ultimate physics Decalogue- generalized relativity and quantum theory

by Paul Pistea

wonder how they could measure the speed of light in an empty space, because nobody could ever ignore that: if one puts light into the vacuity, the voidage isn't empty anymore.
introduction: if I`d say universes are in cosmos embedded icebergs, one would ask <what is cosmos?> if I`d explain that cosmos is an ocean of radiation, ~~dark matter~~ and black energy, one would ask <what is the ocean of radiation?> if I`d define what that is, one would ask what <that> is... and so on.

abstract. the theory of relativity can not explain universe's behavior in singularities. the developing of string theory proves once more that the prior teories of physics must be revised, precisely because they aren't accurate. dark matter should exist everywhere, otherwise the universe were not homogeneous, whereat space-time is not homogeneous especially in time. the system (i.e. universe) is not homogeneous due to singularities, bangs & crunches.
even after symmetry breaks the time symmetric laws can not explain the entrance of asymmetry into the world (such as asymmetry between matter and antimatter[1]), not to mention its localisation in time.
this impediments can be avoided by using the theory of distributions, while generalised functions are valide for infinite values too and an asymmetrical time interval of events (such as mass genesis) is permitted. by using distribution theory all physical laws, if relativity or quantum laws, can be handled as one single theory (unification of relativity and quantum!). even if the laws fail in singularities[2], it is appropriate to use the adequate distribution theory, which works on discrete spaces[3] and on singularities too. test functions have very good properties: infinite derivable, defined on compact spaces; transport of derivative from one factor to an other is allowed. if using distribution theory, functionals, test functions[4], fuzzy logic[5], singularities are avoided, forces needn't be unified, no critical mass[6] and cosmological constant(s) are required.

I. motto: playing lottery, which number would you choose? the often matched, or the no-match ones?
an often ignored, hidden problem of physics consists in choosing *the mathematical instrument to analyze*. for instance:
- using probability- to locate particles the amplitude square of the wave function is used. reciprocal: if square root (the inverse) would be used to determine where the particle probably should not be, the result were: in two places simultaneous; square root assigns for each x-value two y-values. that would disconfirm double slit experiment (note: square root isn`t even a valid function!).
- two reference systems do not remain equivalent, while one of them grows. note that universe is expanding non-uniformly, therefore universe at the moment t(i) is not equivalent to universe at the moment t(k). Laws of physics are not invariant at reduction or scale-up of an inertial system ((iso)static vs. inflation and expansion- reduction or scale-up of an inertial system enables genesis of asymmetry. ergo: to express physical laws in a non-equivalent system another transformation is needed.
- it is wise to consider c an asympthotical value for velocity, since division by zero is not defined!
note: if the division |z|(cosA + isinA)/|y|(cosB + isinB) were made without using modules- a complex number would become a half-line!-, compared with division by zero in complex numbers, the subtraction of angles would operate no change (but no indeterminacy).

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[1] the laws of physics should contain a fundamental asymmetry, e.g. between matter and antimatter.
[2] a beginning singularity like big-bang or steady state is where from matter evolves; an ending singularity like a black hole or big crunch is where matter finalises.
[3] in a fractal coordinate system there exist derivatives/ integrals of real degree/order (not an integer). for discrete spaces there are used set functions and the distribution theory.
[4] complex numbers: one can not strictly order complex values, like it is given for real numbers: z1#z2 does not implicate that z1 is greater or less than z2.
[5] each law is completed with a bracket which clarifies to what percentage it is valid (%true/ %false/ %indetermined).
[6] other theories presume the existence of a critical mass which is necessary to invert (respectively slow down) the expansion. note that an expansion inversion implicates one moment of stagnancy which would not lead to a contraction but to a (cataclysmal) implosion of the system called universe.

