pulses, by the convolution of three temporal amplitude values, are integrated over the pulse length from $t_1 - t_c$. The energy evolving in the spacetime location also provides a visualized model of the convolution, i.e., product, phase shift, and summation at the quantum level.

3.2 Energy Density and Convolution

In practice, the theoretical true-time-simultaneity-based approach in temporal data points may be replaced by convolution of components in a time frame of spatial coincidence, which is consistent with the phasing and wavelengths of the individual components that in principle stretch beyond one data point, assuming energy takes up an amount of space and may be treated as one-dimensional (e.g., line), two-dimensional (e.g., surface, line-time), three-dimensional (e.g., volume, surface-time), and with this spacetime model truly four-dimensional. In practice, it may be necessary in the time frame to refrain from long-wavelength components with contributions near zero by filtering, i.e., restricting photon energy to significant high-energy, short-wavelength components. Whereas the proposed experiment identifies the temporal energy density ideally in one spacetime data point (Dirac), in reality this results in dimensional convolution of time pulses of length from $t_1 - t_c$. The convolution stretches the true time data point and shows by summation the product of the interaction over the time from $t_1 - t_c$. This energy density can then be compared with the energy of the experimentally found Higgs particle in the creation of matter.

The Mizohata-Takeuchi (MT) conjecture shows an upper limit in the one-dimensional treatment, e.g., $\sum ƛ\, n_ƛ h v_ƛ$ eV of photon energy expressed in harmonics energy of frequency and wavelength components, e.g., distributions of the type $a\sin(\omega t)$ and $b cos(\omega t)$. The use of time pulses seems in practice easy to use by the temporal limitation of the pulse length in the time convolution, restricting the energy density to the very short expected wavelengths.

In mass-creation descriptions, the use of energy density is mandatory. Mass in principle is to be treated as a manifestation of energy, i.e., as a phase transformation of pure energy with extended properties of mass and gravitational field. That is, mathematically in spatial dimensions as a volume with density properties of mass and field. The periodic table model shows the basic types of elements, and the 'mass' of objects thus is treated as a summation of different densities of elements and chemical compositions of matter in the total volume of an object. This allows proper description of mass density mathematically in volumes (i.e., object 'mass' as aggregated mass densities) and, e.g., fields through surfaces (e.g., energy density flows). See, e.g., the introduction of mass density as a fundamental approach in gravity contexts, such as in [7].

From (3.1.3) we find:

$$|c| = \sqrt{c_x{}^2 + c_y{}^2 + c_z{}^2} = \left|\sqrt{3c^2}\right| = \sqrt{3}\,c \quad (3.1.4)$$

And with the momentum $(nhv_n)/c$ in the coincident pulses from independent dimensions at the origin:

$$\left(\frac{nhv_n}{c}\right)\left(\sqrt{3}\,c\right) = \sqrt{3}\,(nhv_n) \quad (eV) \quad (3.1.5)$$

This extension to three independent directions theoretically yields a factor $\sqrt{3} \approx 1.73$ times higher (pure-energy-based photonic) energy than the expected value in the one-dimensional components $(1D + t)$ of the Mizohata-Takeuchi conjecture. A description in harmonics components (i.e., photons) carrying energy falls short of reality if it does not exactly define the dimensional density of the energy in treatment. As may be verified in the 4D approach, dimensional sizes stretch the temporal interaction, particularly at the quantum level, making the actual (per data point) energy density extremely sensitive to interaction time. Limiting the interaction to high-energy components may be a resolution; however, it does not yet have a background in radiation at the first stages of the Big Bang (BB). This would require a reverse calculation (without wavelength shifts) of the total energy in background radiation in the universe. The result here is therefore indicative and only for extension of the conjecture to two more independent directions, related to pure photonic incoming energy.

4. ON THE MASS-GRAVITY PROPERTY

The relation between the potential field of the mass property and the velocity of mass is explored from the basic energy E_m of a mass quantum particle with kinetic and potential field energy. In the treatment of mass of small entities or particles, the potential field is often neglected because of its weakness; however, it remains at 50% a substantial part of its energy. A mass-gravity particle therefore may exchange energy with an external field modeled in Newtonian force accelerating the particle. As the field is velocity dependent, the particle's own (internal) radiated field density may decrease externally until fully confined within the entity of the particle.

