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RESEARCH ARTICLE

DISPLACIVE CROSSLINKING IN MATERIAL KINETIC ENERGY CHANGES: TEACHING AND THEORY ABOUT THE MEANING OF ENERGY LAWS REVISITED

Emmanuel Ugochukwu Okoro
Meharry Medical College, Nashville, TN 37208 Department of Microbiology, Immunology, and Physiology.

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Abstract

Publications and textbooks on energy laws are centuries old, but isolated numerical equations eliminate context and significance for non-experts. Hence, the objective of this work is to bring material and energy meaning to the forefront of laws. Specifically, instructive demonstrations, rationales, diagrams, and generally applicable mathematics are presented. Summarily:

(**1**) Energy, associated with movement, requires relevant quantity of matter with mass (M), here simply called construct. In particular, a construct with velocity (V) $\neq 0$ has available kinetic energy (KE) for potential "transfer" to another.
(**2**) Any suitable construct consists of nominally external constructs arranged in counter-opposing (limit-attraction) configuration to a level lower than the potential KE/M maximum.
(**3**) Displacive crosslinking (discrossing), i.e., reaction, represents a collision-like interference, possible with two or more continuous layers of matter under opposing movement distributions. Consequently, a driver(1)-to-load(2) relationship gives rise to acceleration (a) = $\Delta V/\Delta t \neq 0$ at all relevant intervals of space/time until cessation (a = 0). Relationally, $\Delta KE_1/\Delta t = -\Delta KE_2/\Delta t$ and M_1 (a_1) = M2 ($-a_2$) = force. Moreover, on collision-like displacements, <u>p</u>roximal <u>lay</u>er <u>d</u>river-to-<u>l</u>oad <u>rep</u>eat<u>s</u> (playdlreps), i.e., waves, may be generated.
(**4**) Theoretically, a stable construct may contain mass-negligible driving constituents moving along opposing paths to counter-oppose their respective contributions in displacement. These constituents are proposed to be the basis of energy fields (e.g., gravitational), consisting of ejected materialets with recirculating trajectory (EMARETs).
(**5**) There may be KE gain-loss (driver-to-load) and/or gain-gain (driver-to-driver) relationships without change in the total mass or energy.

Introduction:-

The opaque and equation-restricted manner in which energy is described in public physics textbooks, official publications [1,2], and normal vernacular make energy seem like an imaginary entity that exists without a material basis. As suggested via the general relativity theory [2], how can that which does not by itself exist, such as space

Corresponding Author:- Emmanuel Ugochukwu Okoro
Address:- Meharry Medical College, Nashville, TN 37208 Department of Microbiology, Immunology, and Physiology.

and time, curve? Does space truly have dimensionality because humans introduce coordinate system of points for mapping relativity purposes? Regardless of the validity of the theory, it remains that in a realistic world, realistic answers must precede the imaginary and numerical, especially for tutelage to pupils and non-experts. Not suprisingly, dictionary definition of energy reads: "the strength and vitality required for sustained physical or mental activity." Moreover, terms such as solar and gravitational energy are routinely expressed to pupils and non-experts without emphasis on the material linkage. To make the situation worse, advanced numerical representations are universally presented without the foundational logic governing the root system of numbering. To non-experts, the numerical magnitudes associated with various energy-related measurements are human-devised symbols that might as well be fictitious. This is because, both in specialty publications and textbooks, neither the guiding experimental rationales, material bases, nor the critical insights toward making sense of number representations are emphasized. Here, efforts have been made to eliminate these dubious obstacles to understanding the practical meaning of energy. In the modern world, self-empowering knowledge about material relationships is oxygen, and is a key ingredient that extends to the individual and collective well-being, as well as environmental sustainability.

The content magnitude of a desirable range of matter is generically described here in terms of its practically comparable (measurable) or immeasurable mass (M). Further, variable ranges of matter exists in some form of fluidic or rigid construct, a subset of which is designed by nature to be perceptible through extensions (i.e., nerve fibers) that extend to the brain's neurons. Each construct, at suitable magnification or isolation range, has applicable volume limit and crossing superficial planes that define its overall shape. Moreover, a specified construct whose reference position in space is changing between time points has velocity (V) $\neq 0$. Such construct has "transferable" energy in consideration of its potential to displace another, in parts or whole. Moreover, movement of any construct in non-vacuum conditions occurs while others are displaced along its path. Hence, under suitable displacement rates and relative freedom of motion, proximal layer driver-to-load repeats (playdlreps), i.e., waves, can be produced. This is typical of what is generally recognized as collision (driver-load). Of everyday significance, the wave movements of matter (e.g. photons of light) are critical for vision.

The appearance of energy transfer between constructs also occurs when a construct's velocity is seemingly zero, with or without obvious inter-surface contacts. Thus, under the influence of what is typically described as "gravitational energy," a construct with mass, M, apparently above Earth, is crosslinked elastically with the rest of the Earth as a whole at all times. Unopposed, this elastic crosslink causes such a construct to be attracted (gravitated) toward the much larger Earth at a much faster point-to-point acceleration (a) = $\Delta V/\Delta t$ than the Earth. Hence, one could imagine any specified construct to have an elastic band (via gravitational energy field) wrapping it together with the bulk of the Earth. When there's no stopping/insulating load construct between them, the driver-load leads to acceleration = 9.8 m/s2 = g near the Earth's surface. This displacive crosslinking (discrossing), analogous to its collisional counterpart, is typically referred to as reaction or interaction. Specifically, when a construct's velocity is being altered than it would be without another construct near or far, discrossing is in process. Here, discrossing will be used in place of reaction to emphasize that increase or decrease in the velocity magnitude (i.e., speed) of constructs do not occur in isolation, even when no driver-load arrangement is immediately obvious.

The acceleration that arises from discrossing can give the appearance of discrossing when the acceleration magnitude is not zero on the basis of change in direction of velocity, rather than its magnitude, as can occur under rotational motion. Further, analogous to gravitation, constructs of matter that are suitably in fluidic discrossing (e.g., chemical reactions) may reconstruct in more obvious manner, as can be observed when the velocity of constituents abruptly change to give rise to gases and/or temperature rises.