II. dimensions are nothing but abstract information needed for orientation. dimensions haven`t real, natural correspondence in time and space. there is only an aleatory number of locating parameters, called dimensions. the more specifications (alias dimensions) the more covered phenomena (velocity, acceleration-variations of other degrees than 1and 2, discontinuities, inflations, implosions, ...).
curvature implicates an increasing of the number of (so-called) dimensions. curved space should be described by means of not less than 3 dimensions (curved line-R^2, plus torsion-R^3). in a curved space the coordinate system itself should be curved.
practically to locate in time (i.e. motion) at least two specifications are necessary, 1st the variation in space (velocity) and 2nd the variation of space variation (acceleration). more: to operate with square seconds (for instance: kgm/s^2[7]), merely makes sense if time is considered 2-dimensional. thus: an accepted standard location in space-time must be (at the minimum) 5-dimensional.
as locating implies nothing else but to enumerate the required properties of something in time and space, the number of dimensions becomes irrelevant; one can use as many dimensions as necessary required, or even (redundantly) more (Kaluza-Klein, superstrings in 11 or in 26 dimensions). one can use spaces like R^n with nϵN, or fractals, or even R^α, where αϵR.
note: locating particles should be made in concordance with Heisenberg‘s uncertainty principle (quantum mechanics postulates that measuring/observation influences the particles).
a result of relativity is that: space is contracting only relative to the one(!) direction of motion whereby a time dilatation occurs. if time is defined to be motion whereat it obviously depends on at least two variables, acceleration and velocity (in other words: variation of space and variation of variation of space), then time is referring to itself, is non linear and dilatation occurs in two dimensions.
furthermore c^2 should be measured in km^2 per square seconds (i.e. two-dimensional time!)
to define space-time one could start (for example) with acceleration. integral of acceleration (a) is velocity (v), integral of velocity is space-time (SxT(a;v), integral of space-time is S^2xT(a;v), integral of S^2xT(a;v)= S^3xT(a;v) and so on.
motto: if a 4-dimensional object absorbs a 3-dimensional object, no information gets lost: because dimensions do not exist.

III. metrics and units- while mass curves the space around and in cosmos everything is rotating and revolving, in curved spaces plane geometry (incl. Pythagorean metric) is almost useless. orbits actually are no closed curves; a planet orbit is not an ellipse, while the sun rotates with the galaxy, which is moving due to a irregular expansion[8]; even a rotation of the universe is presumed (s. Gödel`s solution for Einstein`s equations)! metrics must be crono-geodesics correspondent.
in the formula $e=mc^2$ the c value needn't be seen as velocity, because $c^2>c$ (axiom violation!). more: what would km^2 per square seconds signify, in fact? maybe accelerated 2-dimensional branes multiplied by mass are nothing but energy?!
the existence of the smallest particle (in time or space)would imply continuity problems. planck-time is an unit which describes the smallest possible(!) time interval for which the physical laws are valid (Planck time is the time that light needs to pass a Planck length and cause a (theoretical) state change. If time intervals were smaller than Planck time, time would lose its familiar (continuity) properties and would quantize. i.e. time would flow discontinuously, so that each object which experiences such a short process would become a singularity. therefore Planck time defines the first era after (the presumed) big bang, which is possible to be described (it is named Planck era). so the theory.
simple refutation: 1 newton=kg*m/s^2 and p= kg m^2/s^3 (in watt). if square seconds or cubic seconds are used, then Planck time (about 10^-43 seconds) at the power of two, or three, respectively (say 10^-86, or 10^-129) becomes, although determined, but significant smaller than Planck time value. if time were linear like nowadays is presumed, then applying probability is useless exactly there where it should be operative.
to avoid all this impediments, it is wise to use distribution theory; all physical variables, entities and values should be represented by functionals.

[7] $a=s/t^2$ or kg*m/s^2 imply a 2-dimensional time, and the definition of power (p= kg m^2/s^3) implies a 3-dimensional time.
[8] the nature of the expansion is not analogue to the nature of (anti)gravity.

