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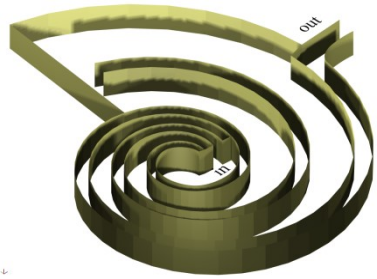

Sedimentation tank
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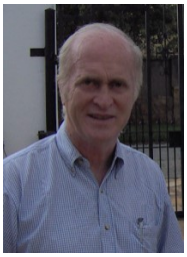
EX SPIRA AQUA MUNDA
In memory of my son Giovanni

24 Nov 2016



An attempt to UNIFICATION of the physical Laws through the use of concepts belonging to the Universal Dynamic Science

Unification in the Laws of Physics based on the existence in the physical Reality of the Ether/ESF as the basic substance made up of two phases. ESF and E_{ESF},. See Google Gsjournal.net Ruggeri A

The two phases are coexisting in the unit of volume of the Euclidean Space and interacting with the physical mass whose presence inside the Euclidean Space is also justifiable through interaction (absorption) consisting of transformations-degradations in time of the phase ESF (of the Ether/ESF) into [Ton] of gravitational mass.

Note: Since the phase ESF of the Ether/ESF is nearly having the density of the whole:

$$\rho_{ESF}=\frac{c^2-1}{c^2}\cong 1=\rho_{Ether/ESF}$$

Here we refer to $\rho_{Ether/ESF}$ and to ρ_{ESF} without distinction.

Such transformation-degradation (absorption by the physical mass of the phase ESF taking place in time) is accumulating presence of substance in the unit of volume of the Euclidean Space as physical mass [Ton] and such accumulation through further transformations-degradations, defined gravitational, causes further degradation of mass [Ton] into mass equivalent in [kJ] which coming out of the gravitational mass, through further internal gravitational process, under absorption by the surrounding phase ESF (of the Ether/ESF) is expanding its status of existence in space and in time through a phenomenon called dissipation.

The UDS (Universal Dynamic Science) describes all these phenomena starting from a "root" formulation, through the use of expansors/multipliers, see below:

- V Measure of the unit of volume [m^3] in absolute inside the Euclidean Space
- ρ Density (concentration of substance in the unit of Euclidean Space) as a phenomenon that needs to be related to the unit of mass 1[Ton] contained in the unit space V_0=1[m^3] :

$$\rho_0=1\left[\frac{Ton}{m^3}\right]$$

- t" [sec] measure of transformation-degradation (flow-expansion as phenomena consequent to absorption etc …) of substance occupying the Euclidean Space ex: of a fixed amount "dm" of mass in [Ton] expanding, in unhindered conditions, its presence in space, through degradation, into equivalent mass dmc^2 in [kJ] as a phenomenon respecting the principle of conservation of the "dm" abovementioned taking place under absorption at c speed over the unit of time t"[sec]in the Ether/ESF.
- c maximum speed of transmission of the unit of expanded mass [kJ] in space over the unit of time t=1"[sec] under absorption by the ESF
- $\bar{k}$ Universal constant of absorption of the phase ESF (of the Ether/ESF) in the unit of time t=1"[sec] as mass by the unit of gravitational mass . (see below).
- $\vec{v}$ vector as measure of directional displacement of an object mass Occupying, under special conditions, a volume V at ρ density over the unit of time 1"[sec].
- v scalar as measure of internal compression inside an object mass M in linear movement at $\vec{v}$ =const speed.

Note: The description of physical effects (transformations-degradations) affecting a physical object mass moving in freefall under the effect of the gravitational field of a mass M_{LGM} requires the use of the LAW of EQUIVALENCE which, in turn, must be interpreted as a Law describing directional movement, in terms of transformation-degradation, taking place in time and in space, of mass in [Ton] into expanded mass in [kJ] associated to presence of internal compression inside the mass, the way it will exposed below.

Energy released in time by an object mass M in freefall (under ablation) inside the gravitational field generated by a mass M_{LGM} inside the phase ESF of the Ether/ESF, follows the Law of equivalence which in this case must be interpreted this way:

$$dm\ [Ton] \equiv dmc^2\ [kJ]$$

Whereas $dmc^2\ [kJ] = Mv^2\ [kJ]$

In freefall the transformation-degradation in time (t" [sec]) is:

$$\frac{1}{2}dm(t)\ [Ton] \equiv \frac{1}{2}Mv(t)^2 = F(t)_{Tot}[kJ]$$

Here below I intend to present the "BASIC ROOT OF ALL THE LAWS of PHYSICS", the one that in conditions of conservation permits the UNIFICATION of all the physical equations in the UDS.

The mathematical embodiment of the root of all the physical phenomena describing presence of substance in a Space containing Ether/ESF (see below), in the various conditions of existence (in quiet or in movement constant or variable taking place along time as a continuum) is:

a) $x * y = const$

(ex: Boyle's Law $p * V = const\ (dmc^2\ [kJ])$

Though we have that at first observation the Euclidean Space appears to be empty, if we assume the presence of a substance in the Universe, the Ether/ESF (made up of substance in a status of upgrade and concentration which here is referred as "Energized Space Fabric", opposed to the presence of the Euclidean invariability of the Space) and occupying in conditions of quiet, the unit of volume in the Euclidean space at average density:

$$\rho_0 = 1\left[\frac{Ton}{m^3}\right]\ V_0 = 1\left[m^3\right]$$

We have that under these assumptions "in terms of conservation", the fundamental BASIC UNIVERSAL LAW of PHYSICS applied to the phase ESF (of the Ether/ESF), becomes:

b) $$\rho_0 \cdot V_0 = 1\,[\mathrm{Ton}]$$

always valid in time (present at time t in the Universal reality).

