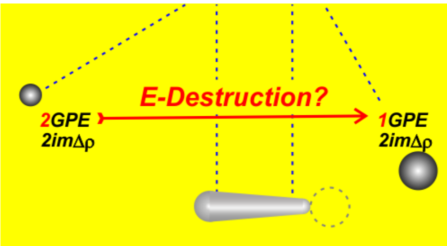
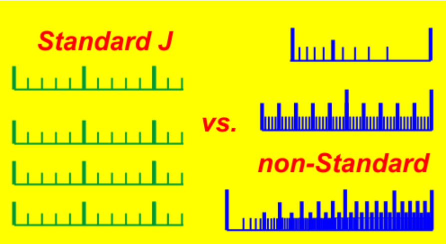
Six Duality Laws of Momentum and Energy

Guide for improving standards.

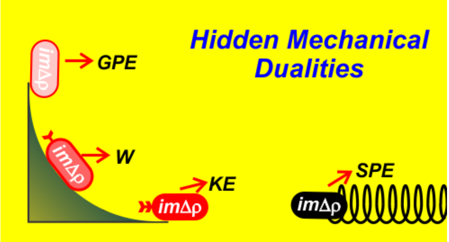
Article 5: Fifth Duality Law of Situational Energy Destruction



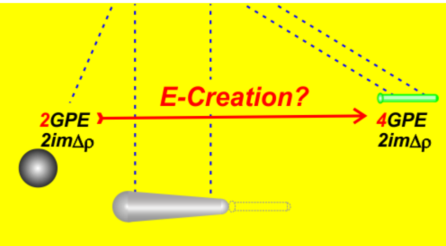
Article 3: Third Duality Law of non-Standard Energy Sizes and Varying Productivity



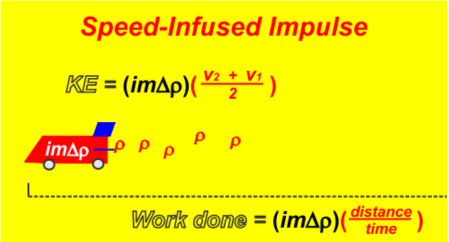
Article 1: First Duality Law of Momentum-Energy Coexistence



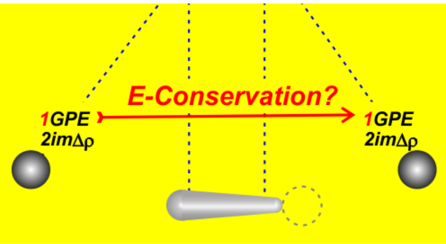
Article 4: Fourth Duality Law of Situational Energy Creation



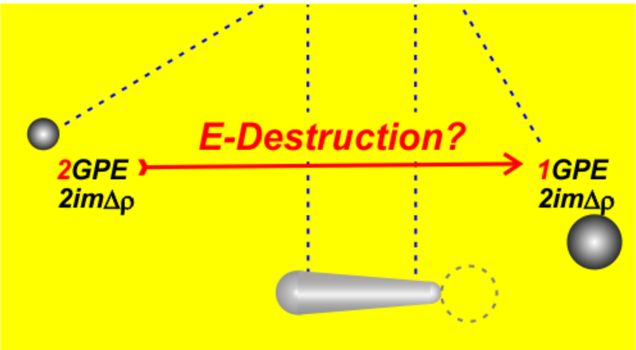
Article 2: Second Duality Law of Perceived Speedy-Impulse



Article 6: Sixth Duality Law of Situational Energy Conservation & Einstein



Six Duality Laws of
Momentum and Energy
Guide for improving standards.



5. Fifth Duality Law of Situational Energy Destruction

Du-Ane Du

www.Wacky1301SCI.com, *"Looking at serious science, sideways!"*

Mathematical Duality Law #5: Energy [speedy impulse] and energy-perception are mathematically destroyed whenever an impulse transfers momentum out of a situation with a higher joule production rate [higher speedy multiplier, J/ρ, m/s] and into a situation with a lower joule production rate. The situations can involve (1) two objects, or (2) an object and a stored/trapped state, or (3) a combination of non-standard joules and standard linearized joules [standard speedy multiplier of 0.84 J/ρ, m/s].

This is the fifth of six advanced articles on the nature of the momentum and energy duality. The 2nd duality law of perceived speedy impulse states: Energy-work is a (reward oriented, psychological) joint perception of average speed and impulse, speed-infused effort, or speedy impulse. This fact is easy to see when the derivation pattern for mechanical energy is written as follows:

$$energy = (average\ speed)(effort) = \text{"}speedy\text{-}im\Delta\rho\text{"}$$
$$energy = \left(\frac{distance}{time}\right)(im\Delta\rho) = \text{"}speedy\text{-}im\Delta\rho\text{"}$$
$$energy = \left(\frac{d}{t}\right)(Ft) = \text{"}speedy\text{-}im\Delta\rho\text{"}$$

Symbols

$im\Delta\rho$ – impulse

10 ρ = 10 kgm/s

10 ρ = 10 N*s

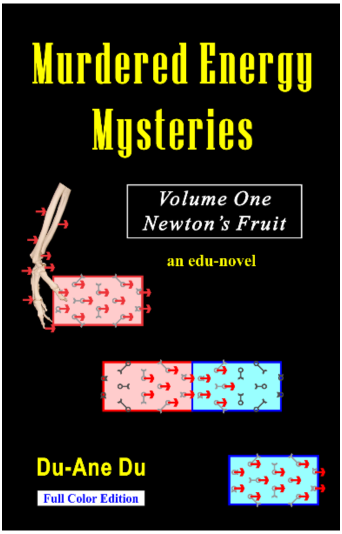
“Energy is a perception,” Devil’s Advocate says, “As a result, some situations create energy-perception, some situations destroy energy-perception, and some situations conserve energy-perception.”

