SYNOPSIS OF UNIFICATION THEORY

The System of Spacetime

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home page (page 1)
home page (page 2)
E-Book

What we see is not Nature, but Nature exposed to our method of questioning - W. C. Heisenberg

Abstract

The conceptual basis of the Unified Field Theory, as presented in these pages, can be briefly sketched as follows:

Our Universe is asymmetric in that it consists only of matter, without an antimatter complement. This cosmic-scale asymmetry was created during the "Big Bang" by the action of the weak force, creating matter from perfectly symmetric light, thus bringing our manifest world into existence. "Noether's Theorem" states that in a continuous multi-component field such as the electromagnetic field (or the metric field of spacetime), where one finds a symmetry one finds an associated conservation law, and vice versa. *The symmetries of light must be conserved no less than its energy*. Consequent upon the creation of asymmetric matter from symmetric light during the "Big Bang", light's lost symmetries are conserved in matter by charge and spin; in spacetime, by inertial and gravitational forces. Light's raw energy is conserved as mass and momentum; light's "non-local" intrinsic motion or entropy drive (as "gauged" by "velocity c") is conserved in "local" matter as time and gravitation.

All forms of energy, including the entropic conservation domain of spacetime, originate as light. During the "Big Bang", an unknown, asymmetric self-interaction of primordial, high energy light produced matter; matter carries charges which are the symmetry (and entropy) debts of the light which created it. Charge invariance is therefore an important corollary of charge and symmetry conservation, maintained in our temporal (gravitational) metric of relative motion by "local gauge symmetry currents" (compensating components of the field vectors, such as magnetism, time, the strong force "gluons", and the massive "Intermediate Vector Bosons" ("IVBs") of the weak force). The invariance of "velocity c", the "Interval", and causality are likewise important metric corollaries of energy conservation (the "Lorentz Invariance" of Special and General Relativity). Charges produce forces which act to return the material system to its original symmetric energy state (light), paying (partially or completely) matter's symmetry/entropy debt. Repayment of matter's symmetry debt is exampled by: 1) spontaneous, exothermic chemical reactions (partial) and matter-antimatter annihilations (complete); 2) radioactivity (partial) and "proton decay" (complete); 3) the nucleosynthetic pathway of stars (partial) and Hawking's "quantum radiance" of black holes (complete). Identifying the broken symmetries of light associated with the charges and forces of physics (including gravity) is the first step toward their conceptual unification. *The charges of matter are symmetry debts of light*.

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Translations

This paper has been translated into French by Kate Bondareva. 16 Aug., 2014. Thanks Kate! See: http://www.autoteiledirekt.de/science/synopsis-de-lunification-theorie

This paper has been translated into Hindi by Nikol. 15 March, 2018. Thanks Nikol! See: (?link?)

The System of Spacetime

Introduction: Charge

The function of charge is to conserve light's various symmetries; charge conservation is one of several conservation principles which are necessary to allow symmetry-breaking during the "Big Bang", and the conversion of free energy to information. Charge and charge conservation are attributes of symmetry conservation, much as entropy and entropy conservation are attributes of energy conservation. Entropy and symmetry are explicitly related through velocity c, which gauges both light's symmetric energy state and primordial entropy drive, vanishing time and distance, maintaining metric (inertial) symmetry and the "non-local" character of light (resulting in the distributional symmetry of light's energy throughout spacetime), while simultaneously causing the expansion and cooling of space. It is because of this dual "gauge" (regulatory) role of c that light's primordial spatial entropy drive may be included with symmetry under the conservation mantle of "Noether's Theorem", a consideration which also extends to the rationale for both aspects of the gravitational "location" charge, whose active principle is time. (See: "Entropy, Gravitation, and Thermodynamics" and "The Double Conservation Role of Gravitation".)

For each of the four forces of physics I identify a charge and the symmetry debt it conserves (charge conservation = symmetry conservation - "Noether's Theorem"). Charge conservation is a temporal (local, material) form of symmetry conservation. (See: "Symmetry Principles of the Unified Field Theory" and "Global vs Local Gauge Symmetry in the Tetrahedron Model").