Note: a more comprehensive interpretation of the above a) at any time t would be:

$$x_{(t)} \cdot y_{(t)} = const_{(t)}$$

This means that substance of density ρ=1[Ton/m^3] in Ethereal impalpable status is present in the Euclidean Space interacting with any mass (substance) coexisting with it and when such mass is in a status that absorbs it in time from the Euclidean space making it in the process part of it, by definition is called “gravitational mass”.

Note: the atomic surfaces including the surface of the Electron are constituted by an extremely thin but resistant layer of the same unchanged substance the phase ESF of which the Ether/ESF is made.

All along the Ether/ESF is defined through presence of Indefinable Particles (IP) inside a Space of immutable nature as substance having horror of presence in space and therefore giving a reactive, Energized character (Fabric) to the Space occupied.

1[Ton] is the amount of substance as Ether/ESF in units of mass in [Ton] occupying the unit of volume 1[m^3] in the Universal space as presence of two separate phases. (ESF and E_{ESF}) see Google: Ether/ESF and the Power of Creation.

This substance under the gravitational process of absorption is transformed into physical mass, and the hypothetical particles constituting it have density ρ_{ESF} whist occupying a volume V_{ESF} :

c) $$\rho_{ESF} = c^2 - 1\left[\frac{\mathrm{Ton}}{m^3}\right] \qquad V_{ESF} = \frac{1}{c^2}[m^3]$$

we see now that diffusing the particles of density of substance ρ_{ESF} occupying a volume V_{ESF} (as in c)) inside a volume V_0=1[m^3] will give us a space mainly empty peppered of high density ρ_{ESF} Indefinable Particles in which the average density of substance will be:

$$\rho_{0-ESF} = \left(\rho_{ESF} \cdot V_{ESF}\right) = \frac{c^2 - 1}{c^2} \cong 1\left[\frac{\mathrm{Ton}}{m^3}\right]$$

Substance at high density filling the unit of volume in conditions of apparent emptiness, interspaced by presence of the phase $\rho_{0\text{-}E_{ESF}}$ of density:

$$\rho_{0-E_{ESF}} = \frac{1}{c^2}\left[\frac{\mathrm{Ton}}{m^3}\right]$$

Note: summing in the unit of volume:

$$\rho_{0-\text{Ether/ESF}} = \rho_{0-\text{ESF}} + \rho_{0-\text{E}_{\text{ESF}}} = 1 \left[\frac{\text{Ton}}{\text{m}^3}\right]$$

As demonstration that the density of the Ether/ESF is $\rho_0 = 1$ [Ton/m^3] as suggested above.

Since mass in [Ton] and expanded mass in [kJ] are two states of existence of the same substance, c^2 is a dimensionless multiplier/expander giving a basic representation of the Universal Law of Equivalence.

In effect whilst to a mass dm [Ton] corresponds an equivalent value of mass dmc^2 [kJ] , in the Universal Reality is necessary to consider the fact that this is a Law which to be implemented requires presence of transformation-degradation of mass in [Ton] into an equivalent amount of mass in [kJ] and this requires by definition an expansion of the volume occupied by the mass dm in the unit of time 1"[sec], since makes available the expanded mass in [kJ] to absorption by the surrounding ESF (no matter if it belongs to a mass M or if it is on its own).

Being the ESF in a status of immobility, its capacity of absorption of mass in [kJ] is cause of movement of it (on its own or whilst belonging to a mass M), "absorption by the ESF" is cause of presence of what is called "Energy of movement" in units of mass expanded in [kJ] belonging to a mass M or coming out of it in the Euclidean Space.

The way all this occurs will be investigated below.

Presence in a mass M=ρV[Ton] in movement at $\vec{v}$, of a dm[Ton] transformed-degraded into an equivalent amount of mass $dmc\vec{c} = \rho dVc\vec{c}$ [kJ] means that M, consistently occupies at $\vec{v}$ speed a predetermined Volume $V_{\vec{v}}$ in space whilst M inside that volume V is moving at $\vec{v}$ under internal scalar compression $\rho vV = Mv$:

$$dmc\cdot\vec{c} = (Mv)\cdot\vec{v} \ [kJ]$$

The movement at $\vec{v}$ of M is acquired thanks to the capacity of the phase ESF (of the Ether/ESF) to absorb, in the unit of time, the mass M containing Mv[kJ] in the direction of the vector $\vec{v}$ (at $\vec{v}$ [m/1"] speed) whilst at the same time internal compression in M is maintained thanks to the capacity of absorption of the depressed phase E_{ESF} surrounding M which causes the internal amount of compression ($\rho Vv = Mv$) in M.

Note: the mass M expands in time presence of its volume V in the direction of $\vec{v}$ but since for $v<<c$ the external depression of the E_{ESF} is unable to overcome the capacity to contain internal compression acting on the thin (but extremely solid) layer of Ether/ESF constituting the atomic surfaces, the mass in movement doesn't varies sensibly in volume but "only" results internally compressed, whilst all takes place in respect of conservation.

Physical gravitational mass as it is present in the Universal Reality is the result of a phenomenon consisting of accretion through transformation-

degradation (through absorption, in time, by the extant mass of density ρ of the phase ESF (of the Ether/ESF) as primary substance of unitary basic density $\rho_0 \cong 1$ [Ton/m^3] coexisting with the physical mass as we perceive it).

We need to represent "in terms of conservation" presence of physical mass in the unit of volume V_0=1[m^3] all over the Universal Reality through a dimensionless multiplier ρ :

$$(\rho \cdot \rho_0) \cdot (V_0) = \rho \left[\frac{\text{Ton}}{\text{m}^3} \right]$$

x * y = const

Note: the above equation describes presence of mass in [Ton] inside the unit of volume, but for an ordinary mass M occupying a Volume V at ρ density we must introduce the multiplier V of V_0 in the above equation :

$$(\rho \cdot \rho_0) \cdot (V \cdot V_0) = M \left[\text{Ton} \right]$$

x * y = const

which if we make reference to ρ_0 =1 and V_0=1 for M occupying a volume V[m^3] will from now on be written:

$$\rho \cdot V = M \left[\text{Ton} \right]$$

Note: to the original equation b) we have at this point introduced two multipliers, ρ (density, showing that the IP particles in the Ether/ESF, from which they originate, can be squeezed in the unit of volume in quantity higher than that accommodating them in the Ether/ESF, but showing us as well that the Space is incompressible) permitting us to refer to V as three dimensional space occupied by a physical object mass M of density ρ.