Here, Article 5 will focus on situations that destroy energy, while Article 4 focused on situations that create energy, and Article 6 focuses on situations where energy-perception is conserved. (Additional advanced articles and simplified discussions can be found at www.Wacky1301SCI.com.)

“Allow this article to stretch your imagination,” Devil’s Advocate says, “like trying on a new outfit—you slip an arm in the sleeve, check the fit, see in the mirror how sharp it makes you look, and if it seems good… relax and make it your own."

Energy destruction during complete momentum transfer

Mathematically, when all of the momentum from a lighter giving object (m_G) is distributed or transferred into a heavier receiving object (M_R), the impulse/momentum-transfer can be expressed as:



Examine or purchase at Amazon.com

$$im\Delta\rho = mv_2 - mv_1$$
$$m_{Giver} < M_{Receiver}$$

$$im\Delta\rho_{Given} \rightarrow im\Delta\rho_{Recieved}$$
$$0 - m_G v_G \rightarrow M_R v_R - 0$$
$$m_G V_G = M_R v_R$$

Next, because the objects are beginning or ending at rest, the receiving object's velocity can be expressed as a mass-ratio multiple of the giving object's velocity, by dividing, as follows:

$$\frac{m_G}{M_R} V_G = v_R$$

Similarly, the mass of the heavier receiving object can be expressed as a mass-ratio multiple of the lighter giving mass, as follows:

$$\frac{M_R}{m_G} m_G = M_R$$

"This means," Devil's Advocate says, "when the beginning or ending velocity is zero, the mechanical energy [speedy impulse] involved can be found using the kinetic energy equation:"

$$KE_{"given"} \rightarrow KE_{"received"}$$
$$0 - \frac{1}{2} m_G V_G^2 \rightarrow \frac{1}{2} M_R v_R^2 - 0$$

Excellent, now the momentum relationship information can be substituted into the mechanical kinetic energy equation:

$$\frac{1}{2} m_G V_G^2 \rightarrow \frac{1}{2} \left(\frac{M_R}{m_G} m_G\right) \left(\frac{m_G}{M_R} V_G\right)^2$$

The square can be distributed, and the mass ratio information can be moved to the front and reduced, to produce:

$$KE_{"given"} \rightarrow KE_{"received"}$$
$$\frac{1}{2} m_G V_G^2 \rightarrow \frac{1}{2} \left(\frac{M_R}{m_G} m_G\right) \left(\frac{m_G}{M_R}\right)^2 (V_G^2)$$
$$\frac{1}{2} m_G V_G^2 \rightarrow \frac{M_R}{m_G} \left(\frac{m_G}{M_R}\right)^2 \left(\frac{1}{2} m_G V_G^2\right)$$
$$\frac{1}{2} m_G V_G^2 \rightarrow \frac{m_G}{M_R} \left(\frac{1}{2} m_G V_G^2\right)$$
$$KE_{"given"} \rightarrow \frac{m_G}{M_R} (KE_{"given"})$$

"This equation is telling us," Devil's Advocate says, "when all momentum is transferred from a light giving object to a heavy receiving object, the mathematical destruction of kinetic energy is always a give-receive mass ratio of the giving object's kinetic energy."

Correct! Because the giving mass has been defined as lighter, the top of the fraction will always be smaller than the bottom. Therefore:

$$KE_{"received"} = \frac{\boldsymbol{m_G}}{\boldsymbol{M_R}}(KE_{"given"})$$

$$KE_{"received"} < KE_{"given"}$$

"Very decisive," Devil's Advocate says, "clearly the destruction of mechanical energy [speedy impulse] is an undeniable fact of the equations themselves."

This situation involves starting/ending velocities of 0, and as a result, this situational energy destruction initially appears to be function of the difference in masses. However, recall that m_G is defined as smaller than M_R and $\boldsymbol{\frac{m_G}{M_R} V_G = v_R}$. This means that when the momentum moved from the greater mass to the lesser mass:

$$V_{Give} > v_{Receive}$$

And

$$0 - V_G > v_R - 0$$

$$\frac{V_G + 0}{2} > \frac{v_R + 0}{2}$$

Giving average velocity > *Receiving average velocity*

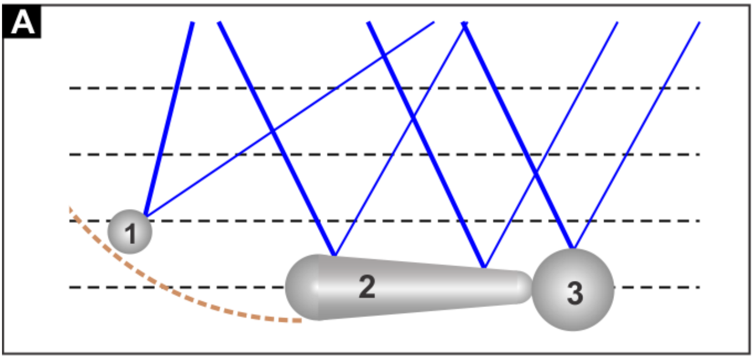
"Mechanical kinetic energy is speedy-impulse, or (impulse)(average speed)," Devil's Advocate says. "Therefore, this situational destruction of energy is actually a function of the change in average speed, and the fact that the greater mass has a smaller speedy multiplier!"