Electromagnetic Force

A) Electromagnetic Force: electric charge. Dimensional asymmetry: the symmetry of space vs the asymmetry of time.
Role: matter-antimatter annihilation - providing a spatial force of attraction between matter and antimatter (particle-antiparticle pairs) that will motivate annihilation reactions within the "Heisenberg Interval", the time limit imposed upon virtual reality by velocity c. Through annihilation reactions, electric charge prevents massless, non-local, atemporal, acausal, symmetric light from devolving into massive, local, causal, temporal, asymmetric matter with "real" charges, including gravitation. Since the photon is the field vector of electric charge, we see light protecting its own symmetry in particle-antiparticle annihilations. Magnetic forces protect the invariance of electric charges in relative motion. "Velocity c" (the intrinsic motion of light) is the metric gauge (regulator) of both the primordial spatial entropy drive of light, and the "non-local" symmetric energy state of light.

Magnetic forces are functional analogs of (and derived from) "Lorentz Invariance", the dimensional flexibility of space and time as formalized by Einstein in his theory of Special Relativity. Lorentz Invariance, in turn, is necessary to protect the invariance of "velocity c", the "Interval", and causality from the variable reference frames and perspectives of relative motion. Magnetic forces protect the invariance of moving electric charges; the Doppler effect is another consequence of Lorentz Invariance protecting the constant velocity of light.

Gravity

B) Gravitational Force: "location" charge (time). Gravity conserves (and eventually restores) both metric gauge functions of "velocity c": light's entropy drive and "non-local" symmetry.
1) Light's entropy drive: converting the intrinsic motion of light to the intrinsic motion of time - by annihilating space and extracting a metrically equivalent temporal residue. (See: "The Conversion of Space to Time".)
2) The "non-local" distribution of light's energy: the symmetric spatial distribution of light's energy (due to intrinsic motion c - Einstein's "Interval" = zero) vs the local spatial concentration of bound energy (due to the intrinsic "rest" of matter - Einstein's "Interval" > zero). Gravity converts bound to free energy in stars (and other gravitationally driven astrophysical processes).

Role 1) (entropy debt): creating matter's time dimension (the primordial entropy drive of bound energy), and the joint dimensional conservation domain of free and bound energy, spacetime. Time marches on to create the conservation domain of information and matter's "causal matrix", history (historic spacetime). Time is necessary to balance the energy accounts of matter in relative motion, provide matter's primordial entropy drive, and to conserve the invariance of causality, velocity c, and the "Interval" (via the dimensional flexibility or "Lorentz Invariance" of Special Relativity). Time also provides the historical dimensional arena in which charge conservation has durable meaning, and in its own turn, induces the gravitational force: *a gravitational field is the spatial consequence of the intrinsic motion of time*. Hence through gravity, time also conserves symmetry (see Role 2) below).

Role 2) (symmetry debt): converting bound to free energy in stars (via the nucleosynthetic pathway), quasars (releasing gravitational potential energy), and black holes (through Hawking's "quantum radiance") - this final and complete conversion pays all the entropy and symmetry debts of bound energy. The conservation role of entropy and symmetry in the creation of the gravitational force is paradigmatic of the relationship between Quantum Mechanics (entropy) and General Relativity (symmetry). The two theories join in the "entropic charge" of gravitation, "time". Gravitation serves energy conservation and entropy, and protects the invariance of causality and the "Interval", despite the relative motion and the immobile, local, asymmetric energy state of matter, creating time from space in order to do so. A local metric is required to conserve the energy of a local energy form; gravity provides the gauge (the universal gravitational constant "G") for that local, temporal metric. The creation of time from space is the single rationale for gravitation; it is because time is such a multitasking workhorse with so many conservation roles after it is produced that gravity appears to be such a complex and confusing force. Because gravity and time induce each other, the symmetry-conserving role of gravitation (converting bound to free energy in stars, etc.) can also be attributed to time. Entropy and symmetry conservation drive toward a common goal.

Both of gravity's (and all of matter's) entropy and symmetry debts are paid by the gravitational conversion of mass to light, since light is massless, non-local, atemporal, and produces no

gravitational field (the recently observed "acceleration" of the Universe is the evidence that light produces no gravitational field). As mass is converted to light by various astrophysical processes, and by particle and proton decay (including any analogous conversion processes in "dark matter"), the total gravitational field of the Cosmos is reduced, resulting in a relative "acceleration". (See: "A Spacetime Map of the Universe.")