Considering $E_m = mc^2$ and $E_m = U_k + V_p$ one finds for the potential energy of a mass particle in an otherwise empty space: $V_p = mc^2 - (1/\, mv^2)$. Writing v with factor a of c, i.e. $v = ac$ or $a = v/c$ with $0 < a < 1$, and:

$$V_p = mc^2 - \tfrac{1}{2}m(ac)^2 = mc^2\left(1 - \tfrac{1}{2}a^2\right) \qquad (4.1)$$

The energy V_p is the potential energy of its gravity field V_g, typical for mass-gravity particles and entities built from mass concentrations with densities d_m (kg/m³).

The gravitational potential field is $V_g = mG/r$. Therefore, without other external sources of gravity field: $V_p = V_g$ and $mG/r = mc^2(1 - (1/2)a^2)$. For example, for an elementary proton accelerated to $v = c$ and at $v = 0$:

1. $(a = 1) \rightarrow (v = c)$ and $V_g = V_p = (1/2)m_pc^2$ and kinetic energy $U_k = m_pc^2 - (1/2)m_pc^2 = (1/2)\, m_pc^2$.

2. $(a = 0) \rightarrow (v = 0)$ and $V_g + U_k = E = m_pc^2$

In the LHC, protons are accelerated to $0.999\ldots c$ (m/s) and consequently their energy in case 1 is $E = (1/2)m_pc^2 + V_g$, whereas at rest, their energy in case 2 is $E = m_pc^2$. In contrast with case 2, the gravitational field $V_g = (1/2)m_pc^2$ of the proton in case 1 cannot develop into a field in space at c (m/s), i.e., it is not radiated, as the physical velocity of the field cannot exceed c (m/s). At c (m/s), the potential field energy therefore is carried within the proton structure, and V_g is not measurable outside the structure. This much resembles a photon structure without mass property, where the potential energy cannot escape the photon for the same reason: the potential field remains bound by velocity c, and it is usually represented in one dimension (thus photon energy depends on its concentration of energy in its dimensional size, i.e., inversely proportional to its wavelength). In a generic sense, for near-c (m/s) moving particles, i.e., for high-velocity mass quanta in the first stages of the Big Bang, their gravity fields will be hardly detectable unless colliding with larger and slower mass entities the chance of which currently is extremely small.

Because of their dependence on velocity, potential fields of mass are thus unsuitable for collecting precise information on 'dark' matter and energy. Unfortunately, they remain 'dark', i.e., confined and undetectable as energy fields.

Protons in the LHC may be accelerated to 0.999c (m/s). These particles in theory therefore could be orbiting at the horizon (however without true time differences) of a black hole. From this it may also be concluded that for mass particles with velocity c (m/s), e.g., the LHC protons orbiting, the core must stretch to r_s when mass M is considered a single fixed property. Whereas (average) mass density yields $M = M_d(4/3)\pi {r_c}^3$, the higher density M_d (i.e., ρ) then allows descriptions where r_s may be larger than r_c, i.e., $r_s > r_c$, where the Schwarzschild radius remains outside the massive core structure, up to the maximum density for matter, e.g., neutron star density at 10^{14} kg/m³. Black hole mass M as a fixed property therefore represents an upper limit of maximum mass where a vacuum state may exist, up to M_{max} where $r_s = r_c$, a property of supermassive black holes possibly in galaxy centers, meaning they may not have a vacuum area anymore:

$(r_s = r_c) \rightarrow (r_s/r_c = 1)$. With $r_s = c^2/2GM$ and $r_c = 2MG/v^2$, it follows:

$$\frac{r_s}{r_c} = \frac{c^2}{v^2} \qquad (4.1)$$

That is, when the massive core $M(r)$ grows to r_s a black hole 'has lost' its vacuum area and remains 'black'. From this size onward, evaporation may be explored.