Wonderful, now this brings us to the second part of Mathematical Duality Law #5: Energy [speedy impulse] and energy-perception are mathematically destroyed whenever an impulse transfers momentum out of a situation with a higher joule production rate [higher speedy multiplier, J/ρ, m/s] and into a situation with a lower joule production rate.

Graphic example

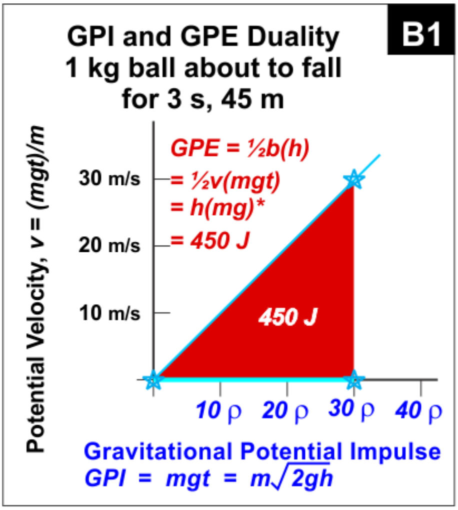
One example of situational energy destruction occurs during an inelastic collision between a moving object and a stationary object. In a home experiment, the simplest option would be to use a double pendulum where a 1 kg metal Ball-1 collides with a 2 kg piece of clay to form a 3 kg Ball-3 which swings up to a stop.

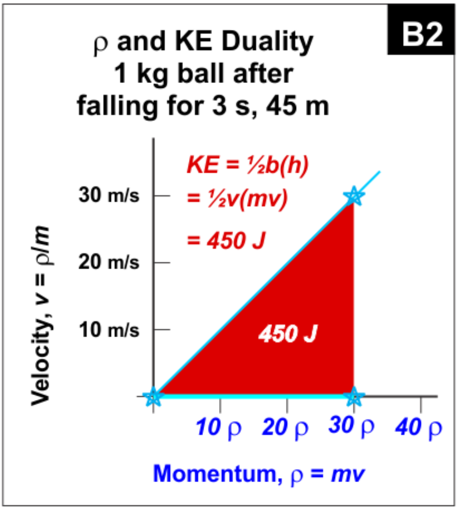
This article, however, will focus on the use of a momentum transfer cone, similar to the one used in Article 4.



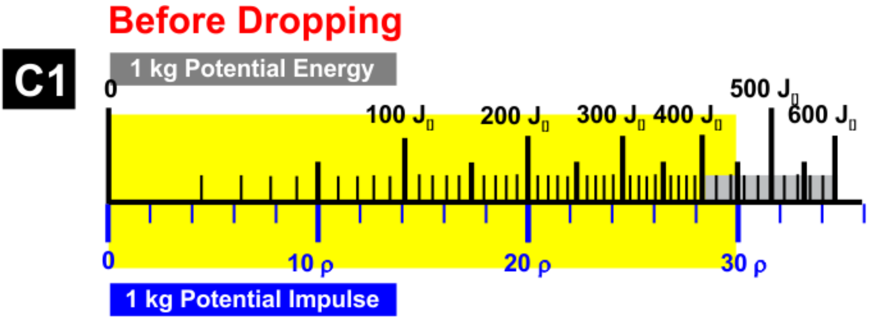
In this case, we will imagine that Ball-1 has a mass of 1 kg, the momentum transfer Cone-2 has a mass of 15 kg, and Ball-3 has a mass of 3 kg, and it is significantly wider than Ball 1. (See also, *Murdered Energy Mysteries*, Chapter 207)

Prior to the experiment, Ball-1 is raised to a height of 45 m, such that the Gravitational Potential Impulse and Gravitational Potential Energy at the top of the swing and the momentum and kinetic energy at the bottom of the swing correspond to the following graphs:





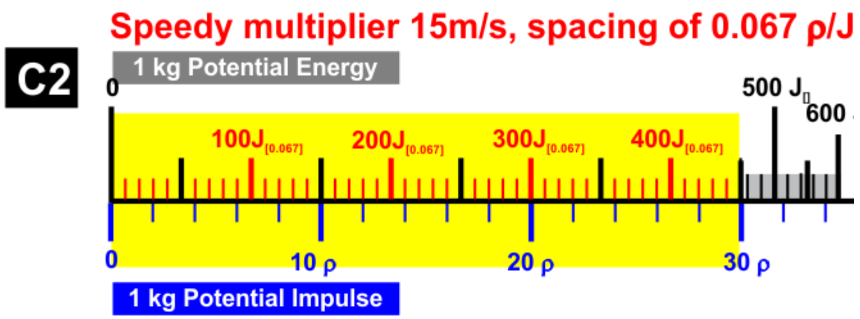
At the bottom of the swing, Ball-1 has a velocity of 30 m/s and a momentum of 30 *ρ*. The energy implications can be visualized by converting the impulse-velocity graphs into line graphs. Using the impulse and energy equations a combined line graph for the potential energy acquisition of a 1 kg object can be made, Illustration C1:



The yellow box indicates the descent data under consideration, and the bottom ticks indicate the momentum levels that Ball-1 will have as it falls. Notice that the ticks on the top energy graph are accelerating. This indicates that the ball will "gain energy" at a faster and faster rate as it falls.