IV. Lorentz transformation- with the theory of relativity a new miracle came into the world: at very high speeds systems are ageing slower[9]. an absolute velocity can`t be postulated (relative to what?), and on the other hand speed must be adjusted by operating with [square root $(1-v^2/c^2)$], noted: Sr(v,c), where v is variable and c is variable too! the adjusting term includes v^2. therefore v is to be adjusted once again by operating with Sr, where v^2 appears anew, again and again... iteration! for big velocity values the term is not negligible. compared with Maxwell transformation [$x`=x-ut$, $y`=y$, $z`=z$ and $t`=t$], Lorentz transformation [$x`=(x-ut)/Sr$, $y`=y$, $z`=z$, $t`=(t-ux/c^2)/Sr$, where Sr=Square-root$(1-v^2/c^2)$] should not change the laws of physics (Poicare`s proposition adopted by Einstein). obviously: $v`=c^2(x-ut)/(t-ux)$; adjusting acceleration ($a=s/t^2$) additionally means that acceleration is not absolute. acceleration depends on Sr too.
- forces, velocities, acceleration,… arevectored physical values. it is considered that mass is not a vector. when using vectors to describe physical behaviors a (first) problem consists in a forbidden operation: division of vectors (for example F/a=m) is undefined. furthermore in F = m*a (more precisely: $F=m(Sr)^3a$) mass has to be adjusted by operating with Sr (square root$(1-v^2/c^2)$. the question is if mass is a scalar indeed, as mass depends on Sr(v,c)? m=m0/Sr(1-v^2/c^2), where v is a vector(!) depending on s, t, which anew depend on Sr(sr(sr(…))). ergo: mass should be a vector too, and even if Sr is negligible, the direction of F will be perpendicular to the mXa-plane, in case of the vectorial product of m and a. on the other hand if scalar product of two vectors is used, the angle between m/Sr and a would not exist if Sr is zero (when v=c)[10].
another problem is that the Sr(Sr(Sr(...))) series are divergent for the first 2-3 steps(!) and converge merely for more iteration steps. what if the values have to be adjusted only 2 or 3 times?

V. motto: the multiverse theory requirement is nothing but the proof that universe is an open system[11].
closed systems do not exist in cosmos: how should asymmetry come into a closed universe? if the energy of the universe is constant, then it's established that the universe has a symmetric behavior, but at the apogee of expansion the universe will become static (for a moment), what shortly would imply an implosion! but an implosion is no contraction! and the system should fall into one centre, if it were not infinite and unbounded, so that it should have a centre in each of its inner points.
a system cannot be a closed system while higgs-englert-fields introduce virtual particles and transform them into real ones. thus we can abdicate those quantum postulates which refere to perfect closed systems. hereby the model of a closed universe fails.
the existence of a time interval during which the mass genesis function can be asymmetrical allows an explication for the predominance of matter in relation to antimatter. a preservation of an other mass quantity before a big-bang in comparation to the mass quantity after a big-crunch would contradict the symmetrical behavior. it is to diagnose that an open universe contents a variable mass of energy. universe is open if its energy is variable in time. in this situation the energy conservation equation must include the quantum vacuum too. the proposition <the longer a system exists, the less is its energy> is valid for an open universe.
on the other hand if the energy of the universe is variable, then a new analysis is necessary. under this terms the multiverse model seems to be more consistently: the universes take their energy from an unlimited infinitely vacuum space, which is permanent connected to the universes. some cosmologists assume about 50 rotations of our universe. einstein's equation allows a solution in case of rotating universe.
even kant`s argument that an infinitely universe does not need to be created by reason of its own infinity, finds its clarification: in an infinitely unlimited set, a Creator can create a limited infinitely set, i.e. big-bang (say: fiat lux).

VI. **epi-theory versus theory**
I name epi-theory the theory about the theory. by using mathematics one can certify the assumed hypothesis. Maths, as epi-theory(!), doesn`t own the gödel, turing, chaitin incompleteness, or indeterminacies said to contain (s. errors in Gödel`theorem-www.Pistea.de[12]). ergo: for the epitheorie, the theory about a theory, binary logic is necessary and sufficient, i.e.: to know what is known (eventually to x%, yes or no), and to

[9] the inflationary speed of vacuum must be faster as light speed; in physicists opinion that is allowed for empty spaces.
[10] does a (so-called) de-vectorising operation exist? i.e.: vector F operated with G is not a vector?
[11] the current theories can not explain the appearance of asymmetry.
[12] especially Kurt Gödel`s theorem is not true, because it starts with a false hypothesis: the theorem itself is an indeterminacy (see demonstration on: www.pistea.de and researchgate.net, Paul Pistea).