Discrossings essentially represent nature's design that some constructs unite and/or separate from each other in a configuration and/or interference basis. Upon reaching stability, a construct or stable arrangement of them have achieved a time-invariant average speed and overall distribution. They either remain in place or continue to move at an applicable average speed. In association with the total KE at collision and/or elastic displacement, the rates of accelerations is predetermined in connection to the magnitude of matter (load) that is stable to the KE or elastic displacement. At least for large constructs with measurable masses, $\Delta KE1/\Delta t = -\Delta KE2/\Delta t$ over applicable intervals of time between driver1-load2. Alternatively, the driver can also be the load, as with energy-field mechanisms of discrossings. Accordingly, the driver/load equation = force (F) equation = M1a1 = M2 (-a2), first published by Newton[3], holds to the extent of applicable M1 and M2 within applicable constructs/layers of matter. Using the equation, the author presumes, he further went on to describe a "remote" counterpart, the "gravitational" equation.

For discrossings that are energy field dependent, the apparent distance between any two material constructs can vary widely between their optically discernible surfaces. However, energy field-dependent discrossings are analogous to an elastic body that has either been compressed or stretched too far, as designed by nature. When the constituents are unopposed, they start moving toward or away from each other, with opposite-directed accelerations that depend on the $\Delta KE/M$ that are synchronously subjected to driver-load relationships.

Mathematically, force on M should be zero when acceleration is zero. However, the potential for force of a given magnitude holds when a suitable driver-driver relationships are load-neutralized at suitable resistive load interfaces. Rather than describing force in a way that is confusing, it should be emphasized that force can be thought of as a magnitude that arises when any suitable construct of matter is prevented from reaching a potential position as a consequence of its velocity and/or elastic displacement from another construct of matter. Importantly, materials are themselves energetic bodies. Strictly speaking, the typical discrossing do not cause a change in mass or energy. Instead, it is change in KE stability that is altered, with or without obvious bond formation and/or cleavages. Discrosssing reconfigurations cause constructs to reciprocally regulate each other's KE via driver-load associtions, giving the appearance that KE is an entity that is transferred from one construct to another. In a more complex manner, as was demonstrated through Joule's experiment, ΔKE initiated through gravitational energy field discrossing can be engineered to drive localized heat waves measurable through suitable load that can undergo human-discernible displacement (e.g., mercury thermometer)[4]. Discrossings, with concurrent ΔKE, are omnipresent in largely subtle, but far-reaching ways. It is at the core of inorganic and organic material reconstructions that govern human nutrition, development, technology, and beyond. Essentially, the laws that govern discrossing apply to biological materials, including humans, at all times until death. Further, directly or indirectly, the laws span all disciplines of human endeavor or occupation. Thus, centuries of experimental research and subsequent theoretical understanding by specialists are at the core of modern technological developments. Still, as is self-evident in our world, research on this topic, substantial communications, and the fruits of studying discrossings laws have been limited to a few scientists over generations.

This presentation is part review, rediscovery treatise, and theory, written to promote independent thought about matter, regardless of specialty or access. As the objective of this presentation is to make it universally understandable, major points are presented through figure legends associated diagrams and demonstrations. Included are mathematically relevant expressions. Further, the integral method of summation is emphasized as the space-time descriptions of material undergoing discrossing are invaluable.

Discussions, Diagrams, and Demonstrations:-

Space and time magnitudes applicable to migration of a material construct

In isolation of intra and inter-construct relative magnitudes, space and time magnitudes have no obvious use. A specified construct, on the other hand, has a beginning and end with respect to its individual and inter-construct relative magnitudes in space occupied. Accordingly, spatial magnitudes are here emphasized in relationship to the movement of a material construct as illustrated in **Figure 1**. Note that an isolated simple construct that is stable with respect to it constituents is either stationary or moving at a constant angular or linear velocity. The velocity relationship of a construct in motion is particularly useful for calculating distances that would otherwise be impractical to measure directly. However, the calculation of the migration distance becomes challenging if the construct is subjected to discrossing along its course. Under this situation, the integral method of calculation is needed for accuracy (**Figure 2** and **Figure 3**).

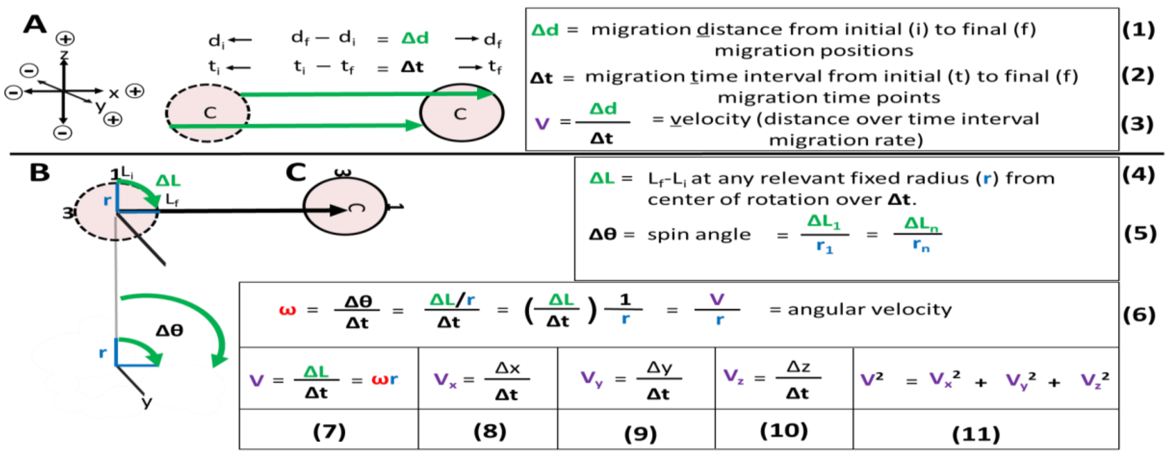

Figure 1:- The schematic images represent cross-sectional and relative positions of a construct (C) of matter migrating between a relevant initial (subscript i) to final (subscript f) positions in time and distance. Emphasis is not placed on the mass, as it does not matter for the enumerations under consideration. Letter symbols are color-coded to emphasize the relativistic basis of the numbers associated with them.