"You know, this graph can be temporarily linearized," Devil's Advocate says, "to do this we average the joule tick-size for the indicated portion of the graph."

True, this is done by dividing the 30 ρ of potential impulse by the 450 J of potential energy. This produces a tick width, or impulse coefficient, of 0.067, as seen in Illustration C2:



The impulse coefficient of [0.067] indicates that the average joule involves 0.067 ρ of impulse, a speedy multiplier of $\frac{1}{0.067}$ = 15 m/s, and a joule production rate of $\frac{1}{0.067}$ = 15 J/ρ. This is consistent with the information in Graphs B1 and B2, and it reinforces the idea that energy is speed-infused impulse.

Returning to the experiment, now Ball-1 is raised to the indicate height, and released.

When Ball-1 contacts transfer Cone-2, the momentum enters the cone as a compression wave, and is transmitted to

Ball-3, which has a mass of 3 kg. Ball-3 receives the 30 ρ of momentum, and begins to move forward with a velocity of 10 m/s.

“According to the equation developed earlier,” Devil’s Advocate says, “the transfer of mechanical energy [speedy impulse] from a heavier object to a lighter object will obey the equation:”

$$KE_{"received"} = \frac{m_G}{M_R}(KE_{"given"})$$

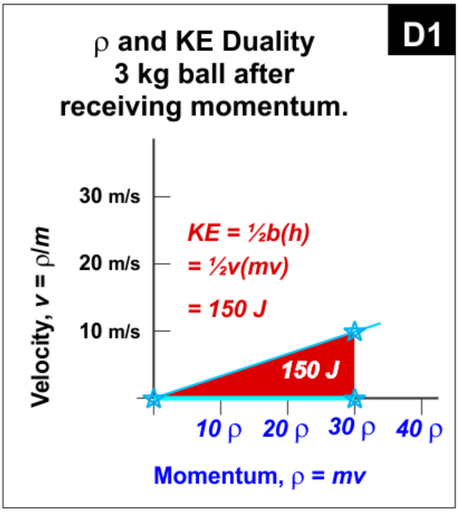
Where:

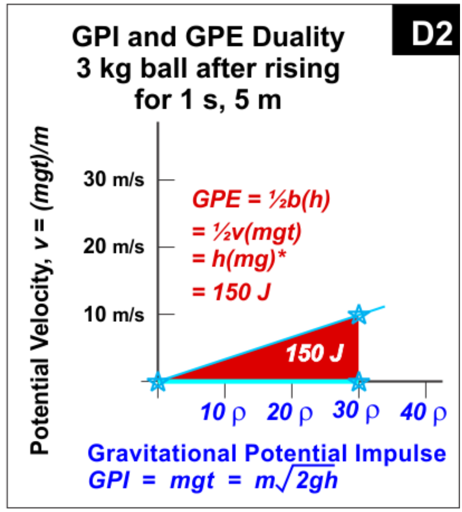
$$KE_{"given"} = 450J_{[0.067]}$$
$$M_G = 1\ kg$$
$$M_R = 3\ kg$$

$$KE_{"received"} = \frac{1\ kg}{3\ kg}(450\ J_{[0.067]})$$
$$\boldsymbol{KE_{"received"} = 150\ J_{[0.20]}}$$

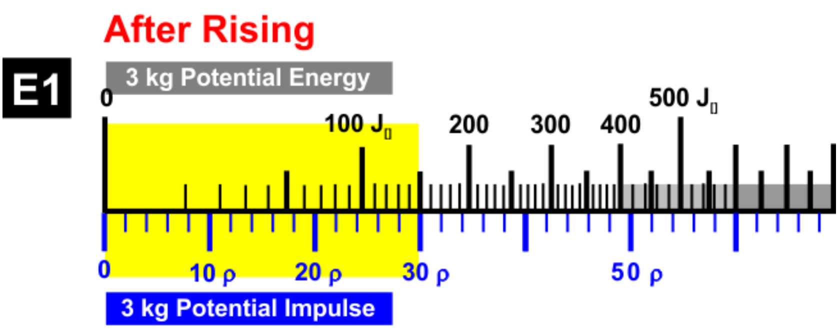
**** Note, the impulse coefficient of [0.067] means 1 $J_{[0.067]}$ involves 0.067 ρ of impulse, a speedy multiplier of $\frac{1}{0.067}$ = 15 m/s, and a joule production rate of $\frac{1}{0.067}$ = 15 J/ρ. Similarly, the impulse coefficient of [0.20] means 1 $J_{[0.20]}$ involves 0.020 ρ of impulse, a speedy multiplier of $\frac{1}{0.20}$ = 5 m/s, and a joule production rate of $\frac{1}{0.20}$ = 5 J/ρ.***

Good, once Ball-3 receives the momentum, it swings up until the momentum “becomes” Gravitational Potential Impulse. As seen in the final graphs:

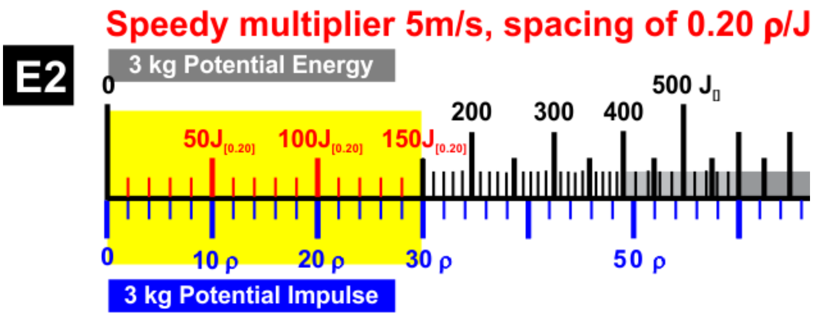




The data in these graphs can also be presented on a number line, as in Illustration E1:



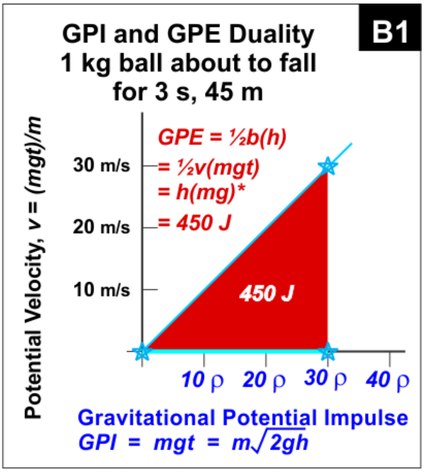
Notice that this curve is both compressed and elongated, as compared to the impulse-energy graph for the 1 kg ball. The highlighted portion of the graph can be averaged and linearized by dividing the 30 *ρ* of impulse by 150 J to determine the tick width, or impulse coefficient, of [0.20]:

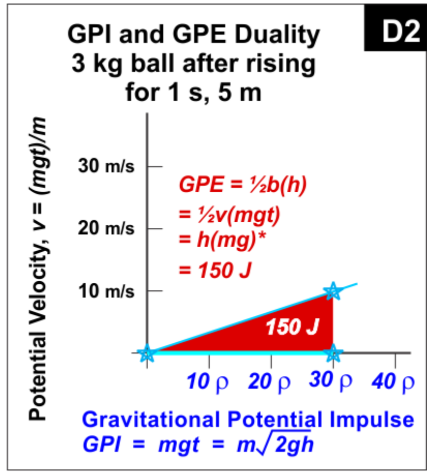


Once again, the impulse coefficient of [0.20] indicates that the average joule involves 0.2 ρ of impulse, a speedy multiplier of $\frac{1}{0.20}$ = 5 m/s, or $\frac{1}{0.20}$ = 5 J/ρ, and a tick width of 0.20 ρ/J. This is consistent with the information in Graphs D1 and D2, and it once again reinforces the idea that energy is speed-infused impulse.

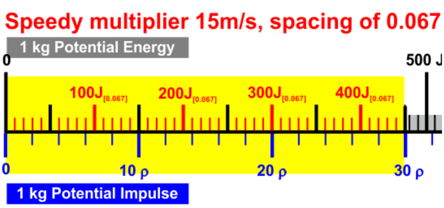
"When I compare Graphs B1 and D2," Devil's Advocate says, "I can see the amount of Gravitational Potential Impulse at the end of the experiment was the same as the beginning, 30 ρ and 30 ρ. The same can be seen in graphs C2 and E2. Momentum was never created or destroyed."

BEFORE **AFTER**

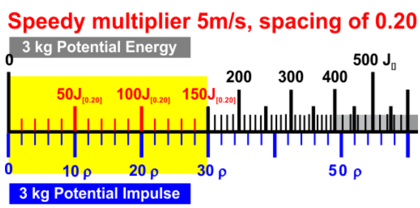




BEFORE



AFTER



However, Gravitational Potential Energy [potential speedy impulse] was mathematically destroyed. The 1 kg giving ball had a joule production rate of $\frac{1}{0.067}$ = 15 J/ρ, producing 450 $J_{[0.067]}$ with 0.067 ρ of impulse per joule, whereas the 3 kg receiving ball had a joule production rate of $\frac{1}{0.20}$ = 5 J/ρ, producing 150 $J_{[0.20]}$ with 20 ρ of impulse per joule. The energy [speed infused impulse] was mathematically destroyed by the change in joule production rate!

Now, to find out how much energy has been mathematically destroyed, the energy values must be subtracted, and that will affect the impulse coefficients.

"The impulse coefficient indicates the width of the ticks on a joules ruler," Devil's Advocate says. "If two measurements have the same impulse coefficient, then the measurements can be added or subtracted—like adding or subtracting two logarithms with the same base."

However, if the impulse coefficients are different, subtraction requires adjustment of the impulse coefficient. The equations for finding the impulse coefficient are similar to finding a weighted average:

Subtracting joules such as, **2 J[IC]** – **1 J[IC]**:

$$new\ [IC] = \frac{[IC]_2 J_2 - [IC]_1 J_1}{J_2 - J_1}$$

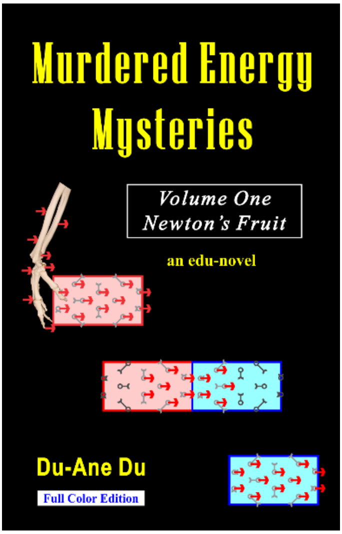
Therefore, in this situation, **150 J[0.20]** – **450 J[0.067]** :

$$new\ [IC] = \frac{(0.20)(150) - (0.067)(450)}{150 - 450}$$

$$new\ [IC] = \frac{30\ \rho - 30\ \rho}{150\ J - 450\ J} = \frac{0}{\text{-}300\ J} = [\mathbf{0.0}]$$

$$energy\ destroyed = \text{-}300\ J_{[0.0]}$$

Note that the impulse coefficient of [0.0] means the tick width is infinitely small, such that 1 $J_{[0.0]}$ involves 0.0 ρ of impulse, with a joule production rate of $\frac{1}{0.0}$ = infinity. And according to this premise, 0 x infinity = –300!



[Examine or purchase at Amazon.com]

"A speed of infinity is physically impossible," Devil's Advocate says. "And, it is mathematically impossible to have mechanical energy without impulse/momentum."

By definition, mechanical energy-work is the anti-derivative of momentum. Mechanical energy is a mathematical fusion of speed and impulse. Gravitational Potential Energy and other forms of mechanical energy are mathematically destroyed any time momentum is transferred from a lighter giving object to a heavier receiving object.

Finally, the important differences between non-standard mechanical energy and standardized joules is significantly reinforced by converting the before and after energy measurements into standard joules using the equation,

$$standard\ J = \frac{(joules)[IC]}{1.185}$$

In the above example, the before and after values become:

$$before\ standard\ J = \frac{(450)[0.067]}{1.185}$$

$$\boldsymbol{before\ standard\ J = 25.32\ J_{[1.185]}}$$

$$after\ standard\ J = \frac{(150)[0.20]}{1.185}$$
$$\boldsymbol{after\ standard\ J = 25.32\ J_{[1.185]}}$$

"The values are the same," Devil's Advocate says, "therefore standardized joules have not been destroyed. The fifth duality law of situational energy destruction only applies to non-standardized mechanical energy."

Furthermore, this points to the idea that the equations for standardized mechanical energy should be:

$$Standardized\ W = \frac{Ft}{1.185}$$
$$Standardized\ KE = \frac{mv}{1.185}$$
$$Standardized\ GPE = \frac{m\sqrt{2gh}}{1.185}$$

Note on standard linearized joules

It is important to reiterate that the situational destruction of energy is exclusive to mechanical energy.

The conclusion to Article 3 "Third Duality Law of non-Standard Energy Sizes and Varying Productivity" states: As the result of Joule's original definitions and experiments, the international treaty for units and measurements contains an unclarified assumption that energy and work are always measured at a fixed speed of 1 ft/s [English] and a fixed productivity of 0.84 J/ρ. Inconsistent adherence to that unclarified assumption has resulted in measurements that may be (1) standard linearized, with an impulse coefficient [IC] = 1.18, or

(2) multiple-linear, resulting in a wide variety of non-standard joule sizes, or (3) multi-parabolic, resulting in an infinite variety of continually changing non-standard joule sizes. (Addition or subtraction of non-standard joule sizes can produce answers that violate the law of conservation for momentum.)

"The situational destruction of mechanical energy is occurring because mechanical energy is multi-parabolic," Devil's Advocate says, "multi-parabolic mathematics involves an infinite variety of continually changing joule sizes."

Standardized joules involve linearized energy. Linearized joules are a mathematical multiple of momentum, and this joule-momentum cannot be created or destroyed. Electric-joules cannot be created or destroyed, light-joules cannot be created or destroyed, and calorie-joules cannot be created or destroyed. (See Article 3) Situational destruction of energy only occurs with the many forms of non-standardized mechanical energy.

Moment-by-Moment Joule Destruction

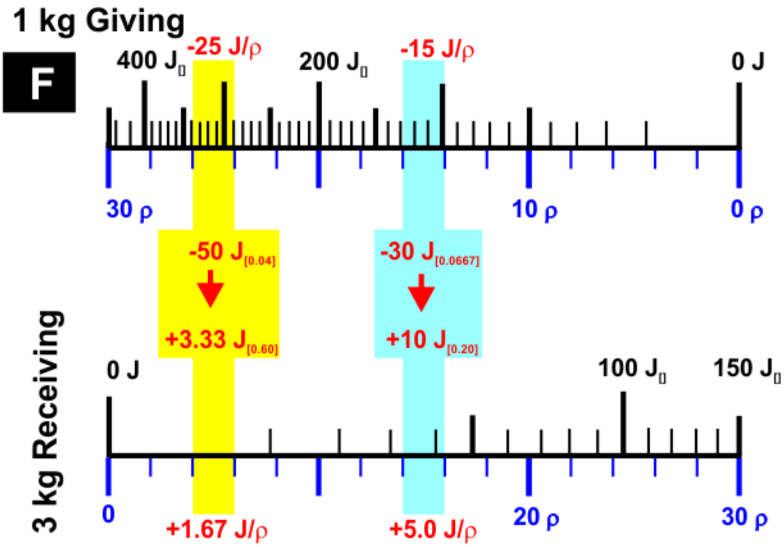
The graphic example used earlier looked at total momentum transfer. However, because of its multi-parabolic nature, a moment-by-moment examination reveals that mechanical energy is being created and destroyed at different rates at different times.