5- CONCLUSIONS

The development of Absolutivity theory started with a mathematical basis of mass-gravity and photon particles by concentration in dimensional volumes and flows through surfaces, combined with S.D. Poisson's theory on potential fields in the description of mass-gravity in vector space, as treated in [7, 8]. The theory fundamentally integrates causality in the irreversible fourth time dimension of dynamic reality events at scales from astrophysics to quantum physics in a complex vector spacetime continuum, unified in a framework of genuine 4D orthogonal spacetime topology.

While mass particles experience Newtonian force balanced with centripetal force, photons balance potential energy dynamically with curvature at the particular location in the field. Both equilibria result from Lagrange's principles of stationary action, not allowing energy exchange [1, 2]. Because of this principle, quantum orbits in vacuum are continuous in a 'perpetuum mobile' that however cannot deliver energy, as trajectories are in equipotential energy (i.e., Newtonian force equilibrium).

Photons may bypass the hole at lower corresponding curvature $k(\lambda)$ and above radius r_λ when crossing r_s for longer wavelengths r_λ, to temporally enter and escape the hole depending on incoming boundary conditions and their energy

(hc/λ). This is not considered Hawking radiation of captured particles, but rather a temporal trajectory inside the Schwarzschild radius at much higher curvatures than expected from r_s. It does not support an assumed cause of 'hidden' dark matter or dark energy in black holes, as this would result in increased curvature in the entire potential field, i.e., measurable outside r_s.

The Theory of Absolutivity:

1. **Renders descriptions** anchored in the principle of universal simultaneity in the continuum of true 4D real-number space with a complex-number geometrically curved and orthogonal time dimension.
2. **Rejects retro-causality** by integration of dynamic causality entangled in the reality of dimensional irreversible time, while dynamic cause-and-effect functions may be explored 'backwards in time' from structural data and information captured in the time surfaces collected in memory structures.
3. **Is based on universal objective reality** (hence Absolutivity) and obviously departs from Relativity's observed subjective reality.
4. **Describes 'invisibles'**, i.e., quanta, mathematically by means of the inverse domain, i.e., a reality description of predictive spatial dimensional quantum energy distributions composed from individual, invisible quanta that cannot be modeled without anomalies by wavefunctions.
5. **Predicts a reality** that literally is not observable, i.e., behind the Schwarzschild radius inside a black hole horizon an area that cannot be described by observing wavefunctions in quantum theory alone.
6. **Implicitly predicts** in this area a myriad of orbit surfaces for photons as well as mass particles by Lagrange's stationary principles.
7. **Supports the QM-predicted Hawking radiation** in the continuum description by perturbation of equilibrium states: electromagnetic radiation and mass particles may escape from black holes from the predicted vacuum state area between the massive core and the horizon, i.e., the 'hidden' area of orbiting particles.
8. **Does not describe the massive core**, i.e., the source of the gravity field. Full 'evaporation' including the core of black holes predicted by S.W. Hawking cannot be predicted in this treatment.
9. **Predicts continuous radiation**, fluctuating by incoming particles alone, not reaching, i.e., colliding with, the core.
10. **Identifies** that attractive force between masses versus curvature of pure energy in gravitational fields is to be treated distinctly, as the stationary actions in principle in causality are different: zero inertial 'natural' curvature versus inertial 'forced' curvature.
11. **Answers** [3] "Can quantum mechanical description of physical reality be considered complete?": definitely not alone; however, proper quantum theory without anomalies may readily acquire validity in Absolutivity.
12. **Opposes intrinsic**, i.e., foundational, spacetime distortion and curvature as concluded by A. Einstein.
13. **Predicts** that photons and mass particles may orbit in a hidden vacuum area at much stronger curvature than $1/r_s$ i.e., $1/r_s < k(r) < 1/r_c$.
14. **Predicts** a factor $3^{1/2}$ higher concentration of possible harmonics energy at a spacetime location compared to the Mizohata-Takeuchi conjecture. Note: it is emphasized that in a mathematical treatment, a dimensional volume, surface, or line should be introduced for a proper coincident energy density.
15. **Identifies** that gravitation by potential field measurements or detection cannot account for estimates of the amount of total created mass in the universe.

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