(**A**) As the migration time (t) magnitude increases toward t_f, C with KE ≠ 0 appears self-displaced (d) toward d_f. Note that the x-y-z positional axes indicated are 90 degrees to each other, as serve only for relative mapping purposes. These axes are used regardless of the exact migration course. The migration distance (**1**) and corresponding migration time interval (**2**) are magnitudes whose ratio (**3**), i.e., speed, or with trajectory direction considered, velocity (V), reflect how fast the C's position is displaced in relationship to corresponding time interval. For V to be point, i.e., d position-specific, the interval Δd and Δt, have to be measured as close as possible to a desired d point along its course. Note that the exact point chosen on C does not affect the V magnitude as long as the point is representative of the C under consideration. (**B**) If the course of a reference C is spin-rotating, there are radius (r)-dependent variations in the spin distance over corresponding time interval (**4**), even though different positions represent the same C without variations in their relative positions. Accordingly, the spin angle (**5**) and angular velocity (**6**) appropriately reflect this course. (**C**) If C is spin-migrating, as in the tires of a moving bicycle, it experiences a non-revolving migration as well. Note that spin course may be represented with a fixed x-y-z axes (**8-10**). However, the course has to be projected along these axes, and then using Pythagorean theorem, the near linear velocity, at spin angle ≈ 0 (**7**), which varies along r, can be calculated from the equational relationships (**11**).

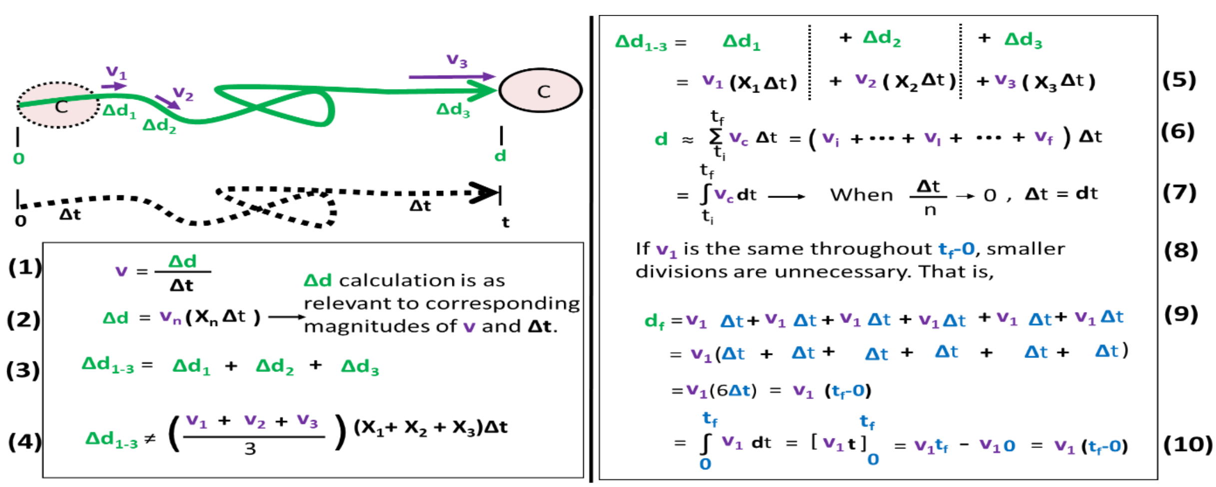

Figure 2:- Using sub-interval (integral) method to calculate distance traveled along course with varying velocity.

The diagrams represent tracings of the course taken by the material construct (C). Total migration distance (d) increases with corresponding total migration time (t). Note that the d course tracings have a corresponding t tracing, from a space-time point of view on C. Further, note that total d up to a specified t is the length along its course axis. The arrow lengths under the velocity (V) magnitudes indicated represent interval of d (Δd) over which the specified V is the same. Up to a desired t, the course is broken into t/n = Δt equal magnitudes. The V inter-relationship to a relevant Δd and Δt is emphasized in equation **1**. Where appropriate, Δd can be calculated by isolative re-arrangement (**2**). If Δd_{1-3} were to be calculated by averaging over time intervals where the Vs are not equal, the value would be erroneous (**4**). The error is thus eliminated if no such averaging is done (**5**). The short-hand way of writing homologous sums (∑) as 5, in which equal intervals of Δt are considered is indicated in equation **6**. When Δt/n approaches, but not equal to zero, erroneous calculations involving inaccurate averaging of V are eliminated (**7**). Note that this interval summation (∫), i.e., integral method, is unnecessary when V is constant along a desired interval (**8-10**).

Figure 3 is an illustrative time-lapse tracing of the course taken by a material construct (C) along which it undergoes discrossing with another (not indicated for clarity). D_{1-3} is a length independent of C's motion, but is subdivided as indicated due to constancy of a given magnitude of acceleration (**a**) across an applicable interval. Migration distance (d) up to a corresponding time (t) point are indicated. The arrows on either side of V indicate the interval of length, and corresponding time, needed to reduce (-) or increase (+) the preceding magnitude of V by the amount indicated, in association with a constant rate of change in velocity, i.e., acceleration (a), equation **2**. The dotted purple line is a diagrammatic graph of the velocity at applicable time and d points. (**2**) The compound magnitude, acceleration (***a***), is defined as ΔV over time (Δt), and thus relates to ΔKE/Δt, or alternatively, ΔKE/ΔD of C. Note that over the interval indicated, etransitions occurred, even without change in apparent bonding or mass magnitude. Between any two points, V either increases and/or decreases. The magnitude, V_f, can be isolated from the acceleration equation (**3**). In calculating V_f magnitude, invalid averaging introduces error (**4**). As explained in Figure 2 legend, the calculation error in V_f is eliminated through successive multiplication and addition across intervals where a given acceleration magnitude is constant, with Δt or dt as a common multiplication factor (**5-7**). D_{1-3} can also be calculated because of the corresponding magnitudes of d, V, and *a* are related by equations (**8-12**). C subscripts emphasize that the minimum number of integral additions are restricted to intervals where constant magnitudes of *a* or V is applicable. Note that the V proximal to a given t is given in equation **7**. Multiplying by a suitable time interval gives the corresponding d (**8**). V_c at a given point in time (**8-9**) is related to the acceleration in equation 7, thus V_c can be rewritten as in equation **10-11**. From the diagram presented $D_{1-3} = d_f$-0 can thus be calculated by adding successive magnitudes of d over suitable time intervals from 0 to t_f (**12**).