know what is unknown. not to know what one knows, as well as not to know what one does not know doesn`make much sense. epi-theory consists of (logical) statements, not of formulas. at the epi-theory level there are defined no indeterminacies. only the theory itself should contain indeterminacies, or asymptotic uncertainties for its physical terms included in the laws. to determine the indeterminacy, the difference between the cardinals of countable sets, discrete sets, continuous sets, etc. must be evaluated.
furthermore, in the epi-theory, a law about the variation of theory laws is necessary, due to the fact that physical laws are built on proportionality[13]/ symmetry/ invariancy/ constancy! it is quite evident that all the laws of physics are indetermined for extreme time intervals/ spaces/ asymptotic values. proportionality is not functional at zero, or at extreme values; not to mention the values (with)in the asimptote. symmetry is not completely (perfect); symmetries are partially and withal relative to each variable in the law.
deductions from the theory level tot he epi-theory level are not allowed, because to invert determination of indeterminacies, would lead to indeterminate determinations. i.e. to invert values, for example, to an 80% truth in the theory could be assigned the logical value of (axiomatic incorrect) 125% true in the epi-theory (calculating the initial value of a 20% scaled down truth in the theory means to scale back by multiplying with 1,25% (in the epi-theory), but a 125% truth is not acceptable.
quantum theory laws are not time symmetrical (s. weyl+ricci tensor, riemann, beckenstein-hawking equations), while the laws of relativity contrarily are. the more symmetries a theory contains, the less its explicative power (Roger Penrose). I would say: since relativity laws are time simetrical, while quantum theory laws are not time symmetrical, the theories cannot be unified. my proposition is: use the theory of distributions to handle symmetry and asymmetry as well.

VII. **axiomatise-** all laws seem to collapse (to be indetermined) for the time interval while the features they describe do not exist. time, for example, is supposed to disappear in singularities. the law of gravity, $G=gmM/R^2$, for instance, should not be valid at mass zero, where the distance R, either is zero, or it disappears. the law of gravity is based on directly and inverse proportionality, so that it is multiple indetermined, although, while mass is equivalent to energy. but the law of gravity works for energy too, even in absence of mass- the objects with mass zero are controlled by gravity too. for the theory neutrosofic or fuzzy logic are recommended, while minding following impediments:
- v=s/t v=vector, where s and t cannot be vectors; division of vectors is not defined, but division of scalars define a vector and division of a vector and a scalar (a=v/t) define a vector too.
- quantum principles which suppose a closed system (whereat a universe doesn't communicate with other systems) should be ignored. closed systems do not exist.
- there remain two postulates to be adapted: 1st-(if) measuring does influence the measured system and 2nd estimating probability by wave-amplitude^2 which is a surface, but no 3-dimensional space or more dimensional space-time!?).
- physical laws should be invariable to a kind of generalized Lorentz transformation, GLT, (Poincare`s idea adopted by Einstein). terms which must be adapted by operating with GLT are not absolute.
- particle localization in space is determined to the detriment of velocity and reciprocally. in other words Heisenberg`s uncertainty principle, the more precisely the position of some particle is determined, the less precisely its momentum can be known[14]. for specifications fuzzy or neutrosophic logic[15] should be used.
- there is nothing that should be decelerated by emptiness. spaces where gravity does not prevail are not yet discovered.
to axiomatise physics proceed as follows: first list a number of axioms needed (s. decalogue below). then play ping-pong between hypotheses and conclusions: case one conclusion is false, the axioms` system is to revise and get a new theory. suspicious conclusions are anew revised by changing corresponding axioms and so on. in this way axioms are deduced to be necessary and sufficient.
axioms:
1) laws vary relative to an increasing/ decreasing reference system.
2) while everything is in motion physical terms must be adjusted by operating with a generalized Lorentz transformation depending on an absolute[16] (dimensionless) value.

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[13] for instance: Ohm`s law R=U/I, built on direct proportionality (the linear function m=y/x, is invalid in (0/0)) and the power formula: L=U*I, based on inverse proportionality, should not be used simultaneously.
[14] maybe due to the fact that a differential operator (generally) is discontinuous: space (s) versus velocity (v, ds=v)
[15] a question is if: true=50%, indeterminacy=0, false=50% is equivalent to 100% indeterminacy?