Let us consider now the gravitational phenomenon which is based on continuous absorption in time of the phase ESF (of the Ether/ESF) , in Universal terms, by a mass M of density ρ occupying a volume V and which is a phenomenon of transformation-degradation of said phase ESF (of the Ether/ESF) absorbed as a dm/1" into the mass M, which absorption to be described requires the definition of a recurrent amount of transformation-degradation of reference defining what we call an unit of time t=1"[sec].

We start with the definition of the phenomenon of absorption, in which a constant amount $\bar{k}$ [Ton/m^3] of the phase ESF (of the Ether/ESF) of density $\rho_0 \cong 1$[Ton/m^3] per unit of volume, is absorbed in the unit of time t=1"(sec) by a mass of density ρ_0=1[Ton/m^3] as defined in the b) above:

d) $$\left(\frac{\frac{G\cdot 4\pi}{c^2}}{1''}\rho_0\right)\rho\ V=\left(\frac{\bar{k}}{1''}\right)\rho\ V=\left(\frac{\bar{k}}{1''}\right)M=\frac{\Delta m}{1''}\left[\frac{Ton}{1''}\right]$$

Where G is Newton's Universal constant of gravitation, valid for a mass M of volume V[m^3] and density ρ [–] :

The amount $$\frac{G\cdot 4\pi}{c^2}=\frac{k}{c^2}=\bar{k}=9.303e-24\left[\frac{Ton}{m^3}\right]$$ is the value in [Ton] that a specific mass (mass of density ρ=1[Ton/m^3] absorbs per unit of time t=1"[sec] from the phase ESF(of the Ether/ESF) , transforming it into an amount of mass in [Ton] inside it.

ex: for the Sun of mass M_{SUN}=2e27[Ton], the phase ESF (of the Ether/ESF) absorbed as physical mass in the unit of time is:

$$\frac{\Delta M_{SUN}}{1''}=\left(\frac{\bar{k}}{1''}\right)M=\frac{1.674e21}{c^2 1''}=\frac{18{,}606}{1''}\left[\frac{Ton}{1''}\right]$$

Note 1): $\bar{k}$/1" and ρ[–] are both multipliers of the mass contained in the unit of volume of M

Note 2): $\bar{k}$ <u>can from now on be considered a new embodiment of the Universal constant</u>.

The above physical equation shows that the equation a) can be adapted to represent an unstoppable natural phenomenon as Dominant Force in [Ton/1"] obtained through a multiplier $\bar{k}$, defining a transformation-degradation of substance made up by the phase ESF (of the Ether/ESF) into physical mass, affecting the mass of density ρ=1[Ton/m^3] in the unit of time, t=1"[sec].

Note: time, is universally defined here on Earth as a transformation-degradation of reference which repeated 86400 times coincides with the full period of rotation of Earth on its axis.

Note: the term $\bar{k}$ is obviously a multiplier referred to a constant amount of transformation-degradation in the unit of time affecting M, increasing the value of M over t=1"[sec] at the expenses of the phase ESF(of the Ether/ESF).

It gives another meaning to the physical concept x•y=const since for ρV=M we usually refer to the equation:

$$\left(\frac{\bar{k}}{1''}\right)\cdot M=\frac{\Delta m}{1''}\left[\frac{Ton}{1''}\right]$$

As a transformation-degradation maintaining in time the relation of conservation.

Then since the mass M is absorbing permanently the phase ESF(of the Ether/ESF) surrounding it, in the unit of time (and in terms of conservation

transforms it into an addition to the mass), due to the fact that the phase ESF(of the Ether/ESF) behaves like a fluid substance, this absorption is bound to produce in the space surrounding M and containing the phase ESF(of the Ether/ESF) a permanent spherical field of flow and an associated field of depression around M in terms of a transformation-degradation taking place over the unit of time 1"[sec].

What I want to discuss now is the equation in a) as a Law which in terms of conservation is bound to respect a relation of inverse proportionality, no matter what type of transformation-degradation over the unit of time takes place inside a mass existing in Space.

The absolute fact that, in terms of presence in the Universal Reality of natural phenomena of transformation-degradation such as gravitational phenomena, as well phenomena concerning the Laws of Thermodynamics, the mass M results impregnated of expanded mass $dm(t)c^2$ (t>=0), associated to simultaneous directional absorption by the phase ESF (of the Ether/ESF) of the $dm(t)c^2$ belonging to M (or coming out of it).

Such absorption is the phenomenon causing movement of M if the $dm(t)c^2$ (t>=0) belongs to it and dissipation if $dm(t)c^2$ (t>=0) comes out of M as expanded mass (Heat).

In conclusion, we cannot discuss these phenomena, unless we accept that they are modifications of the objects in the natural world which are following fixed patterns or Laws of degradation in time (always in respect of conservation).

Once accepted that there is absorption, in time, of the phase ESF(of the Ether/ESF), as substance in a particular status of existence inside the Euclidean Space, by a gravitational mass M_{LGM}, we have to accept the fact that the phase ESF(of the Ether/ESF) in behaving as a fluid will be flowing into the unit of the external surface of the M_{LGM} of radius R_{LGM}, and density ρ_{LGM} generating externally to it a field of constant flow from $\infty > r > R_{LGM}$ in the following manner:

$$\frac{dm}{1"} = \frac{\bar{k}\ M_{LGM}}{\left(4\cdot\pi\cdot r^2\right)1"} = \frac{a(r)}{c^2}\left[\frac{Ton}{m^2\, m\cdot 1"}\right] \quad \text{for } \infty > r > R_{LGM}$$

The above equation then, describes the field of constant flow of the phase ESF (of the Ether/ESF) in [Ton/(m^2 m*1")] caused by absorption of the phase ESF(of the Ether/ESF) by a mass M.