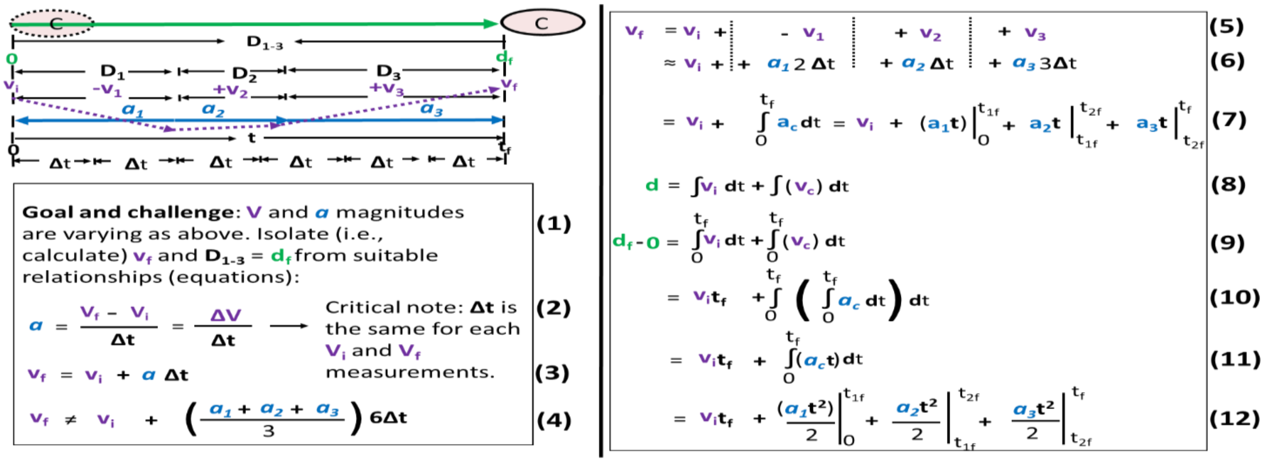

Figure 3:- Applying the integral method in calculating V and D of a fixed mass-construct undergoing discrossing.

Gravitational-field induced discrossing induces ΔKE/Δton a construct that is dependent on its mass.

Qualitatively, everyone is familiar that when an isolated construct with sufficiently large mass (M) and density (M/volume) is released from opposition against "falling," it starts to fall toward the Earth' surface. Nevertheless, to a non-specialist, it is far from obvious that this represents an attraction to the Earth, rather than some other phenomenon. That is, the "Earth" is vaguely defined, nor it is practical to demonstrate by isolating the Earth's mass. Thus equations, such as the "gravitational equation" are far from sufficient to explain what is happening.

Rationale in qualitative comparisons of the relative KE of constructs with different masses and/or velocities.

If the KE of a specified construct is transferredto another with a fixed mass, and directed against gravitational discrossing, then the height reached is a reflection of the KE received. Such an experimental design is illustrated in **Figure 4A-B**. Note that under the sole influence of gravitational discrossing, the constructs experience an acceleration of 9.8 m/s^2 = g. Thus, after falling through the same height, D, each construct has the same velocity, as explained in Figure 3.Experimentally, it can thus be shown that, under the influence of gravitational discrossing, ΔKE of a construct over the same interval of distance (D) increases as the mass increases (**Figure 4E**). Note that the typical parabolic path taken by a construct thrown up at an angle is explained by acceleration = 9.8 m/s^2 due to the uniformity of the gravitational discrossing close to the Earth's surface. Thus, despite achieving the same velocity over a given D, constructs with larger masses gain more KE (**Figure 4E**).

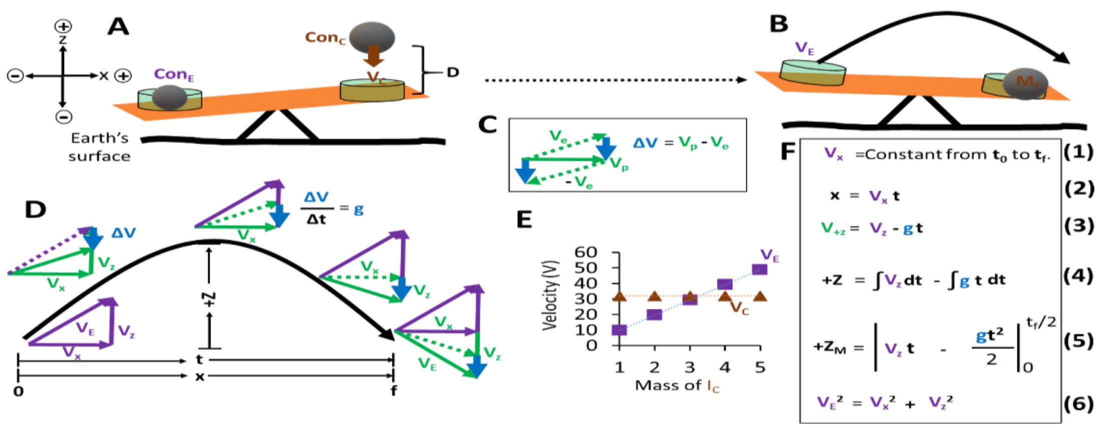

Figure 4:- Gravitational-field induced discrossing induces ΔKE/Δt on a construct that is dependent on its mass.