Gravity is weak because gravity is the energy required to produce matter's time dimension, the temporal entropy-energy of a given mass. In the case of the Earth, the gravitational energy Gm (where m is the mass of the Earth) is the energy required to produce Earth's time dimension (via the gravitational annihilation of space). The weakness of gravity tells us that creating Earth's time dimension does not require much energy, nor (equivalently) the conversion of much space to time. This is because matter, unlike light, is only tangentially connected to its historic entropy domain (via the "present moment"). (See: "The Half-Life of Proton Decay and the 'Heat Death' of the Cosmos".)

Black holes provide the physical demonstration of the gravitational conversion of space and the drive of spatial entropy (the intrinsic motion of light) to time and the drive of historical entropy (the intrinsic motion of time). The event horizon of a black hole is a temporal entropy surface (the Hawking-Bekenstein theorem). (See: "A Description of Gravitation".) (See also: J. D. Bekenstein "Information in the Holographic Universe". *Scientific American* Aug. 2003, pages 58-65.)

Strong Force

C) Strong Force: color charge, "gluon" field vectors. Partial charge asymmetry: the fractional charges of the sub-elementary quarks vs whole quantum unit charges (as in the leptons). The strong force protects the invariance of whole quantum charge units despite the partial charges of the quarks. An internal symmetry debt peculiar to particles composed of quarks ("hadrons" = baryons and mesons).
Role: permanent confinement of quarks to whole quantum unit charge combinations (so their charges can be neutralized, canceled, annihilated, or carried by the alternative charge carriers (leptons and mesons)). A related symmetry of color charge is known as "asymptotic freedom", the self-annihilation of color charge necessary for proton decay and the creation of heavy baryons (hyperons) from neutral leptoquarks (via the hypothetical "X" IVB?) during the "Big Bang". (See: "The Particle Table".)

A secondary expression of the strong force (between baryons rather than within baryons) involves the binding of protons and neutrons ("nucleons") into compound atomic nuclei via a "Yukawa" exchange field of mesons. These fusion reactions result in the conversion of bound nuclear energy to light in the nucleosynthetic pathway of our Sun and the stars. (See: "The Strong Force: Two Expressions".)

Weak Force

D) Weak Force: "number", or "identity" charge. "Anonymity" asymmetry: all photons are alike but the elementary particles are distinguishable from photons and from each other.
Roles: provides the basic asymmetry which allows the creation of matter. Identifies the correct antimatter partner in annihilation reactions; provides alternative charge carriers (the leptons) and metric catalysts (the "Intermediate Vector Bosons" (IVBs)) to enable the creation, destruction, and transformation of *single* elementary particles of matter (leptons and quarks). (Charges can be

balanced by leptonic alternative charge carriers rather than antiparticles; the latter would only cause annihilation reactions.) The large mass of the weak force Intermediate Vector Bosons (IVBs) (as scaled by the Higgs boson), recreates the primordial electroweak force unification symmetric energy state of the "Big Bang". The weak force mechanism for the creation of elementary particles is essentially a "mini-Big Bang", recreating the original conditions in which the reactions it now mediates first took place, thereby guaranteeing the invariance of elementary particle mass, charge, and identity across eons of time and despite the entropic expansion of the Cosmos. (See: "The Origin of Matter and Information"; "Identity Charge and the Weak Force"; "The 'W' IVB and the Weak Force Mechanism"; "Global-Local Gauge Symmetries in the Weak Force"; "The Higgs Boson and the Weak Force IVBs".)

The Dimensions

The Dimensions of Spacetime are Entropic Conservation Domains

The dimensions of spacetime are conservation/entropy domains, created by the entropic, "intrinsic" motions of free and bound electromagnetic energy. The intrinsic motion of light, gauged by "velocity c", creates space; the intrinsic motion of matter's time dimension, gauged by "velocity T", creates history. "Velocity c" also gauges the time dimension - as the duration (measured by a clock) required by light to travel a given distance (measured by a meter stick). Gravity, gauged by "velocity G", converts space to time, welding space and time together to create spacetime, the joint conservation/entropy domain of free and bound energy. These dimensional domains function as arenas of action, where energy in all its forms can be simultaneously used and transformed, but nevertheless conserved. This is the major connection between the 1st and 2nd laws of thermodynamics. (See: "Entropy, Gravitation, and Thermodynamics".)