3) natural constants are not constant indeed.
4) dimensions are an aleatory number of locating parameters, thus the number of dimensions is variable (as needed). time is at least 2-dimensional depending on not less than velocity and acceleration.
5) space-time is not homogenous. density is variable in time and in space.
6) symmetry breaks must be included in the time interval of asymmetry.
7) metrics should be reconsidered according to crono-space-cosmodesic curvature.
8) in cosmos there is no closed system.
9) theory (but not epitheory) ist o build by using neutrosophic or fuzzy logic.
10) physical laws should be written in the language of distribution theory[17]

VIII. the world formula and the theory of everything- in case of using binary logic one single theory of everything, whereat one single world formula is involved, cannot exist, simply because: the laws of physics are invariant according to those terms which **do not** appear in the formulas that describe them AND at the same time(!) they are depending on exactly(!) the terms included in the describing formula. e.g.: in $E = mc^2$ the time is absent as a term, what means that this law is time independent (symmetrically, invariably, forever and always valid), but depending on energy and mass[18]! more, mass depends on velocity: m=m0*Sr(v,c), where Sr(v,c)=(1-v²/c²)^1/2, and v=s/t (s=space and t=time), whereas other laws are mass independent.
ergo: physical laws cannot apply all together for the whole time, or the entire space. on the other hand it is postulated that the laws possess all the symmetries at the supposed big-bang- at those conditions there were no broken symmetries. the conclusions are:
1st- the world formula either includes all in the entire theory of physics involved terms, or none. many a terms are included in some physical laws, but not in all laws.
2nd: a system of all physical laws cannot be consistent, in case of using binary logic!

IX. motto: past alone seems to be most invariant., case it is not made variable by historians.
theory of distributions- natural constants (including speed of light) can be limited, but not constant indeed. (see demonstration: www.pistea.de, zentralblatt für mathematic Paul Pistea, Vasile Postolica, universitatea din bacău, studii şi cercetări ştiinţifice seria: matematică nr. 18 (2008), pag. 221 – 232). a wellknown reason for using distributions theory is that the derivative of a constant functional is zero, if its test functions have a symmetrical behavior outside of a compact interval. assume that to each natural constant in the law-describing formula there is assigned a constant functional[19]. the conditions for which the derivative of the constant functional has the value zero furnish additional information about the terms included in the formulas and about the time interval during that asymmetry gets into the world (time interval where a symmetry-break happens has to be included- a symmetry-break shoud not occure symmetrically).
moreover: smallest particles and units such as planck-time would imply operations in dis-continuities[20].
operating in discontinuities is avoided by using test functions and set functions. physical entities shall be described by using functionals of complex function argument (i.e. the distributions theory). relativity theory has already introduced adjusting functions like: square root of 1-v²/c² (I named it Sr(v,c). to operate with terms like Sr(Sr(Sr(...))), it is wise to use distribution theory (to mention only: infinite derivable test functions, and the functional argument which is a (complex) function of two variables Sr(v,c)).
accordant to current theories the existence of the universe began with a big-bang which is considered as a singularity. the theory of inflation considers that an extremely rapid expansion of vacuum took place during a short time-interval. therefore the models do not handle the existence of the universe including the big-bang moment, but from the time after. at the high presumed energy that unifies all forces all laws break down (especially at big-bang). in other words, the construction of laws on the basis of formulas is impossible at all

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16 acceleration is not absolute and is not equivalent to gravitation.
17 distribution theory epitomizes even multiplying/ dividing by terms like Sr(v,c)=(1-v²/c²)^1/2, a term already introduced as protofunction by relativity. Sr should be revised too.
18 if a law contains a variable, the law implicitly hasn`t a symmetrical behavior exactly(!) relative to that (included) variable. and, according with transitivity, a whole group of laws will be, and at the same time contrariwise won`t be, symmetrically relative to the same variable.
19 speed limit for each kind of matter is an asimptote. physical values (acceleration, gravity, mass- a, F, G, m, v and so on) should be considered functionals.
20 matter-radiation interaction is discrete (Planck): E=hv h=6,67*10**-34.

the singularities (like big-bang, black holes). to avoid this it is appropriate not to use the quantum theory at big-bang, but the (quantum)-distributions theory; theory of distributions is valid in singularities too!.
for example: in the language of distributions the mass of an "entity" A can be described as:

$m(A) = \int \rho d\mu_A$, where μ is an adequate measure and ρ the density function.