(**A**) Model-diagram of the effective KE transfer arrangement used to evaluate the ΔKE of a construct (Con$_C$) of matter as it falls through a fixed distance (D) in an etransition that involves gravitational energy fields linking the Con to the Earth in an unopposed arrangement. At collision, the accumulated ΔKE on Con$_C$ due to Earth's gravity is essentially transferred to an ejectable construct, Con_E, with a fixed mass. (**B**) The height reached by Con_E under opposing gravitational discrossing is a reflection of its ejection velocity, V_E, and ultimately its initial KE upon ejection. The line is a tracing of the course taken by Con_E toward return to the Earth's surface. (**C**) V_p and V_e are the indicated position (p) and immediate early (e) velocities of Con_E along its course. $\Delta V = V_p - V_e$, is illustrated. Note that the direction (sign) of $V_e$is switched to reflect the equational relationship, i.e., $V_e + \Delta V = V_p$. (**D**) Line tracing of the course taken by Con_E is diagrammed between position of ejection along z-axis to return to the same z-axis position. The purple right triangle is defined in relationship to V_E and perpendicular projections to x-z axes. Note that the direction-independent acceleration on a given construct due to Earth's energy field is constant at g = 9.8 m/s^2 close to the Earth's surface. The consequence of this constant g and the original V_E is that Con_E follows a parabolic course. (**E**) An idealized experimental result which can be obtained under suitable conditions where no other etransition is acting in addition to that due to Earth's gravity. Note that V_E increases with increasing mass of Con_C. Thus over the same ΔD, Con_C with larger masses are subjected to greater ΔKE. (**F**) Isolated, the gravitation-induced etransition on Con_E is restricted to the z-axis, thus V_x is constant between t_0 and t_f (**1**), thus calculation of the migration distance along x over a specified migration time is given in equation **2**. The rate at which V_z changes is constant at –g (upward) or +g (downward). Thus upward magnitude of V_z at a specified time is given in equation **3**. Because g is constant throughout, it takes equal amount of time for +Z and -Z, as diagramed in D. Thus, $t_f/2$ is the time to reach +Z. From these relationships, equation **4** reflects the cumulative magnitude of +Z up to a relevant time. Z_{max} (Z_m) can thus be calculated from equation **5**. Using Pythagorean theorem, V_E can be calculated (**6**).

Demonstration of discrossing through cradle-balance collisions

Although pupils are taught to memorize force laws in textbooks, what the force laws represent in practice are widely de-emphasized. Here, efforts have been made to illustrate the material basis of the force equation.

Experimental setup rationale and reproducible laws.

The global presence of gravitation-inducedΔKE on a construct means that it is necessary to eliminate the contribution of gravitation in order to isolate the contribution of ΔKE due to readily visible inter-material relationships (i.e., collision). The cradle balance setup achieves this purpose (**Figure 5**). At a vertical string orientation (θ = 0), the spherical ball with suitable M is neutralized against gravitation-induced ΔKE. At θ> 0, this is incomplete (**Figure 5A**). With gravitational field as the initiator of the discrossing, along with resistance offered through the string, the ball follows a curved path, achieving a given velocity prior to collision (**Figure 5B**).

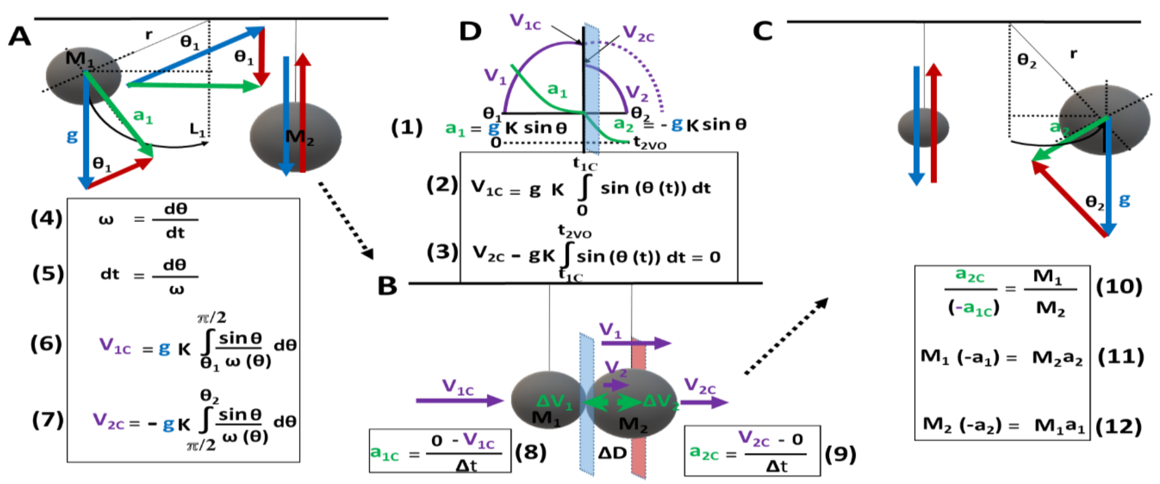

Figure 5:- Demonstration of discrossing through cradle-balance collisions.

(**A**) A construct of matter (ball) with mass (M_1) is motion-separable at a flexible hinge (string). When released at θ_1> 0, it is subjected to an orbital-like course initiated by gravitational energy field. The blue arrow diagrammatically indicates that when unopposed, the Earth's energy field drives it towards the Earth's surface. In the setting of resistance along the axis of the string, the overall acceleration (a_1) is perpendicular to the long axis of the string. (**B**) Immediate to colliding with construct with M_2, ball-1 has KE with corresponding velocity (V_{1C}). At this exact position, gravitational field-induced discrossing is cancelled out via the string. Hence, the proximal changes in the velocities of ball-1 and ball-2 is due to the driving KE of ball-1 on collision. ΔD and Δt represent the distance and time interval, respectively, over which ball-1 loses its pre-collision KE to ball-2 as the initial load. Over this time, $\Delta KE_1/\Delta D = \Delta KE_2/\Delta D$. Similarly, $\Delta KE_1/\Delta t = \Delta KE_2/\Delta t$. Similarly, their respective acceleration, a_{1C} and a_{2C}, is related to the relative magnitudes of M_1 to M_2. The double-sided arrow is meant to reflect this relationship, which represents a collisional driver-to-load that depend on ball-1 and ball-2 relative material magnitudes. (**C**) Subsequent to gaining the precollision KE of ball-1, ball-2 immediately starts to lose its KE due antagonist gravitational discrossing, in association with the string attachment. (**D**) V_1 and V_2 represent the respective velocities of ball-1 and ball-2. Note that the V_2 tracing (dotted line) would be symmetrical to that of V_1 if $M_1 = M_2$. The equations represent their respective accelerations and velocities in relationship to progression of time and angle, as governed by driver-load relationships. Note that equation **10-12** represent difference ways of representing the "force" relationship.