Note: we are dealing here with an Energized substance in Ton, it is absorbed from a mass M_{LGM} (with which its status of existence overlaps) and continuously transformed into mass inside it in a way that can be described through a phenomenon continuous-recurrent over the time.

Note: We assumed that the IP particles constituting the phase ESF (of the Ether/ESF) in the Euclidean Space, have density $\rho_{IP} \cong c^2$ but they occupy only a volume $dV=(1/c^2)[m^3]$ of the unit of volume of Euclidean Space (when in undisturbed status of existence).

The consequence is that, to the value of transformation-degradation, in a gravitational mass [Ton], is associated a spherical field of depression of the

phase ESF(of the Ether/ESF) in function of r over the unit of volume, which can be considered permanent, as it is permanent the total flow of the phase ESF(of the Ether/ESF) over the spherical surface along the unit of time (1"[sec]) at radius $\infty > r \geq R_{LGM}$.

For the depression of the phase ESF (of the Ether/ESF) , first we determine the flow of the phase ESF (of the Ether/ESF), whose value is the same of the depression of ESF over the unit of radial length and extend, through an integral, such value of depression to the whole field of flow, for $R_{LGM} \leq r < \infty$, for a gravitational mass $M_{LGM}=\rho V_{LGM}$ we have:

e) $$\int_r^{\infty} \frac{a(r)}{c^2} dr = \int_r^{\infty} \frac{(k\rho)(V_{LGM})}{(4\cdot\pi\cdot r^2)\cdot c^2} dr = \frac{a(r)}{c^2}\cdot r = \varepsilon(r) \left[\frac{Ton}{m^3}\right]$$

Since the above value is depression of substance, {in the phase ESF (of the Ether/ESF) of uniform mass 1[Ton/m^3]}, at the generic radius $R_{LGM} \leq r < \infty$ the density $\rho_{ESF}(r)$ of the phase ESF (of the Ether/ESF) over the unit of volume of the Euclidean Space will be:

$$\rho_{ESF}(r) = \{1 - \varepsilon(r)_{ESF}\} \left[\frac{Ton}{m^3}\right] \quad \text{for } R_{LGM} \leq r < \infty$$

The above equation is then, a physical representation of a permanent field of depression, in function of r, of the phase ESF(of the Ether/ESF) in [Ton/m^3] having at the centre the mass M_{LGM} which generated it.

Note: in this representation to the phase ESF(of the Ether/ESF) have been attributed the characters of an elastic fluid (a fluid whose density $\rho_{ESF}(r)$ can be subjected to variation whilst residing in the unit of volume of a perfectly rigid Euclidean Space).

The general Law of Equivalence is meant to declare that:

A mass in units of [Ton] $\rho V = M$ [Ton]
Is equivalent to expanded mass
in units of [kJ] $c^2 \rho V = c^2 M$ [kJ]
Where the term c^2 is a multiplier term, "a pure number"
In effects, is commonly presented as $E[kJ] \equiv M[Ton]*c^2$ [-]

If we accept that the mass in [kJ] is energized substance we have to realize that the above Law represents a complete transformation-degradation of mass in [Ton] into mass in [kJ] and by now we know that a partial transformation-degradation of an amount ΔM of M [Ton] taking place over a short time Δt is cause of a simultaneous large expansion in space (atomic

explosion) thanks to which the mass ΔM belonging to M, was suddenly released as energized substance (Heat radiation) measurable as ΔMc^2 [kJ].

$\Delta M\ [\mathrm{Ton}]$ was released in a short time interval of time Δt, as an equivalent amount of energized mass in [kJ] $\Delta M \cdot c^2 [\mathrm{kJ}]$

In actual fact, in Nature, dmc^2 [kJ] can be present inside a mass M:

1) in scalar status, in which case its presence as Heat can be measured by absolute T of the atomic substance contained in it:
for a gas) inside a container of volume V:
$dmc^2 = dQ = (\rho v V) * (\vec{v}) = (Mv)(\vec{v}) = pV = nRT$

note: the $(\vec{v})$ is the individual velocity of the single components of the gas inside the container and not the directional velocity of the whole mass M of the gas as a whole.
With the dmc^2 (scalar) inserted through a chemical/atomic transformation-degradation the first result is that the transformation-degradation released trough a sudden event produces an internal phenomenon in M, measurable trough internal temperature rise followed by dissipation in time of the dmc^2 which in this case is released in units of expanded mass in [kJ] as form of Energized expanded mass called Heat.

2) in vector status causing in a mass considered in quiet ($\left|\vec{v}_0\right| = 0$ a directional velocity $\vec{v}$ in the Euclidean Space :

f) $$\{dm \cdot c\} \cdot \vec{c} = (\rho v V) \cdot \vec{v} = \{Mv\} \cdot \vec{v}$$

in this case 2), to directional insertion of mass equivalent $dmc\,\vec{c}$ [kJ] inside a mass M in presence of the two phases of the Ether/ESF (ESF and E_{ESF}) corresponds respectively expansion in Space of the mass M in movement at $\vec{v}$ speed in the same direction of the directional insertion, whilst M is subjected to external depression (internal compression v) due to presence of the phase E_{ESF}.
If the presence of directional expanded mass in M is a time dependent process, of gravitational nature, (as will be shown below) due to absorption by the phase ESF (of the Ether/ESF) it will generate, in time, increase of velocity $\vec{v}(t)$ of M to which the expanded mass belongs:

f') $$\left\{\frac{1}{2}\Delta m(t) \cdot c\right\} \cdot \vec{c} = \left\{M\ \frac{v(t)}{2}\right\} \cdot \vec{v}(t)\ [kJ]$$