Time is implicit in free energy as "frequency", and is the actual driver of light's intrinsic motion: symmetric space ("wavelength") flees asymmetric time ("frequency"), which is an embedded characteristic of light's own nature (frequency multiplied by wavelength = c). Time (the proverbial "bur under the saddle") is the implicit, hidden, internal motivator of light's perpetual, "intrinsic" (self-motivated) motion, velocity c. "Velocity c" is actually a symmetry condition of free energy, which, in obedience to Noether's Theorem, forever moves in such a way as to prevent the explicit appearance of time, with its inevitable companions: mass, charge, and gravitation - the asymmetric "Gang of Four".

Spacetime is a closed, conserved, and protected domain of free and bound electromagnetic energy; c and T are (and must be) essentially "infinite" velocities which seal its borders, preventing causality tampering by either "time machine" or "superluminal" space travel; similarly, any possible metric or inertial loopholes ("wormholes") are closed gravitationally by the "event horizons" and central "singularities" of black holes. (In the extreme case of the black hole, the gravitational metric takes over all conservation functions formerly performed by the electromagnetic metric.) The invariance of velocity c also protects the invariance of causality and Einstein's "Interval", and is in turn protected (in massive systems) by the "Lorentz Invariance" of Special Relativity, the flexibility of the dimensions between observers in relative motion ("moving clocks run slow", etc.). The entropic gauges c, T, and G create and defend dimensional conservation domains for free and bound electromagnetic energy: space, history, and historic spacetime. See: "Spatial vs Temporal Entropy". Entropy is a corollary of energy conservation. The function of entropy is to protect energy conservation by preventing the abuse of energy: because of entropy, energy cannot be used twice to perform the same net "work". Without entropy, energy

conservation would prevent any use of energy at all.

The historical expansion of the cosmos is funded by the gravitational deceleration of the spatial expansion of the cosmos. This is physically accomplished by the gravitational annihilation and conversion of space into metrically equivalent temporal units. Gravity pays the entropy-"interest" on the symmetry debt of matter, creating time and hence the historical dimension in which charge conservation can have durable meaning and causal significance. When mass is converted to light in stars, gravity pays the energy-"principle" of matter's symmetry debt, completing the entropy/symmetry conservation loop. The total mass of the Cosmos and its associated gravitational energy is reduced, in consequence increasing the universal spatial expansion - as recently observed.

The Metrics of Space and Time

The Metric

The metric is the measured relationship within and between the dimensions. The metric functions to conserve energy, entropy, symmetry, and causality. We experience the metric through such phenomena as time, the velocity of light, gravity, and inertial force. The electromagnetic metric of space and light is "gauged" or regulated by the electromagnetic constant "c" such that one second of temporal duration is metrically equivalent to 300,000 kilometers of linear distance. Traveling at this "velocity", the photon (a quantum of light) has no time dimension, and no length in the direction of motion. As a consequence, light's energy is symmetrically distributed everywhere, simultaneously. "Velocity c" therefore gauges multiple symmetries of light's metric, including the symmetrical relations between the spatial dimensions (no favored directions in space), and the symmetrical relations between the spatial and temporal dimensions (the asymmetric one-way time dimension is suppressed at velocity c). Other metric symmetries of light include light's zero "Interval" (expressing light's "non-locality" and two-dimensionality), and the consequential fact that light, moving freely in spacetime, produces no gravitational field. Since the intrinsic motion of light also produces space and the expansion and cooling of the spatial cosmos, "velocity c" also gauges the spatial "entropy drive" of light. Space is an entropic conservation domain for free electromagnetic energy, created by light's own intrinsic/entropic motion. These are only some of the symmetry-keeping and energy conservation functions of light's electromagnetic metric.

Light and Space

The function of the metric is energy, entropy, and symmetry conservation, including protecting the invariance of causality, velocity "c", and Einstein's "Interval". The "Interval" is an invariant measure of spacetime, the same for all observers whether at rest, in relative motion, or even in accelerated motion, whose function is the conservation and protection of the causality relations of all massive objects in relative motion. The "Interval" remains invariant due to the covariance of space with time ("Lorentz Invariance") in Einstein's theories of Special and General Relativity. The Interval of light = zero, which is Einstein's formal (mathematical) statement of the "non-local" character of light. Light's non-local character involves the fact (also discovered by Einstein) that light has no x or t dimensions: light is a 2-dimensional transverse wave whose "intrinsic" (entropic) motion sweeps out a third spatial dimension. Having no distance or temporal component, light has forever to go nowhere, hence light's "infinite" velocity and non-local character (lacking 2 of 4 dimensions, light's position cannot be specified in 4-D spacetime).