The acceleration of the balls, with M_1 and M_2, can thus be determined. From this type of experiment, the force law (**Figure 5, equations 10-12**) can be determined. These relationships are further illustrated in **Video 1**. Per collision, ΔKE is largely restricted to M_1 and M_2. However, invisible contributors (e.g., gases in the air and heat released from the materials) eventually bring the balls to rest. Thus, the motion of M_1 and M_2 will come to a stop soon after repeated collisions. To further illustrate that $\Delta KE_1 = -\Delta KE_2$ relationship is preserved between collisions, intermediate collisions involving spherical constructs with equal resistance and equal masses are shown in **Figure 6**.

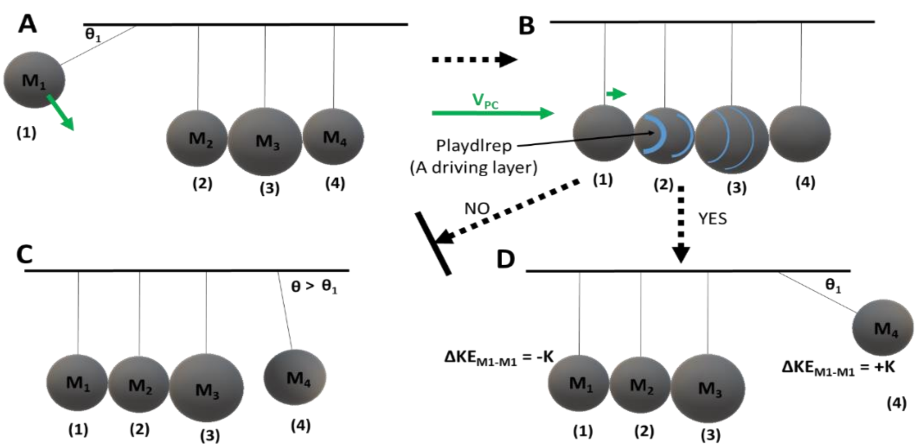

Figure 6:- Involvement of proximal layer driver-to-load repeats (playdlreps), i.e., waves.

(**A**) A rotation-isolated ball with mass (M_1) at position 1 (1) is driven to collide to another due to gravitational energy field. (**B**) Upon colliding, invisible repetitive displacements, playdlreps, are created because the initial mass constituents, mainly M_1 to M_4 at start, experience ΔKE/m gradients that is highest at the collision initiation interface and propagates toward the load in a driver-to-load repeat. V_{PC} is velocity of M_1 prior to collision. The blue lines symbolize transverse distribution of the playdlrep driver layers at a suitable point in time, prior to reaching M_4. The thicker the line, the greater the range of layer displaced along the propagation axis. Thus the layered displacement is largest at the initiating collisional interface, and drops from there, analogous to displacements observed in a "still" water at the air/water interface of a falling metal ball. Note that the playdlreps are connectivity changes related to the ΔKE/m gradients at the instant of collision, which rapidly dissipate and repeat without gap. At suitable junctions, displacements are complete (i.e., bonds break). If the discrossing is restricted to the constructs indicated, the starting angle, θ_1, of M_4 is equal to that on M_1 because they have the mass magnitude (**D**), rather than **C**.

Further, note that the propagation of collisional displacements may spread as proximal layer driver-to-load repeats (playdlreps), i.e., waves, as a consequence of continuous driver-to-load repeats (**Figure 6B**). The limited range of movement freedom thus induces dissipation of the driver's continued movement so that the load becomes the driver to constituents immediately bordering (proximal) to the original load. The elastic-like nature of the displacements bring the original constituents back to their undisplaced positions, allowing for additional driver-to-load repeats. Further, the associated KE/M determines the velocity of propagation of any given playdlrep driver-to-load layer. Thus higher KE/M means higher velocity. In this case, the displacement ranges are too small to be seen directly, but the presence of playdlreps is evident from the increased acceleration of the terminal spherical ball while the preceding ones appeared stationary.

Determining the gravitational discrossing magnitude (F_g) within a restricted space.

Gravitational energy field, thusgravitational discrossing, is persistent on all constructs close to the Earth's surface, thus the gravitational force magnitude on a specified construct does not go away. As an alternative to measuring the force due to gravitational energy field while a desirable construct is in free motion, a more practical strategy is to relate the force magnitude to a secondary discrossing within a confined space. One approach is conceptually illustrated in **Figure 7**.

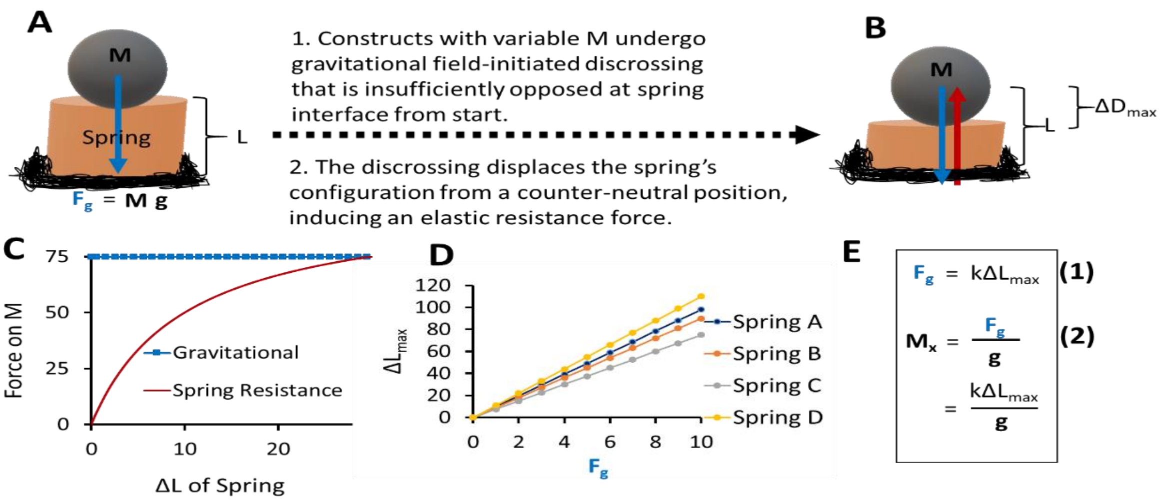

Figure 7:- Determining the gravitational discrossing magnitude (F_g) within a restricted space.