3) Sudden insertion of Heat at high temperature $T_1 > T$ inside a volume V_1 belonging to a device cylinder-piston whose external temperature is maintained at T, can be described in V_1 through the following equation:
Valid in terms of conservation:

f “) $$dm\cdot c^2 = \Delta Q(T_1) = \left(\Delta Q\,(T_1 - T) + p_1 V_1\right)[kJ]$$

$$for \quad p_1 V_1 = nRT$$

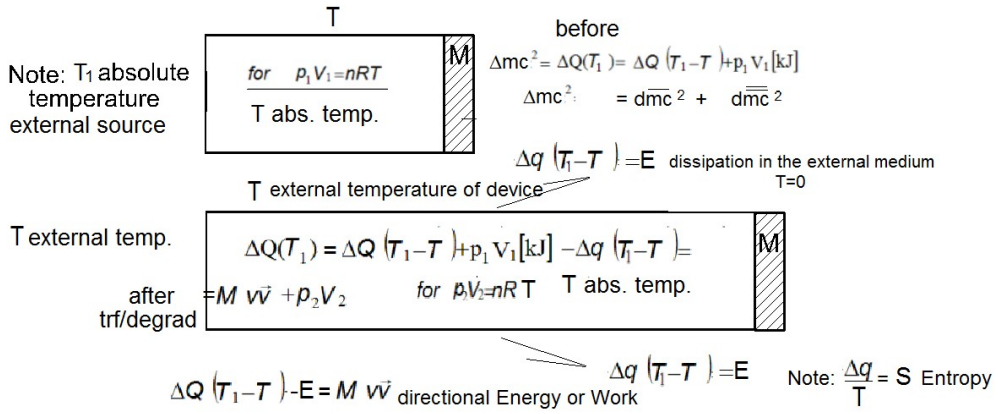


Fig. 1

f “ “) $$dmc^2 = \Delta Q(T) = p_1 V_1 = p_2 V_2 [kJ]$$

It must be observed that, between status 1 and 2 there has been expansion of a constant amount of Heat as substance dmc^2 belonging to the gas inside the cylinder: $\Delta Q(T) = p_1 V_1 = dmc^2$ taking place at T=constant temperature which must be considered a <u>transformation-degradation</u> which since is taking place at constant temperature T respects the Law of conservation $\Delta Q(T) = p_2 V_2 = dmc^2$.

Simultaneously inside the system cylinder-piston the mass M is under the effect of a transformation that since:

$$\Delta Q(T_1) = \Delta Q(T_1 - T) + \Delta Q(T)$$

is upgrading the amount $\Delta Q(T_1\text{-}T)$ with ($T_1 > T$) into directional expanded mass that the piston of mass M captures as $Mv\vec{v}$ [kJ].

The end result is that though $\Delta Q(T)$ remains constant, through expansion it has undergone transformation-degradation in conditions of conservation, furthermore, as counterpart, Heat=$\Delta Q(T_1\text{-}T)$ [kJ] would have been fully transformed into an equal amount of Work $F_{Tot}=Mv\vec{v}$ [kJ] which is a higher quality form of Energy in terms of conservation if it wasn’t for the <u>loss $\Delta q(T_1\text{-}T)=E$ [kJ]</u> (always present when a device is used) :

Expansion from V_1 to $V_2 > V_1$ in terms of Boyle’s Law maintains respect to the Law of conservation for the gas at constant temperature, inside the cylinder but is a non return degradation.

The phenomenon describing such double effect establishes the second Law of thermodynamics:

To "upgrade" through transformation (in time) the status of existence of Heat, prone to dissipation in all directions into "Energy/Work" causing directional expansion of a mass M, we must have an associated transformation-degradation consisting of loss of Heat (lost as dissipation at the external surface of the cylinder) in such expansion the mass M under acceleration, builds up F_{Tot} at the end of the expansion in $V_2 > V_1$. $S=E/T$ [kJ/^oK] is a measure of the degradation always associated to upgrade of Heat into Work:

$$S = \frac{\Delta q(T_1 - T)}{T} \quad \left[\frac{kJ}{^0K}\right]$$

Note: Carnot discovered the association (possibility to transform) Heat into Work and Fermi pointed out presence in the process of an index measuring the intensity of the degradation taking place "Entropy" etc… rendering indispensible the acceptation of the "principle of equivalence" as intended in the UDS (Universal Dynamic Science) with the proviso that in the Universal reality each transformation consisting of upgrade of Heat into Work is associated to a degradation consisting of expansion in conditions of conservation of Substance/Energy, following Boyle's Law, see: f " ") above (first principle of Thermodynamics) to which must added the second principle of thermodynamics (Kelvin) saying that is not possible to have a transformation-upgrade whose unique result is transformation of Heat (dmc^2) $=\Delta Q(T_1-T)$ belonging to a mass of gas inside a device cylinder/piston, into Work ($W<Mv\vec{v}$) belonging to the mass M of the piston due to the fact that to upgrade is always associated a loss $\Delta q(T_1-T)=E$ [kJ] (degradation by dissipation in the reservoir of Heat at temperature T outside the device cylinder/piston see f " ") and fig. above.

The evaluation of Entropy as a Law that to upgrade of expanded mass must correspond a value of degradation, has no exceptions, establishing once and for all that in the Universal reality is not possible to have an "upgrade" unless is associated to an ST=E [kJ] lost as "degradation".

As above mentioned, the meaning of the Law of equivalence is that it applies to a dmc^2 [kJ] inside a mass M [Ton] in movement:

In the above equation f) to $|v| \rightarrow |c|$ the $dm \rightarrow M$

To which $\lim dmc^2 = Mc^2$ [kJ].

Under these conditions a mass M, properly solicited (gravitational phenomenon), can release through internal transformation-degradation, in time, a fraction dm(t) belonging to it which will expand in space due to

directional absorption by the phase ESF (of the Ether/ESF) causing in terms of conservation a speed $\vec{v}(t)$ of M associated to simultaneous internal compression Mv(t)/2 in M (present in M whilst moving at $\vec{v}(t)$) since M is under Mv(t)/2 depression by the phase E_{ESF} of the Ether/ESF, see f) above.