Consider now a double pendulum collision experiment where a 1 kg magnet swings downward and bounces against a 3 kg magnet, which then swings upward. Basically, the same scenario as before, only this time there is no transfer cone, so the 1 kg magnet's momentum goes directly into the 3 kg magnet.

"Momentum cannot be created or destroyed," Devil's Advocate says, "so the two magnets will experience momentum transfers that are the same, but opposite in direction. The masses are different, so the accelerations will not match, and the velocities will change at dramatically different rates."

More importantly, there will be no coordination in the average velocities from moment to moment. (There is no law of conservation for average speed!)

The following graph displays the energy levels that occur in each magnet during the momentum transfer:



The key to understanding the two events lies in the joule production rates. Recall that energy, in this case kinetic energy, is speedy impulse:

$$KE = \frac{1}{2}m_G v_2^2 - \frac{1}{2}m_G v_1^2$$
$$KE = \frac{1}{2}(v_2 + v_1)(m_G v_2 - m_G v_1)$$
$$KE = \left(\frac{v_2 + v_1}{2}\right)(im\Delta\rho)$$

Note that the impulse, or momentum transfer, is being multiplied by the average speed. The average speed is the same thing as the joule production rate:

$$J\ production = \frac{J}{\rho} = \frac{kg(\frac{m}{s})(\frac{m}{s})}{kg(m/s)} = m/s$$

In the yellow moment of Illustration F, 2 ρ of momentum are transferred between the two magnets. The 1 kg magnet has an average speed of -25 m/s, and a joule production rate of -25 J/ρ. This results in the "loss" of -50 $J_{[0.04]}$ of kinetic energy.

At the same time, the 3 kg magnet has an average speed of +1.67 m/s, and a joule production rate of +1.67 J/ρ. This causes the 3 kg magnet to "gain" +3.33 $J_{[0.60]}$ of kinetic energy. Using traditional notation, this requires a net destruction of 46.67 joules!

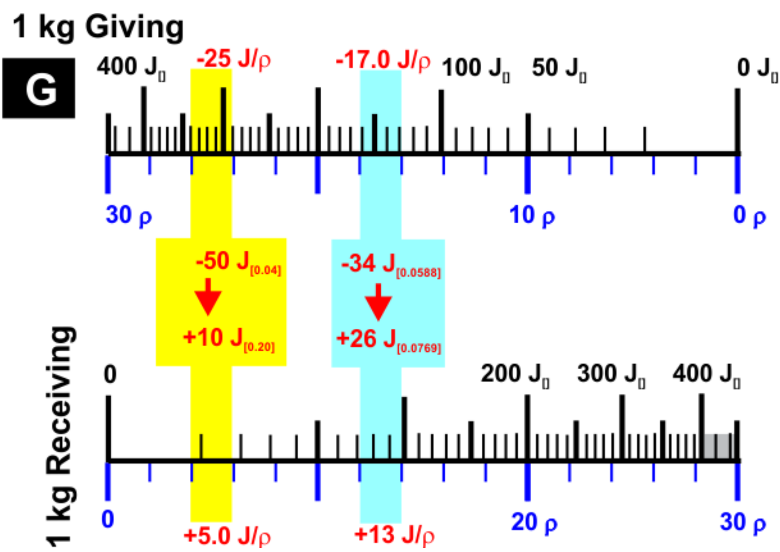
Turning to the blue moment in time, once again 2 ρ of momentum are transferred between the two magnets, but the joule production rates are different. Now the 1 kg magnet has an average speed of -15 m/s, and a joule production rate of

-15 J/ρ. This results in the "destruction" of -30 $J_{[0.0667]}$ of kinetic energy.

At the same time, the 3 kg magnet has an average speed of +5.0 m/s, and a joule production rate of +5.0 J/ρ. This causes the "creation" of +10 $J_{[0.20]}$ of kinetic energy. According to traditional notation, 20 joules of energy are destroyed in this process!

"Once again," Devil's Advocate says, "this confirms the fact that energy is destroyed whenever an impulse moves momentum from a situation with a higher joule production rate to a situation with a lower joule production rate."

Good point. As a final example, consider the pendulum collision between two 1 kg magnets:



In the yellow part of Illustration G, 2 ρ of momentum are transferred between the two magnets. The giving magnet has an average speed of -25 m/s, and a joule production rate of

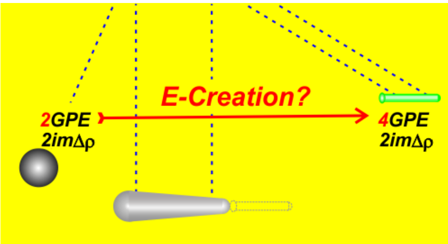
-25 J/ρ. This results in the "loss" of -50 $J_{[0.04]}$ of kinetic energy.

At the same time, the receiving magnet has an average speed of +5 m/s, and a joule production rate of +5 J/ρ. This causes the "gain" of +10 $J_{[0.2]}$ of kinetic energy. According to traditional notation, there is a net destruction of 40 joules!

Examining the blue moment in time, once again 2 ρ of momentum is transferring between the two magnets, but the average speeds are different. Now the giving magnet has an average speed of -17.0 m/s, and a joule production rate of -17.0 J/ρ. This results in the "destruction" of -34 $J_{[0.0588]}$ of kinetic energy.