(**A**) A construct with mass (M), under the influence of gravitational discrossing, is subjected to a gravitational force (F_g), as can be determined in isolation of opposing groups. When placed on top of an elastic material which is unable to initially oppose the gravitational force on M, a secondary opposing (elastic) discrossing is induced. The force on M due to the spring's resistance increases as the spring is displaced from its stable configuration. (**B**) When this opposing spring force (red arrow) equals that of the gravitational, no further displacement occurs. (**C**) A graphical illustration of the increasing magnitude of the secondary spring force as the ΔL of the spring increases. (**D**) Idealized experimental results obtainable when using different springs in relationship to compressive gravitation-induced force (F_g). Note that as F_g increases, the maximum compression length (ΔL_{max}) increases. Thus, within suitable ΔL range, appropriate F_g magnitude can be determined in relationship to the spring or other suitable arrangement used. (**E**) From D, it possible to relate the magnitude of F_g to the compression length on a suitable spring, and ultimately the total material content, M, can be calculated (**2**).

ΔKE/ΔD associated with energy field discrossing is relatable to elevated temperature.

Elevated temperature is a characteristic consequence of collisional discrossing, reflecting bond cleavages that release constructs that are optically imperceptible. Unlike light photons, heat constructs typically combine transiently, but are subsequently released in part or whole from a suitable construct. If the escape of heat constructs are prevented from escape through a heat-reflecting (insulating) material, then the accumulation of heat constructs within a confined spaceis quantifiable as elevated temperature. Over a century ago, Joule is reported to have performed an experiment of conceptually equivalent designillustrated in **Figure 8**.

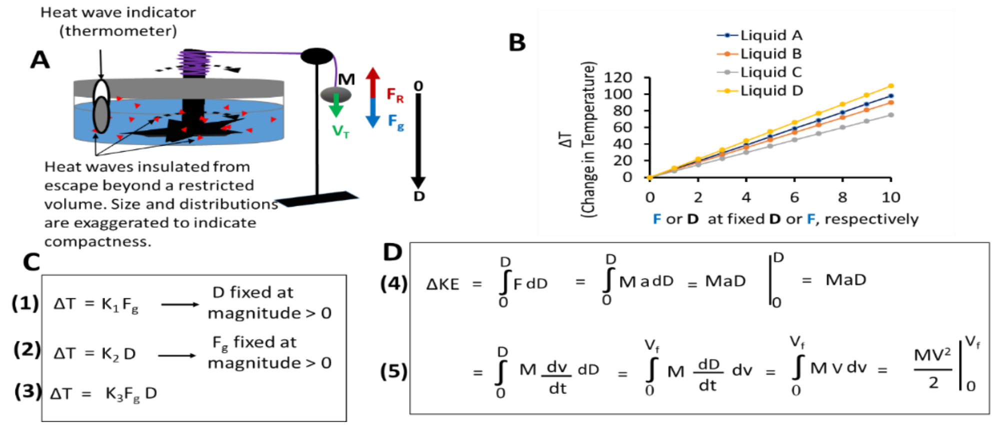

Figure 8:- ΔKE/ΔD associated with energy field discrossing is relatable to elevated temperature.

(**A**) A heat-wave impervious wall surrounds a liquid chamber subjected to gravitational-field induced discrossing under magnitude, F_g. As the rotor-blade spins, it collides with the surrounding liquid, thus inducing a characteristic propagation of heat wave due to collisional discrossing. While F_g is maintained, the velocity of the inducing construct with M reaches a stable velocity (V_S) when $F_g = F_R$, thus maintaining the rate at which heat is released in accordance to F_g. As such, the potential gravitational-induced ΔKE over ΔD can be correlated to change in temperature (ΔT) at a specified F_g. (**B**) Illustrative diagrams obtainable using different liquid groups to emphasize that ΔT ultimately depend on the balance between heat generation and neutralization in the material. (**C**) Equational relationships which may be deduced from corresponding magnitudes of ΔT, F, and D from B graph. (**D**) Note from equation 3, a general relationship relating ΔKE for a given force and discrossing distance, D, may be deduced.

Magnetic field visualizations as a representation of energy fields and energy field regulated discrossing.
Most people, experts or not, are familiar with magnets from a utility point of view. The existence of stable magnetic field on suitable materials make them ideal for demonstratingthe distribution of energy field around an observable construct. In **Figure 9**, images are presented that demonstrate the extend to which the energy field of a suitable material extends. The material-dependent ΔKE is also illustrated in **video 2**.

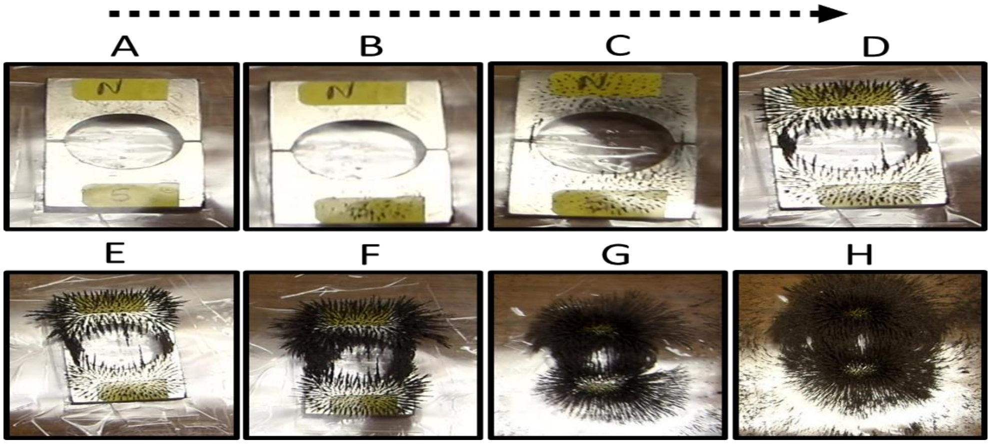

Figure 9:- Magnetic field visualizations as a representation of energy fields and energy field regulated discrossing.