(i) E = mc² in which E is the energy, m is the mass and c is the speed of light should be described as the following constant functional:

$$f(c^2,m) = \int (GLT*mc^2)'$$

then, the integral as well as the derivative[21] are operators depending on time (m is to be adjusted by using generalized Lorentz transformation (GLT)). if the energy of the universe is zero[22] then:

$c^2\int$ (GLT*m)` must be zero, i.e. a symmetrical behavior for the function of genesis of mass (considered as complex set function) outside of a time interval[23]). it is notable that if and only if the mass genesis function, or GLT has the properties of a test function, then the energy of the universe is zero. also remarkable is that a test function (including its derivatives) allows asymmetry within a time interval.
on the other hand, if Heisenberg`s uncertainty principle would be valid for the universe[24] too, then it is not allowed that its whole energy is zero (i.e. determined(!).
if the energy of the universe is a constant, but not zero, then the derivative of the mass function (the mass density) must be symmetrical (at least) outside of the assymetrical time interval. this fact is in opposition to Heisenberg`s uncertainty principle too (energy can be determined).
ergo: the natural constants are not constant indeed; they[25] can be limited by constant values.

X. conclusions: some of the physical laws could be helpful to determine the time interval (a,t) during that the asymmetry entered/enters into the world and its localisation relative to the supposed singularities. this time interval aleatory includes presumed small and big-bangs as well as big-crunches and small crunches. each big-bang/ big-crunch which is not included in (a;t) implicates the existence of a symetrical big-crunch/ big-bang[26]. even big bangs or big crunches nested inside of bangs, or crunches (singularity in a singularity) are theoretical allowed, but outside of the interval (a,t) the symmetrical event must exist[27].
while symmetry breaks probably are not symmetrically, they took place inside of (a,t).
taking into account the uncertainty principle (for a field and its time variation) vacuum is filled with virtual particle-antiparticle pairs; the gravity field would be zero, if space wouldn't be filled (not even) with v-particles; that means that G may not be zero[28]! this conclusion implicates that the universe is not closed (as supposed).
the quantum mechanics viewpoint is that time symmetry implicates the energy conservation equation.
present analysis shows that an abdication of symmetry even for a limited time-interval, allows an explication for some cosmological problems[29].
Keywords and phrases: distribution for complex set functions, natural constants, complex functionals, universe model, law of physic, symmetry, asymmetry, generalized Lorentz transformation, singularities, dimensions, world formula, theory of everything, axiomatic system, epi-theory.

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[21] if the function of mass genesis is not continuous (each physical object hypothetical is greater than 10^-43), then it is not differentiable. to avoid this problem one can use the distributions theory for set functions, respectively fuzzy-sets and noninteger derivatives (even of fractal range).
[22] according to the theory of relativity there exist positive and negative as well as null energy.
[23] classical Sr(v,c) as well as its derivatives are neither zero nor symmetrical; Sr is infinite derivable.
[24] why shouldn`t it apply if the universe dimensions were about 10**-30 at the origins?
[25] the natural constants are implicated in all physical laws
[26] it is not allowed that only one of the two events happens outside of (a,t)
[27] if the whole inflationary period resided outside of (a,t)- it happend in the vacuum (although mass didn`t yet exist, but there was an equivalent energy)-, then, because of symmetry, an inflationary period must have its symmetrical inversion after a big-crunch.
[28] universe exerts gravitation to outside?
[29] the unification of quantum mechanics with relativity must implicate asymmetry; laws should be constructed on more than only proportionality.
one of superstring theory properties is: a*b = -b*a, where a,b are real numbers; one analogy to present analysis is: u`v = -uv`, where u and v are functions. numbers should be maybe replaced by functionals.