At the same time, the receiving magnet has an average speed of +13 m/s, and a joule production rate of +13 J/ρ. This causes the "creation" of +26 $J_{[0.0769]}$ of kinetic energy. According to traditional notation, this results in an overall destruction of 8 joules.

CONCLUSION 1:



Fifth Duality Law of Situational Energy Destruction: Energy [speedy impulse] and energy-perception are mathematically destroyed whenever an impulse transfers momentum out of a situation with a higher joule production rate [higher speedy multiplier, J/ρ, m/s] and into a situation with a lower joule production rate. The situations can involve (1) two objects, or (2) an object and a stored/trapped state, or (3) a combination of non-standard joules and standard linearized joules [standard speedy multiplier of 0.84 J/ρ, m/s].

CONCLUSION 2: The alleged theory of "universal conservation of kinetic energy" is mathematically untenable and false. Energy [speedy impulse] is mathematically destroyed whenever momentum moves from an object with a higher joule production rate [higher speedy multiplier, J/ρ, m/s] and into an object with a lower joule production rate.

Note that the situational mathematical destruction of kinetic energy does affect the kinetic theory of heat, and the *Impulse Theory of Heat*, which is a topic for another article. (See *Murdered Energy Mysteries*, Part 3, as well as www.Wacky3101SCI.com/heat)

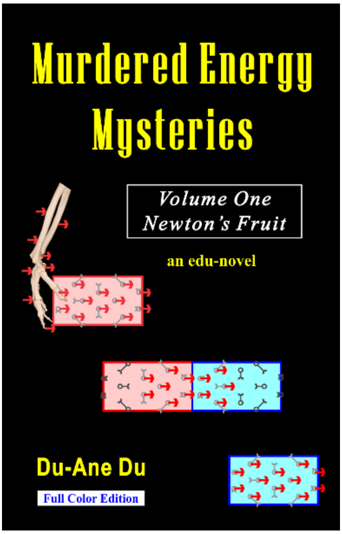
CONCLUSION 3: More research needs to be done into the relationship between mechanical energy and other theoretical forms of energy. Many common beliefs may actually be philosophical myths.

Murdered Energy Mysteries is an edu-novel that seeks to increase understanding of the various forms of momentum and momentum transfer, as well as the various forms of energy and energy transfer. The lack of understanding on the part of the scientific community is substantial, and more research needs to be done.

—Du-Ane Du, author of the edu-novel *Murdered Energy Mysteries* (Amazon, Kindle, e-book 2018, paperback 2021.)

For more information, see:

Murdered Energy Mysteries, as well as:

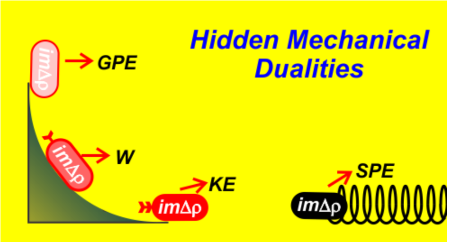


Examine or purchase at Amazon.com

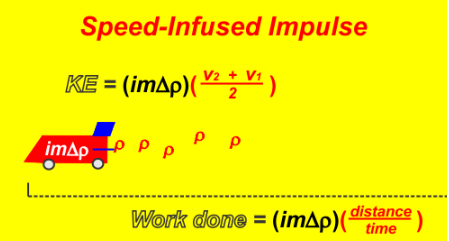
Six Duality Laws of Momentum and Energy

Guide for improving standards.

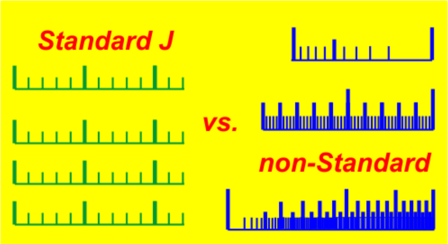
Article 1: First Duality Law of Momentum-Energy Coexistence



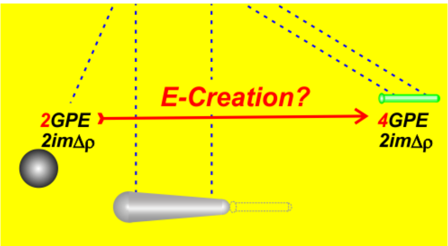
Article 2: Second Duality Law of Perceived Speedy-Impulse



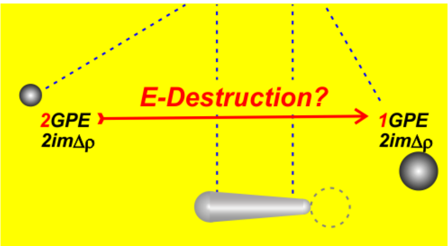
Article 3: Third Duality Law of non-Standard Energy Sizes and Varying Productivity



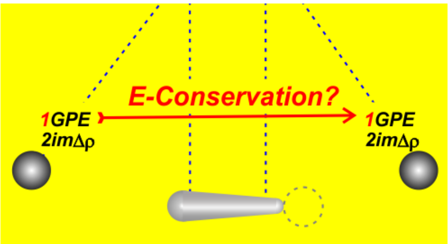
Article 4: Fourth Duality Law of Situational Energy Creation



Article 5: Fifth Duality Law of Situational Energy Destruction



Article 6: Sixth Duality Law of Situational Energy Conservation & Einstein



These advanced articles and less complex discussions of these topics are available at: www.Wacky1301SCI.com