The images are video capture images of a magnetically-driven discrossing. The geological north (N)- and south (S)- aligning polarities, due to Earth's global magnetic field, are indicated. Note that the N and S poles also represent regions on a magnetized construct where the local energy field strength, and the resulting force of attraction or repulsion is maximum. If a magnetic field is exposed to a suitable non-magnet (e.g., iron materials), the iron and the magnetic material experience an attraction in relationship to the relative contribution of energy fields that appear to originate and end around the N-S poles. If they are both magnetized, the attraction or repulsion is orientation-dependent, but the combined discrossing acts in such a way their respective N-S axis are driven to be parallel, and in the same orientation to each other. (**A**) Magnet without iron filing. (**B**) Iron filings are released randomly from the top of the page, without effort to distribute them to the N or S end. At sufficient magnetic field density, the magnetic discrossing on an iron filling, thus force, is greater than that due to gravity. As the magnetic energy field is strongest at the N or S, an iron filing experiences displacement toward N or S, depending on proximity of release. The space occupied by each iron filing is sufficiently small so that it can capture the energy field with a small volume of space, but sufficient to be visualized without magnification. Upon contact, the magnetic force on the iron filing is resistively opposed, but the energy field is not. Thus the orientation and additional collection iron filings represent the visually detectable continuity of the magnet's original energy field. (**C-D**) More iron filings added. Note the tendency of the iron filings to accumulate at specific foci on the magnetic, rather than distribute uniformly. (**D-H**) As more iron filings are progressively added, a continuity between the N and S magnetic field becomes evident as separated networks that communicate between the N and S. Note that where gravitational discrossing on the iron filings are neutralized (glass surface), complete "line" loops between N and S are observed (**H**).

Summary

Constitutionally, a material construct is an energetic network whose totality is reflected in its mass. The elastic and/or movement-dependent effect on displacing a load mass is essentially what is measured as energy. Through suitable inter-construct discrossing (i.e., reactions), materials are displaced in a way that largely retains or alter the distribution of relevant constituents.

Theory Of The Material Basis Of Energy Fields

Electrical and magnetic energy fields exist on constructs where suitable counterparts may combine to neutralize their respective driver-to-driver energy fields. As the construct moves, the energy field also follows. Therefore, it seems reasonable to propose that energy fields represent a form of current instability of the material cluster from which the constituents are derived. When suitable stabilizing arrangements are formed, the energy field destabilization is eliminated or neutralized through collapse between compact bodies of matter. "Energy fields," by virtue of the fact that they remain strongly united with the discernible material construct associated with them, while extending beyond the major bonding boundaries, are akin to the orbiting of planets around the sun. However, they simultaneously behave as if they are ejected materialets that are recaptured among the major sub-constructs from which they appear to originate.

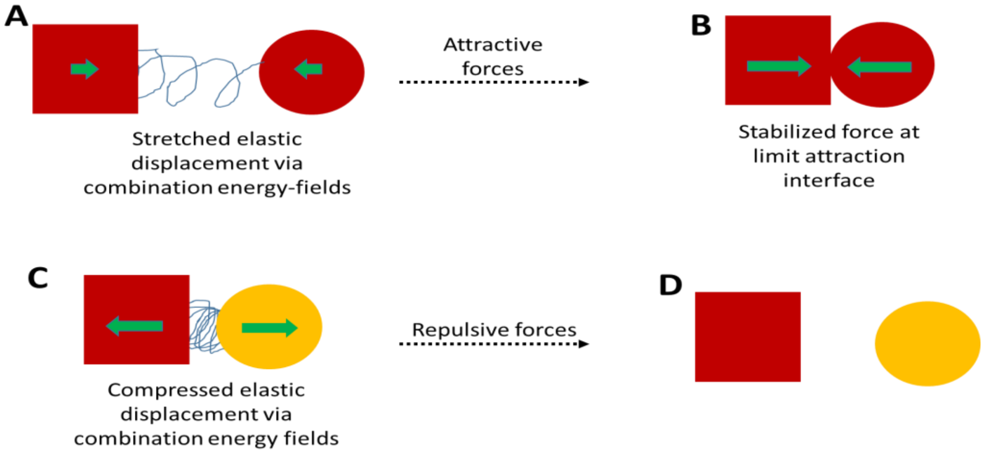

Figure 10:- Generalized models of energy field-dependent discrossing.

Simplified diagrams showing elastic-like displacements of material constructs in association with combining energy fields. (**A-B**) When an energy field-carrying construct is in suitable proximity with a neutral, but susceptible material, their respective energy fields combine so as to be analogous to a stretched spring. Unopposed, they start moving toward each other until their surfaces stabilize against further displacements (**B**). (**C-D**) When suitable construct's energy field combine, they behave like a compressed spring that cause them to be repelled from each other.

It thus proposed that ejected materialets with recirculating trajectory (EMARETs) underlie "energy fields." The EMARETs may have clockwise and counterclockwise wave-like (playdlrep) effects on each other. For gravitational energy field, as the mass of the constructs increases, it becomes increasingly destabilized/synergized to produce EMARETs of the "gravitational" type. When the gravitational EMARETs current density per cross-sectional area increases, its tendency to destabilize the typical material with much smaller mass and induce secondary EMARETs on the smaller mass increases. The consequence of inter-material induced EMARETs is a reaction/discrossing that can promote movement of the constructs toward each other (**Figure 10A-B**). In the case of electrical and magnetic energy fields, much smaller masses are inherently unstable with respect to their energy fields/waves, and the elastic sum of suitable energy field combinations promote repulsion of the material constructs (**Figure 10C-D**).

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