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Cases worth of attention:

A dm(t)c$\vec{c}$ can be present inside a mass M in linear movement:

1) As result of transformation-degradation of dm taking place inside it in time
   (ex: induced in it by the gravitational phenomenon)
2) Introduced in it and shared by contact with another mass M' joining M in movement.
3) Etc…

Note: the above equation f) is not a mere equivalence but is the result of association to movement of a mass M containing inside the atomic entities an internal amount dmc^2 [kJ] of mass in directionally expanded conditions which being absorbed from inside M by the phase ESF (of the Ether/ESF) along the direction of gravitational flow causes M to move in Space, (at v$\vec{v}$ in inverse proportionality with c$\vec{c}$).

$$dmc\vec{c} = Mv\vec{v}\ [kJ]$$

Note: gravitational absorption can be interpreted as a particular elastic phenomenon of drag.

M moves at (vector) $\vec{v}$ speed whilst inside the atomic entities is present internal scalar expansion v (internal compression) caused by external depression (due to presence of the depressed phase E_{ESF} of the Ether/ESF). **

1) dmc^2=const, [kJ] out of a mass M in unfettered expanded status (means Heat in [kJ]) and due to the absorption by the phase ESF (of the Ether/ESF) would move in Space as substance in "dissipation" at $\vec{c}$ speed expanding in all directions as substance (in degradation) losing density in the process, whilst along the expansion, follows a Law of inverse proportionality of presence of expanded mass inside the unit of volume.
   Note: presence of the Ether/ESF in the Universal Reality is essential since the "dissipation" is a phenomenon which wouldn't exist without a substance in Space, (Space occupying a perfect vacuum cannot have physical effect on the mass).
   The phase ESF (of the Ether/ESF) is a carrier that has a double effect on expanded substance, 1) through absorption gives movement to a mass containing it in directional expansion and 2) when expanded substance comes out of a mass on its own the phase ESF carries it on its own through absorption at the maximum speed c.

2) $dmc\vec{c}$ =const , belonging to a mass M (internal to the atoms of M, whose surface is made of a thin but extremely resistant layer of the phase ESF (of the Ether/ESF).

The phase ESF(of the Ether/ESF) absorbs the $dmc\vec{c}$ inside the mass M, carrying M at $\vec{v}$ directional speed whilst the atoms of M under the thin layer of ESF , due to presence of E_{ESF} are subjected to internal compression Mv

The phase ESF of the Ether/ESF absorbs the mass equivalent $dmc\vec{c}$ contained in M, in units of [kJ], changing the position of M in space over t=1"[sec], of a const $\vec{v}$ [m/1"] : for $|v| << |c|$

g) $$\left((\rho v)\cdot\vec{v}\right)\cdot V = Mv\cdot\vec{v}\,[kJ]$$

here below will be shown what happens when the specific mass of density ρ=1[Ton/m^3] , through internal gravitational transformation-degradation (ablation) is subjected to a constant increase of velocity :

$$\frac{d\vec{v}}{dt}\left[\frac{m}{1"}\right]$$

To which will correspond presence of internal scalar increase of compression:

$$\left|\frac{dv}{dt}\right|$$

Note: we will see below with due considerations how the above equation g) is applied in thermodynamics (Boyle's Law).

GRAVITATIONAL phenomena and their absolute dependence from presence of Ether/ESF

As mentioned above, the gravitational field of permanent depression in the Ether/ESF:

$$\varepsilon(r) = \frac{a(r)\cdot r}{c^2} = \frac{v(r)^2}{c^2}\left[\frac{Ton}{m^3}\right]$$

(caused by absorption of the phase ESF belonging to the Ether/ESF by a mass M_{LGM}) is coexisting with the flow of the phase ESF (of the Ether/ESF):

$$\frac{a(r)}{c^2}\left[\frac{Ton}{m^2 m\cdot 1"}\right]$$

also caused by said absorption.

M in existence in stationary status, in the Ether/ESF while resting (impeded to move) above a mass M_{LGM} is subjected to the flow of the phase ESF(of the Ether/ESF) caused by the M_{LGM} , which releases by ablation an amount of mass equivalent strictly belonging to M:

for $\infty > r \geq R_{LGM}$

$$dm(r)\cdot c^2 = Ma(\vec{r}) \ [kJ]$$

This, being absorbed by the phase ESF (of the Ether/ESF) along the direction of flow, generates in M (impeded to move) “only a tendency” to move in the direction of flow, (such a tendency is the Static Force the one described through Newton’s Universal Law of Gravity).

Gravitational transformations-degradations acting over a mass M impeded to move:

NOTE: 1) F_S=M a(r) [kJ] is the Static Force (see above) to which is subjected the mass M impeded to move whilst immersed inside the field of flow of the phase ESF (of the Ether/ESF) generated by a mass M_{LGM}). It represents a potential of transformation-degradation in [kJ] maintained by the flow of the phase ESF (of the Ether/ESF)

2) $F_D(r)=F_S\{a(r)/c^2\}=F_{S^*}$ ($\varepsilon(r)/r$)[kJ/1”] or [kW] is the portion of the gravitational Potential of transformation-degradation or F_S in M, coming out of M as dissipation due to ablation caused in M by ablation of the F_S due to the flow of the phase ESF (of the Ether/ESF) over it.

The equation 2) here above in the general conditions, (mass M laying over a mass M_{LGM}) represents an extremely small transformation-degradation whose value is usually overlooked.

At present, we consider the mass M subjected to Static Force, as a perfectly rigid object, opposed by a perfectly rigid contact surface.

Furthermore, since mass is a physical substance, (and not a mathematical entity to which we can associate a positive and a negative character) the Static Force only describes the existence of a Potential inside the Mass M that if released will produce a series of transformations-degradations in time (inside M) which whilst are taking place in time, are simultaneously absorbed with M by the surrounding phase ESF (of the Ether/ESF) in the direction of the flow of the phase ESF (of the Ether/ESF) caused by the gravitational mass M_{LGM} acting on M, as described here below.