"Velocity c" is not an actual velocity, but the electromagnetic gauge regulating, among other things, the spatial entropy drive of light (light's intrinsic motion) expanding and cooling the spatial Cosmos, and the symmetric, "non-local" distribution of light's energy throughout space, everywhere, simultaneously. Both these symmetries are conserved by gravity. (See: "The Double Conservation Role of Gravity".) "Velocity c" also gauges the energetic equivalence between free and bound forms of electromagnetic energy (E = mcc), and the magnitude of electric charge. For all these reasons and more, "velocity c" is the principle gauge of the electromagnetic metric and for obvious reasons of energy, entropy, symmetry, and causality conservation must remain invariant, even if space and time must be "bent", "warped", or "curved" (co-vary) to accomplish the task. Space is the entropic/energetic conservation domain of free electromagnetic energy (light), created by the intrinsic motion of light for its own conservation. Light is the only energy form capable of creating its own conservation domain (from nothing) by means of its own "intrinsic" (entropic) motion. Bound energy (matter) must create its conservation domain from pre-existing space and light. Therefore all-symmetric light is the primary energy form, and asymmetric matter is secondary, derived from light, in both its energy, its conservation domain, and its primordial entropy drive.

Matter, Time, and Gravity

Enter now bound electromagnetic energy (matter created from light), with its inevitable asymmetric companions: mass, time, gravity, charge. In the conversion of free electromagnetic energy (light) to bound electromagnetic energy (matter) during the "Big Bang" or "Creation Event", the raw energy of light is conserved as mass and momentum; the symmetry of light is conserved as charge and spin; the spatial entropy drive (intrinsic motion) of light is conserved as gravitation and the intrinsic motion of time. *The charges of matter are the symmetry debts of light* (Noether's theorem). The active principle of gravity's "location " charge is time. Time is the necessary additional dimensional parameter which must be created to record and accommodate the variable energy accounts of matter in relative (rather than absolute) motion. The creation of matter's time dimension is the crucial task of gravitation. In turn, the intrinsic (entropic) motion of time creates history, the conservation domain of matter's causal information field.

Light's electromagnetic metric cannot accommodate these bound energy forms, specifically because of their 4-dimensionality, undistributed mass, and lack of intrinsic motion "c". Nevertheless, a metric must somehow be created to accommodate the energy conservation needs of bound forms of electromagnetic energy. A metric's function and rationale is energy conservation, and this is no less true for the temporal metric of matter and bound electromagnetic energy, gauged by "G" (the universal gravitational constant), than for the spatial metric of light and free electromagnetic energy, gaged by "c". These two metrics must be combined into a metric of "spacetime" capable of conserving the energy accounts of both free and bound forms of electromagnetic energy simultaneously and seamlessly. Nature accomplishes this daunting task effortlessly by the simple expedient of extracting time directly from the spatial metric by means of gravity. As Einstein discovered, space is not just space but is in fact "spacetime". Light and the space light creates contains a suppressed temporal component, present implicitly as "frequency" (frequency x wavelength = c). Gravity annihilates space, revealing its hidden, metrically equivalent temporal component. By this means a gravitational/temporal metric is created which is entropically and energetically compatible and integrated with space, creating the spacetime conservation domain we know and inhabit. It should be no surprise that electromagnetic energy, having both a free and bound form, should also have within itself the means to create a compound

metric capable of satisfying the conservation needs of both these forms simultaneously. (See: "The Conversion of Space to Time".)

The active principle of gravity's "location" charge is time itself. The field vector of gravity is the temporal component of spacetime. Time has intrinsic (entropic) motion into history (the temporal analog of space), which is situated at right angles to all three spatial dimensions. As the entropic time charge moves into history, it pulls space along with it. However, space cannot squeeze into the point-like end of the one-dimensional time line, and self-annihilates at the entrance. The self-annihilation of space produces another temporal component (the metric equivalent of the annihilated space), and so the entropic cycle continues forever. *A gravitational field is the spatial consequence of the intrinsic motion of time*. Gravity is the only one of the four forces of physics with an entropic charge - a charge with intrinsic dimensional motion. (See: "A Description of Gravity".)