Up to now the phenomenon of absorption of the phase ESF (of the Ether/ESF) by the gravitational mass was described as transformation-degradation acting on the mass M, which by necessity requires the definition of the time phenomenon and the POTENTIAL FORCE and assimilated with the Static Force.

Now we examine the case in which a gravitational transformation-degradation is taking place along the radial line connecting the centre of gravity of the mass M and that of the mass M_{LGM} , (whereas the M_{LGM}>>M), the POTENTIAL FORCE ($\vec{F}_S$ in [kJ]), once released becomes, in time, an active increasing Dominant Force
{$F_D(t)$ [kJ/1"] or [kW] } that develops accelerated movement of M in time, along r, towards the M_{LGM} :

$$\frac{dv}{dt}=a(r) \qquad \int_0^t \frac{dv}{dt}dt = a(r)\cdot t = v(t)$$

$$\vec{F}(t)_D = \vec{F}_S \cdot a(r)\cdot t = M\vec{a}(r)\, v(t) = \vec{F}_S\, v(t) \left[\frac{kJ}{1"}\right] \text{ or } [kW]$$

We see now that the sum of all the gravitational transformations-degradations over the time t in M simultaneously absorbed by the phase ESF(of the Ether/ESF) is the cause of displacement in space of M in the direction of absorption of the ESF by the M_{LGM}.

The above transformation-degradation (ablation), inside M, is consisting of release and simultaneous expansion of a dm(t)/1" [Ton/1"] of mass (inside M) into an equivalent amount of expanded mass dm(t)c^2/1"[kJ/1"] .

To expansion of the transformed dm(t)/1" into the dm(t)c^2/1" in time is associated simultaneous absorption of it, by the phase ESF (of the Ether/ESF) in the direction of flow, and due to the fact that the velocity of M increases at the rate dv/1" for each 1" of time , due to expansion the mass M subjected to Potential of transformation-degradation F(r)=Ma(r) after a time t is moving its volume V at v(t) ((due to expanding ablation) at increased velocity dv/1" along the radial line.

Since the phenomenon is endowed of continuity, at the end of the first second of time <u>the volume V</u> will expand $\Delta\vec{r}(1") = (d\vec{r}/1") = (0.5)\,\vec{a}(r)$ [m] acquiring $\vec{v}(1") = \vec{a}(r)$ at the end of 1", the next time interval of 1" (t=2")the mass at velocity $\vec{v}(1") = \vec{a}(r)$ carries on expanding along r acquiring velocity $\vec{v}(2") = 2\,\vec{a}(r)$ whist expanding $\Delta\vec{r}(2") = (d\vec{r}/1") + \vec{a}(r) = (0.5)\,\vec{a}(r) + \vec{a}(r) = 1.5a(r)$ etc…. (see table below)……

t"	Δ r (t) vector	expans in space	v(exp)	v(compr)	velocity at t
1	→(0.5)a (r)	(0.5)a(r)	1•a(r)	0.5•1•a(r)	1a(r)
2	→(0.5)a (r)	(1+0.5)a(r)	2•a(r)	0.5•2•a(r)	2a(r)
3	→(0.5)a (r)	(2+0.5)a(r)	3•a(r)	0.5•3•a(r)	3a(r)
4	→(0.5)a (r)	(3+0.5)a(r)	4•a(r)	0.5•4•a(r)	4a(r)
5	→(0.5)a (r)	(4+0.5)a(r)	5•a(r)	0.5•5•a(r)	5a(r)
	r(5)	Δr=12.5 a (r)	→v(t)=5•a (r) vectorial/expansion in space	v(t)=0.5•5a (r)=2.5a(r) scalar/compr at t" increase of internal compression in function of t"	

The transformation-degradation consisting of ablation by the force F_S and acting inside the gravitational mass M subjected to the gravitational field of depression and flow of the phase ESF (of the Ether/ESF) generated by absorption by the mass M_{LGM} , is taking place whilst M is moving along the radial direction towards the M_{LGM} and is generating at the time t, an expansion V(t) of the volume V originally occupied in a status of quiet :

$$V(t)=\frac{1}{2}\, a(r)\cdot t^2\cdot V$$

In the other hand, the internal compression in M increases with the increase of internal transformation-degradation and since the atomic masses are under very high internal compression for v(t)<<c we have that inside the V occupied by M although there is extra compression:

$$M\cdot \frac{v(t)}{2}$$

can be assumed that the overall volume V of the atoms of the mass M remains constant.

Justification of the variable transformation-degradation taking place inside a mass M=ρV expanding presence in space of its volume V along the time t when under transformation-degradation, is moving along the radial direction r towards the centre of M , was given in the above table, we resume it all below:

Whereas: $a(r)\cdot t=v(t)$

L) $$M\cdot\vec{a}(r)\ \frac{V(t)}{V}=M\cdot\vec{a}(r)\ \frac{1}{2}a(r)\cdot t^2[kJ(t)]$$

or

$$\{\rho\cdot\frac{1}{2}a(r)\cdot a(r)\cdot\ t^2\}\ \cdot\ V\ =\ \frac{1}{2}M\cdot v(t)^2=\ F(t)_{Tot}\left[kJ(t)\right]$$

Note: see the equation f') above.

In order to get the value of the whole transformation-degradation at t time, in the above equation, L) the Static Force Ma(r)[kJ] is multiplied (expanded)

by the term ½ a(r)t^2 [-] representing an overall transformation-degradation in time, increasing in time.

Once known t the above equation satisfies the Law of conservation in terms of equivalence of the mass in [Ton] to mass in [kJ] under transformation-degradation in space over a time interval as required by the laws of physics:

$$M \cdot \frac{a(r)}{c^2} = dm[Ton] \equiv M \cdot a(r) = dm \cdot c^2 [kJ]$$

Which multiplied for the pure number ½ a(r)t^2 [-] gives the:

$$F_{Tot}(t) = dm(\tfrac{1}{2}\, a(r)t^2)c^2 = dm(t)_{Tot}c^2[kJ]$$

Note: the above equation L) was already presented by me (see a new Universal formula on Google A Ruggeri April 5 2013) .