Gravity is weak because matter is only tangentially connected to its historic conservation domain - via the universal "present moment". Whereas light fully occupies its spatial conservation domain, matter exists only in the present moment of history. Consequently, gravity creates only enough time to satisfy the entropy drive of matter's tiny connection to history. This connection is equivalent to the surface area of a black hole containing the mass of the given object. (See: "A Spacetime Map of the Universe".)

Black Holes

Although the gravitational field of small masses is very weak, because gravity is only attractive, with no repulsive component, and cannot be neutralized except by the conversion of mass to light, gravitational fields can increase in intensity to the limiting value of g = c (the black hole). Beyond this limit, they can only increase in size (the supermassive black holes of galactic centers). As a gravitational field increases in intensity, its temporal metric begins to dominate and progressively replace the electromagnetic metric, including the latter's conservation functions. At low gravitational field energies, as in single atoms up to and including planetary sized bodies, only the entropy conservation function of gravity is evident - the conversion of light's intrinsic spatial motion to the intrinsic historical motion of matter's time dimension. Gravity crosses a threshold in stars, however, as its symmetry conservation function comes into play, in the conversion of bound energy (mass) to free energy (light) via the nucleosynthetic pathway. (The gravitational potential energy of in-falling matter is also converted to kinetic and radiant energy (think of meteors), becoming a truly significant effect in black holes and quasars.)

Other high-energy thresholds of the temporal metric are indicated by the members of the remarkable "condensed matter" series of "final states" for astronomical bodies, in which gravity begins to take over the binding functions of the other forces. First among these is the white dwarf, in which the electromagnetic force begins to give way as the electron shells of atoms are crushed and reduced to an "electron sea". Next is the neutron star, in which the electrons are driven into the protons, producing a gigantic gravitationally bound atomic nucleus (weak force beta decay gives way). Finally in the black hole, even the strong force is overwhelmed as matter is crushed to a point ("singularity") - no doubt producing "proton decay" in the interior of the black hole (in the limit of "asymptotic freedom"). (See: "Proton Decay and the 'Heat Death' of the Cosmos".) In the black hole, at the "event horizon" where space is accelerated to velocity c (where g = c), the temporal/gravitational metric completely overwhelms and replaces the spatial/electromagnetic metric. Time replaces space and becomes "visible" as the surface area of a black hole's "event

horizon". The surface area of a back hole is equivalent to the temporal entropy of its mass (the Bekenstein-Hawking theorem). (See: J. D. Bekenstein "Information in the Holographic Universe". *Scientific American* Aug. 2003, pages 58-65.)

Just as a rock is the energy of light converted to an asymmetric massive form and brought to rest, so the surface area of a black hole is the spatial entropy drive (intrinsic motion) of light converted into an asymmetric temporal form and brought to rest. At the event horizon of a black hole, light and time stand still, and meter sticks shrink to nothing. The temporal metric has completely replaced the spatial metric - seconds become of indefinite duration as space dwindles to nothing and light ceases to move - the extreme limiting case of "Lorentz Invariance", or the co-variance of space with time.

The black hole demonstrates not only the gravitational conversion of space to time, but also both inside (via proton decay) and outside (via Hawking radiation) that the conservation role of gravitation - and hence also ultimately of time - is the conservation of the non-local symmetric energy state of light: specifically the non-local distributional symmetry of light's energy content, and the "all-way" symmetry of light's primordial spatial entropy drive. We also note that in the surface area of a black hole, matter achieves a complete integration with its entropic conservation domain, just as matter is also returned to intrinsic motion c at the event horizon. These phenomena, originally observed only in the case of light, demonstrate again the complete replacement of light's electromagnetic metric and all its conservation functions by the temporal/gravitational metric of matter.

In the phenomenon of "Hawking radiation" we see the final triumph of light over darkness, gravity and time. With the complete conversion of the mass of the black hole to light, the gravitational field associated with the hole also vanishes, indicating that its symmetry-conservation role is finished, completely fulfilling the mandate of Noether's Theorem. (See: "A Rationale for Gravity".)

For an equivalent synoptic statement regarding matter, see: "Synopsis of the System of Matter" and "The Intrinsic Motions of Matter".
For text to the "Tetrahedron Model of Light and Conservation Law", see : "Synopsis of the Unified Field Theory: a Tetrahedral Model".

Related Papers

"A Synopsis of the System of Matter"
The "Tetrahedron Model" vs the "Standard Model" of Physics: A Comparison.
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Links:

home page (page 1)
home page (page 2)
E-Book