Summing up: the Ether/ESF is endowed of properties and those more in evidence as illustrated here, are:

- The Universal Reality as appears to our senses shows presence in the Euclidean Space of mass and phenomena apparently tied only to it hiding in effects coexistence with the Ether/ESF a status of the substance overlapping the mass in the Euclidean Space as a compound made up of two phases 1) the ESF as Energized Space Fabric made up of indefinable particles IP between which a depressed phase 2) the E_{ESF} behaves as interstitial substance (search Google Gsjournal.net Ruggeri A "Ether/ESF and the Power of Creation")
- Capacity of the phase ESF (of the Ether/ESF) to be absorbed, in time, through transformation-degradation, as substance in [Ton] by the gravitational mass and being transformed into addition to it.
- Capacity of the phase ESF (of the Ether/ESF) existing in a status of immobility, in the Euclidean Space, to absorb directionally from the volume containing mass M (at ρ density) in [Ton], mass equivalent contained inside M as result of release by gravitational ablation of internal transformation-degradation, (inside M) as a (½)dm(t)c^2/1", in units of [kJ]. Such absorption, whilst the (½)dm(t)c^2/1" belongs to M, is causing, as consequence, directional movement of M, at increasing velocity $\vec{v}(t)$ [m/1"] taking place in space and in time whist M is maintaining internal increasing compression at a rate (½)v(t).
- In the case of a gas see below (Boyle's Law).

- The way an amount of expanded mass:

$$dm(t) \cdot c\vec{c}\ [kJ]$$

Is present inside a mass M in the expanded status of mass equivalent in [kJ] requires association with M moving at velocity $\vec{v}(t)$:

-1) gravitational case $dm(t)\cdot\frac{c}{2}\cdot\vec{c}= M\cdot\frac{v(t)}{2}\cdot\vec{v}(t)$

-2) thermodynamics $dm(t)\cdot c\cdot\vec{c}= M\cdot v(t)\cdot\vec{v}(t)$ for t>=0

- Associated to the above movement of M in space and in time is the simultaneous capacity of the depressed phase E_{ESF} (of the Ether/ESF) to depress (compress internally to M) a scalar value which in the gravitational case is v(t)/2 (equal to half that of the simultaneous directional expansion $\vec{v}(t)$ [m/1"] of M in Space over the unit of time) whilst in the case of the gas if we consider sudden insertion in M of a dmc^2 the scalar value $|v|$ is the same of $|\vec{v}|$.

Note: the case of $\vec{v}$ orbital velocity of a mass M around a gravitational M_{LGM} moving in a constant field of depression of the ESF will be treated apart.

Note: the phase ESF(of the Ether/ESF) is present also in particular conditions, also to be treated apart, inside the mass (any mass), since is constituting, through presence of a thin extremely resistant spherical film, the boundary between an atom and the surrounding Ether/ESF.

Note: a summary calculation assuming that an atom of iron has density ρ_{Fe}=7.85 and radius r_{Fe}(126 [pm] =126*10^{-12}m) gives, at its surface, a thickness dr_{Fe} of the film made up of the phase ESF (of the Ether/ESF) of density $\rho_{ESF}\sim c^2$ [Ton/m^3], (the ESF displaced by the mass of the atom, concentrates at density $\rho_{ESF}\sim c^2$ [Ton/m^3], over its surface:

$$dr_{Fe}= \frac{\rho_{Fe} r_{Fe}}{3\cdot c^2}=3.66\,E{-}27\ [m]$$

Gaseous mass

The expanded mass in [kJ] belonging to a gaseous mass M of density ρ contained inside a generic container of volume V where the velocity $\vec{v}$, inside V, is haphazard for the single particles (atoms and molecule of the gas) whilst the same "single particles" are still subjected to internal compression v inside V is referred in the following manner:

$$\Delta Q= \rho dV\cdot c\vec{c} = \rho V\cdot v\vec{v}\ \left[kJ\right]$$

Since $\vec{v}$ related to single particles moving in all directions inside a fixed volume V, the ΔQ (Heat) can be referred as scalar entity, for the unit of volume 1[m^3] we have:

$$p = \rho v^2 \left[\frac{kJ}{m^3} \right]$$

Then, if we consider the volume V perfectly insulated (exclude dissipation) will be valid the following:

Boyle's Law

BL) $$p \cdot V = dm \cdot c^2 \left[kJ \right]$$

$x * y = const$

The above is an inverse proportionality Law, to which is associated the concept of conservation, but is valid only in terms of degradation, (increase of the volume V occupied by the gas) is a Law to which, we can introduce an associated simultaneous transformation-upgrade, in time, of Heat into Work that to be performed requires an ever present loss of part of the Heat (Entropy). See above.

Presence inside a mass M, (solid, liquid or gaseous) of mass equivalent (as result of insertion in it or as result of internal transformation-degradation, groups all the phenomena of movement affecting M, including Heat, under a unique Science:

The Universal Dynamic Science (UDS)

The founding statements of it are:

1) Sudden presence, due to insertion (independent from time), inside a mass M, of a dmc^2 (the equivalent to a value of mass dm) as Heat or as external Total Force (both in [kJ]):

$$dmc^2 = M \cdot v \cdot \vec{v} \left[kJ \right] \qquad \text{for } t \sim 0 \text{ [sec]}$$

2) Presence due to internal gravitational transformation-degradation developing in time:

$$\frac{1}{2} dm(t) c \ \vec{c} = \frac{1}{2} M \cdot v(t) \vec{v}(t) \left[kJ \right]$$

Many more phenomena of movement can be tied to presence of a mass dm(t) [Ton] expanded into equivalent mass $dm(t)c^2$[kJ] as result of transformation-degradation-upgrade, in the conditions above mentioned.

Through the use of these basic concepts the UDS intends to replace explanations related to Theoretic Mechanics and to Thermodynamics. More to follow.

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